

# Surface Water Supply of the United States 1961-65

## Part 5. Hudson Bay and Upper Mississippi River Basins

Volume 1. Hudson Bay Basin

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GEOLOGICAL SURVEY WATER-SUPPLY PAPER 1913

*Prepared in cooperation with the States  
of Minnesota and North Dakota and  
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**UNITED STATES DEPARTMENT OF THE INTERIOR**

**ROGERS C. B. MORTON, *Secretary***

**GEOLOGICAL SURVEY**

**W. A. Radlinski, *Acting Director***

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## PREFACE

This report was prepared by the U.S. Geological Survey in co-operation with the States of Minnesota and North Dakota, and with other agencies, by personnel of the Water Resources Division, E. L. Hendricks, chief hydrologist, G. W. Whetstone, assistant chief for Reports and Data Processing, under the general direction of G. A. Billingsley, chief, Reports Section, and B. A. Anderson, chief, Data Reports Unit.

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# SURFACE WATER SUPPLY OF HUDSON BAY AND UPPER MISSISSIPPI RIVER BASIN

## SCOPE OF WORK

This volume is one of a series of 37 reports presenting records of stage, discharge, and content, of streams, lakes, and reservoirs in the United States during the 1961-65 water years. Since 1888, when the U.S. Geological Survey first studied streamflow in relation to problems of irrigation, similar records have been obtained at more than 17,500 gaging stations in the 50 States. On September 30, 1965, the Geological Survey and cooperating organizations were maintaining 9,100 gaging stations. Partial-record stations for low flow or for floodflow have been operated at many other points. The records for the 1961-65 water years at gaging stations and partial-record stations in the Hudson Bay basin are given in this report.

## COOPERATION

Many State, municipal, and private organizations have cooperated with the Geological Survey in this work by either furnishing or helping to collect data. Organizations that supplied data are acknowledged in station descriptions, and organizations that assisted in the collection of data through cooperative agreements with the Survey are as follows:

Minnesota--State Department of Conservation, Division of Waters; State Department of Highways; and State Iron Range Resources and Rehabilitation Commission.

North Dakota--State Water Conservation Commission and the State Highway Department.

Assistance in the form of funds or services was given by the U.S. Department of State in collecting records published herein for 45 gaging stations; by the Corps of Engineers, U.S. Army, for 29 stations; by the Bureau of Reclamation, U.S. Department of the Interior, for 13 stations; by the Fish and Wildlife Service, U.S. Department of the Interior, for 5 stations; and by the Soil Conservation Service, U.S. Department of Agriculture, for 5 stations.

On waters adjacent to the international boundary, certain gaging stations are maintained by either the United States or by Canada under mutual agreement, and the records are obtained and compiled in a manner equally acceptable to both countries. These stations are designated herein as "international gaging stations."

## DIVISION OF WORK

The stream-gaging work was done by the Water Resources Division of the Geological Survey under the direction of personnel cited in the preface. The data for stations in the several States were collected and prepared for publication in the district offices listed below.

<u>State</u>	<u>District office</u>	<u>Address</u>
Minnesota <u>a</u> / . . . . .	St. Paul 55101. . . . .	1033 Post Office Building
Montana . . . . .	Helena 59601 . . . . .	421 Federal Building
North Dakota <u>b</u> / . . . . .	Bismarck 58501. . . . .	348 New Federal Building

a/Except for Red River of the North at Halstad but including Bois de Stoux River near White Rock, S. Dak.

b/Including Red River of the North at Halstad, Minn.

## DEFINITION OF TERMS AND ABBREVIATIONS

The terms of streamflow and other hydrologic data, as used in this report, are defined as follows:

Gaging station is a particular site on a stream, canal, lake, or reservoir where systematic observations of gage height or discharge are obtained. When used in connection with a discharge record, the term is applied herein only to those gaging stations where a continuous record of discharge is obtained.

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

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

Discharge is the volume of water in a stream which passes a given point in a unit of time.

Cubic foot per second (cfs) is the rate of discharge representing a volume of 1 cubic foot passing a given point during 1 second and is equivalent to 7.48 gallons per second or 448.8 gallons per minute.

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

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

Acre-foot (ac-ft) is the quantity of water required to cover an acre to the depth of 1 foot and is equivalent to 43,560 cubic feet or 325,851 gallons.

Cfs-day is the volume of water represented by a flow of 1 cubic foot per second for 24 hours. It is equivalent to 86,400 cubic feet, 1,983,471 acre-feet, or 646,317 gallons, and represents a runoff of 0.0372 inch from 1 square mile.

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

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

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

Drainage area of a stream above a specified location is that area, measured in a horizontal plane, enclosed by a topographic divide from which direct surface runoff from precipitation normally drains by

gravity into the river above the specified point. Figures of drainage area given herein include all closed basins, or noncontributing area, within the area unless otherwise noted.

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

#### DOWNSTREAM ORDER AND STATION NUMBER

Beginning with the series of reports for the water year ending September 30, 1951, the order of listing gaging-station records is in a downstream direction along the main stem. All stations on a tributary entering above a main-stem station are listed before that station. A station on a tributary that enters between two main-stem stations is listed between them. A similar order is followed in listing stations on first rank, second rank, and other ranks of tributaries. The rank of any tributary on which a gaging station is situated with respect to the stream to which it is immediately tributary is indicated by an indentation in the listing of gaging stations in the table of contents of this report. Each indentation represents one rank. This downstream order and system of indentation show which gaging stations are on tributaries between any two stations and the rank of the tributary on which each gaging station is situated.

The order of listing used before the publication of the 1951 report listed first all stations on the main stem from headwaters toward mouth, then all stations on the uppermost tributary to the main stem from the tributary's source to mouth, and then all stations from source to mouth of the uppermost tributary to the tributary.

As an added means of identification, each gaging station and partial-record station has been assigned a number. Numbers have been assigned in the same downstream order as described in this report. In assigning station numbers, no distinction is made between partial-record stations and regular gaging stations; the station number for a partial-record station indicates downstream-order position in a list made up of both types of stations. Gaps are left in the numbers to allow for new stations that may be established; hence the numbers are not consecutive. The complete 8-digit number for each station, such as 05-0825.00, includes the part number "05" plus a 6-digit number. In this report the nonessential zeros are not shown. For example, the complete number 05-0825.00 will appear as 5-0825, just to the left of the station name.

#### EXPLANATION OF DATA

The base data collected at gaging stations consist of records of stage and measurements of discharge. In addition, observations of factors affecting the stage-discharge relation, weather records, and other information are used as needed to supplement base data in determining the daily flow. Records of stage are obtained from a water-stage recorder that gives a continuous graph of fluctuations (for digital recorders, a tape punched at 15-, 30-, or 60-minute intervals) or from direct readings on a nonrecording gage. Measurements of discharge are made with a current meter by the general methods adopted by the Geological Survey on the basis of experience in stream gaging since 1888. These methods are described in Water-Supply Paper 888 and in U.S. Geological Survey Techniques of Water Resources Investigations, book 3, chapter A6.

Rating tables giving the discharge for any stage are prepared from stage-discharge relation curves defined by discharge measurements. If extensions to the rating curves are necessary to define the extremes of discharge, they are made on the basis of indirect measurements of peak discharge, (such as slope-area

or contracted-opening measurements, computation of flow over dams or weirs, and by other methods), velocity-area studies, and logarithmic plotting. The application of the daily mean gage height to those rating tables gives the daily mean discharge, from which the monthly and the yearly mean discharges are computed. If the stage-discharge relation is subject to change because of frequent or continual change in the physical features that form the control, the daily mean discharge is determined by the shifting-control method, in which correction factors based on individual discharge measurements and on notes by engineers and observers are used in applying the gage heights to the rating tables. If the stage-discharge relation for a station is temporarily changed by the presence of aquatic growth or debris on the control, the daily mean discharge is computed by what is basically the shifting-control method.

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

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

For some gaging stations there are periods when no gage-height record is obtained or the recorded gage height is so faulty that it cannot be used to compute the daily discharge. This happens when the recorder stops or otherwise fails to operate properly, intakes are plugged, float is frozen in the well, or for various other reasons. For such periods the daily discharges are estimated on the basis of recorded range in stage, adjoining good record, discharge measurements, weather records, and comparison with other station records from the same or nearby basins.

The data in this report generally comprise a description of the station, and tables showing the daily discharge and monthly and yearly discharges of the stream. Records are published on a water year basis which begins on October 1 and ends on September 30.

The description of the station gives the location, drainage area, records available, type and history of gages, average discharge, extremes of discharge, general remarks, and notations on revisions of the previously published record. The location of the gaging station and the drainage area are obtained from the most accurate maps available. River mileage, given under "Location" for some stations, is that determined and used by the Corps of Engineers unless otherwise noted. Under "Records available" are given the periods for which there are published records generally equivalent to those at present site. Under "Gage" are given the type of gage currently in use and the datum of the present gage above mean sea level, and a condensed history of the types, locations, and datums of previous gages used during the period of records available. The reference to "datum of 1929" and adjustments of other years are to the datum and adjustments of the U.S. Coast and Geodetic Survey. Under "Average discharge" is given the average discharge for the number of years indicated. It is not given for stations having fewer than five complete years of record or for stations where changes in water development during the period of record cause the figure to

have little significance. Under "Extremes" are given, usually in tabular form, the maximum instantaneous discharge and gage height for the current water years (1961-65); the minimum instantaneous discharge if there is little or no regulation; the minimum daily discharge if there is extensive regulation (also the minimum instantaneous discharge if it is abnormally low); and the minimum gage height if it is also abnormally low. For stations for which peak discharges are published, all independent peaks above the selected base and the time of occurrence and corresponding gage heights are published in the first table under "Extremes." The base discharge, which is given in parentheses in the table heading, is selected so that an average of about three peaks a year will be presented. Peak discharges are not published for any canals, ditches, drains, or for any stream for which the peaks are subject to substantial control by man. Time of day is expressed in 24-hour local standard time; for example, 12:30 a.m. is 0030, 1:30 p.m. is 1330. The minimums for these stations are published in a separate table following the table of peaks. In the paragraph following the current data, the data given are for the periods of record within the calendar year dates in the heading (not necessarily those for the complete years indicated by the heading dates). Reliable information concerning major floods that have occurred outside the period of record are given in the last paragraph under "Extremes." Unless otherwise qualified, the maximum discharge corresponds to the crest stage obtained by use of a water-stage recorder (graphic or digital), a crest-stage gage, or a nonrecording gage read at the time of the crest. If the maximum gage height did not occur at the same time as the maximum discharge, it is given separately. Information pertaining to the accuracy of the records and conditions which affect the natural flow at the gaging station is given under "Remarks."

Previously published records of some stations have been found to be in error on the basis of data or information later obtained. Revisions of such reports are usually published along with the current records in one of the annual or compilation reports. In order to make it easier to find such revised records, a paragraph headed "Revisions (water years)" has been added to the description of all stations for which revised records have been published. Listed therein are all the reports in which revisions have been published, each followed by the water years for which figures are revised in that report. In listing the water years only one number is given; for instance, 1933 stands for the water year October 1, 1932, to September 30, 1933. If no daily, monthly, or annual figures of discharge are concerned in the revision, the fact is brought out by notations after the year dates as follows: "(M)" means that only the instantaneous maximum discharge was revised; "(m)" that only the instantaneous minimum was revised; and "(P)" that only peak discharges were revised. If the drainage area has been revised, the report in which the revised figure was first published is given. It should be noted that for all stations for which cubic feet per second per square mile and runoff in inches are published, a revision of the drainage area necessitates corresponding revision of all figures based on the drainage area. Revised figures of cubic feet per second per square mile and runoff in inches resulting from a revision of the drainage area only are usually not published in the annual series of reports.

The daily table gives the discharge corresponding to the daily mean gage height unless there are large or rapid changes in the discharge during a day. For days having large or rapid changes, discharge for the day is computed by averaging the mean discharge for several parts of the day. For digital recorders, the daily mean discharge is always the average of the discharges at each punched reading. For stations equipped with non-recording gages, the daily discharge corresponds to once-daily readings of the gage or to the mean of twice-daily readings; but for periods of rapidly changing stage, the discharge is determined from gage-height graph based on gage readings.

In the monthly summary below the daily table, the line headed "TOTAL" gives the sum of the daily figures; it is the total cfs-days for the month. The line headed "MEAN" gives the average flow in cubic

feet per second during the month. On the line headed "MAX" the figures are the maximum daily discharges for the months, not the momentary maximum discharges. Likewise, the line headed "MIN" are the minimum daily discharges for the months. Discharge for the month may be expressed in cubic feet per second per square mile (line headed "CFSM"), or in inches (line headed "IN"), or in acre-feet (line headed "AC-FT"). Figures for cubic feet per second per square mile and runoff in inches are omitted if the drainage area includes large noncontributing areas, or if the average annual rainfall over the drainage basin is usually less than 20 inches, or if the flow is appreciably affected by regulation by upstream reservoirs.

In the yearly summary below the monthly summary, the figures of maximum are the maximum daily discharges for the calendar and water years; likewise, the minimums are the minimum daily discharges.

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

For most gaging stations on lakes and reservoirs the data presented comprise a description of the station and a monthly summary table of stage and contents. For some reservoirs a table showing daily contents or stage is given. A skeleton table of capacity at given stages is published for all reservoirs for which records are published on a daily basis, but is not published for reservoirs for which only monthly data are given.

#### ACCURACY OF FIELD DATA AND COMPUTED RESULTS

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

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

In earlier reports the figures of daily mean discharge, computed manually, were usually rounded to tenths below 10 cfs, but the rounding rules were not rigid; some discharges were given to hundredths if the accuracy was sufficiently good and others were rounded to whole numbers if the accuracy was poor. In this report, however, most of the tables of daily mean discharge are tabulated by a computer which rounds the figures solely on basis of the magnitude of the discharge. Therefore, zeros to the right of the decimal point should not be construed to indicate an accuracy greater than is stated in the "Remarks" paragraph.

Discharge at some stations, as indicated by the monthly mean, may vary widely from natural runoff, owing to diversion, consumption, regulation by storage, increase or decrease in evaporation due to artifi-

cial causes, or to other factors. For such stations, figures of cubic feet per second per square mile and of runoff in inches are not published unless satisfactory adjustments can be made for diversions, for changes in contents of reservoirs, or for other changes incident to use and control. Evaporation from a reservoir is not included in the adjustments for changes in reservoir contents, unless it is so stated. Even at those stations where adjustments are made, large errors in computed runoff may occur if adjustments or losses are large in comparison with the observed discharge.

#### OTHER DATA AVAILABLE

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

Information of a more detailed nature than that published for most of the gaging stations is on file in the district offices, such as discharge measurements, gage-height records, and rating tables. Many gaging-station records have been analyzed to give several statistical summaries, mainly: (1) the number of days in each year that the daily discharge was between selected limits (duration tables); (2) the lowest mean discharge for selected numbers of consecutive days in each year; and (3) the highest mean discharge for selected numbers of consecutive days in each year.

At or near some gaging stations, water-quality records also are collected. Data are obtained on the chemical quality of the stream water, on water temperature, on suspended-sediment concentration, and on the particle-size distribution of suspended sediment and bed material. Under "Remarks" of the station description, reference is made to water-quality records collected on a regular basis for that station. Results of the data collected are published in water-supply papers entitled "Quality of Surface Waters of the United States," and in annual reports issued by States beginning with the 1961 water year. These annual reports are entitled, "Water Resources Data for (state). Part 2, Water Quality Records." Information on the availability of electronic computer analyses, unpublished data, or quality of water records may be obtained from the district offices listed on page 1.

#### PUBLICATIONS

Through September 30, 1960, the records of discharge and stage of streams and contents and stage of lakes or reservoirs were published in an annual series of U.S. Geological Survey water-supply papers entitled "Surface Water Supply of the United States." Prior to 1951, there were 14 volumes in the series; one for each of the 14 parts whose boundaries coincided with certain natural drainage lines within the conterminous United States. From 1951 to 1960, there were 20 volumes in the series, including one each for the States of Alaska and Hawaii.

This report marks the beginning of a new series of water-supply papers to be published on a 5-year basis. This series covers the 5-year period October 1, 1960, to September 30, 1965. To meet interim requirements, streamflow and related data have been released by the Geological Survey in annual reports, beginning with the 1964 water year, by State. These reports are entitled, "Water Resources Data for (state), Part 1, Surface Water Records." Distribution of these reports is limited and primarily for local

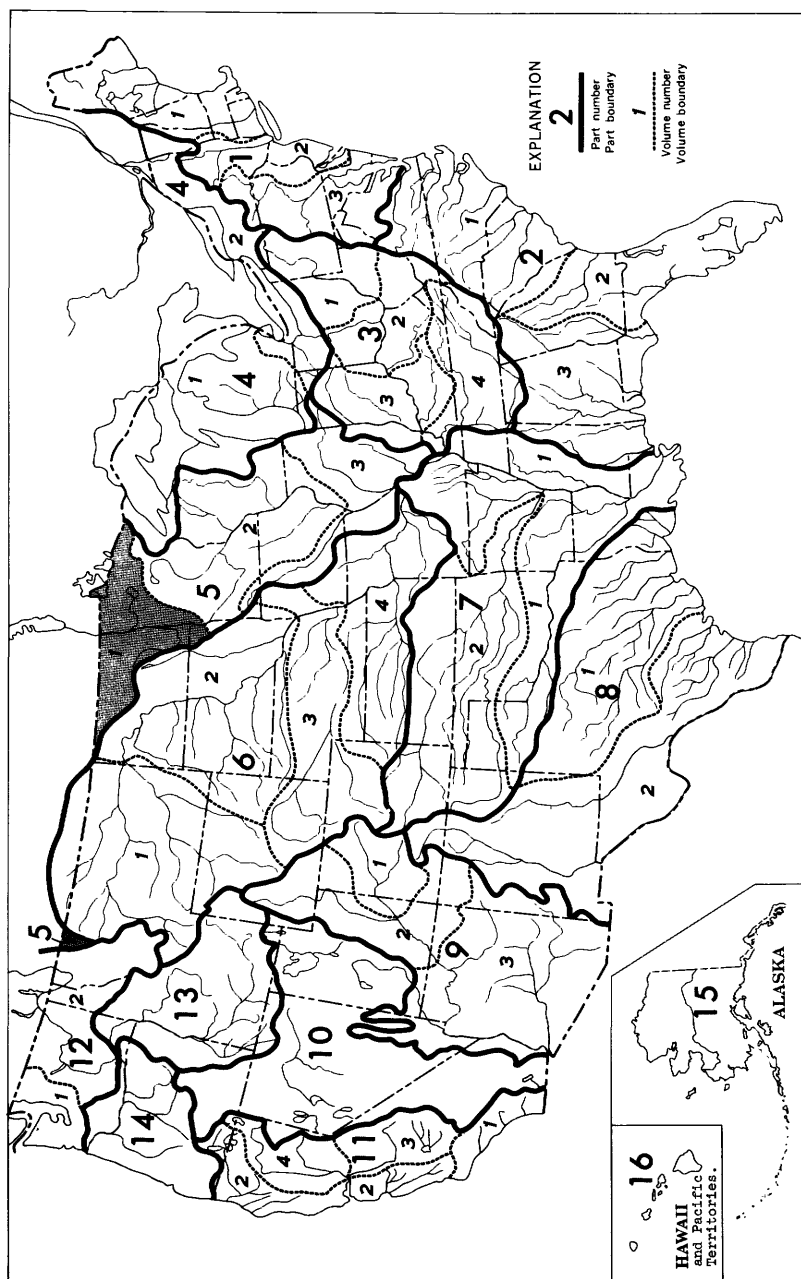


Figure 1.--Map of the United States showing area covered by the volumes in the series on surface-water supply. The area covered by this report is shaded.

needs. Any revision or corrections found necessary to the records published in these annual State reports have been made and published herein without reference.

This series of 5-year water supply papers consists of 37 volumes. The boundaries of the various parts and volumes within the parts are indicated in the following list and on the map in figure 1.

- Part 1. North Atlantic slope basins, in three volumes:
  - Volume 1: Basins from Maine to Connecticut
  - Volume 2: Basins from New York to Delaware
  - Volume 3: Basins from Maryland to York River
- Part 2. South Atlantic slope and eastern Gulf of Mexico basins, in three volumes:
  - Volume 1: Basins from James River to Savannah River
  - Volume 2: Basins from Ogeechee River to Carrabelle River
  - Volume 3: Basins from Apalachicola River to Pearl River
- Part 3. Ohio River basin, in four volumes:
  - Volume 1: Ohio River basin above Kanawha River
  - Volume 2: Ohio River basin from Kanawha River to Louisville, Kentucky
  - Volume 3: Ohio River basin from Louisville, Kentucky, to Wabash River
  - Volume 4: Ohio River basin below Wabash River
- Part 4. St. Lawrence River basin, in two volumes:
  - Volume 1: Basins of streams tributary to Lakes Superior, Michigan, and Huron
  - Volume 2: St. Lawrence River basin below Lake Huron
- Part 5. Hudson Bay and Upper Mississippi River basins, in three volumes:
  - Volume 1: Hudson Bay basin
  - Volume 2: Upper Mississippi River basin above Keokuk, Iowa
  - Volume 3: Upper Mississippi River basin below Keokuk, Iowa
- Part 6. Missouri River basin, in four volumes:
  - Volume 1: Missouri River basin above Williston, North Dakota
  - Volume 2: Missouri River basin from Williston, North Dakota, to Sioux City, Iowa
  - Volume 3: Missouri River basin from Sioux City, Iowa, to Nebraska City, Nebraska
  - Volume 4: Missouri River basin below Nebraska City, Nebraska
- Part 7. Lower Mississippi River basin, in two volumes:
  - Volume 1: Lower Mississippi River basin except Arkansas River basin
  - Volume 2: Arkansas River basin
- Part 8. Western Gulf of Mexico basins, in two volumes:
  - Volume 1: Basins from Mermentau River to Colorado River
  - Volume 2: Basins from Lavaca River to Rio Grande
- Part 9. Colorado River basin, in three volumes:
  - Volume 1: Colorado River basin above Green River
  - Volume 2: Colorado River basin from Green River to Compact Point
  - Volume 3: Lower Colorado River basin
- Part 10. The Great Basin
- Part 11. Pacific Slope basins in California, in four volumes:
  - Volume 1: Basins from Tia Juana River to Santa Maria River
  - Volume 2: Basins from Arroyo Grande to Oregon State line except Central Valley
  - Volume 3: Southern Central Valley basins
  - Volume 4: Northern Central Valley basins
- Part 12. Pacific Slope basins in Washington, in two volumes:
  - Volume 1: Pacific Slope basins in Washington except Columbia River basin
  - Volume 2: Upper Columbia River basin
- Part 13. Snake River basin
- Part 14. Pacific Slope basins in Oregon and Lower Columbia River basin
- Part 15. Alaska
- Part 16. Hawaii and other Pacific areas

Water-supply papers and other publications of the Geological Survey containing data on the water resources of the United States may be purchased or consulted as follows:

1. Copies may be purchased from the Superintendent of Documents, Government Printing Office, Washington, D. C. 20402, who will, on application, furnish lists giving prices. A list of Geological Survey publications may also be obtained by applying to the Director, Geological Survey, Washington, D. C. 20242.

2. Sets of the reports may be consulted in the libraries of the principal cities in the United States.

3. Sets are available for consultation in the offices of the Water Resources Division of the Geological Survey. Addresses of the offices in the area covered by this report are given on page 1.

Early records of the flow of streams in the United States are published in the reports listed below. In many of these reports records for years earlier than those indicated have been included for some streams. Most of these reports are out of print, but may be available for consultation in the district offices and in public libraries.

Streamflow data for the years 1884-1901, in reports of the Geological Survey

(A - Annual Report; B - Bulletin)

Report	Character of data	Year
10th A, pt. 2	Descriptive information only.	
11th A, pt. 2	Monthly discharge and descriptive information . . . . .	1844 to September 1890
12th A, pt. 2	. . . . do . . . . .	1844 to June 30, 1891.
13th A, pt. 3	. . . . do . . . . .	1884-92.
14th A, pt. 3	Monthly discharge. . . . .	1888-93.
B 131. . . .	Descriptions, measurements, gage heights, and ratings. . . .	1893-94.
16th A, pt. 2	Descriptive information only.	
B 140. . . .	Descriptions, measurements, gage heights, ratings and monthly discharge.	1895.
WSP 11. . . .	Gage heights. . . . .	1896.
18th A, pt. 4	Descriptions, measurements, ratings, and monthly discharge.	1895-96.
WSP 15. . . .	Descriptions, measurements, and gage heights of streams east of the Mississippi River, and Missouri River and tributaries above Kansas River.	1897.
WSP 16. . . .	Descriptions, measurements, and gage heights of streams west of the Mississippi River, except Missouri River and tributaries above Kansas River.	1897.
19th A, pt. 4	Descriptions, measurements, ratings, and monthly discharge.	1897.
WSP 27. . . .	Measurements, ratings, and gage heights of streams east of the Mississippi River, and Missouri River and tributaries.	1898.
WSP 28. . . .	Measurements, ratings, and gage heights of streams west of the Mississippi River, except Missouri River and tributaries.	1898.
20th A, pt. 4	Monthly discharge. . . . .	1898.
WSP 35 to 39.	Descriptions, measurements, gage heights, and ratings . . . .	1899.
21st A, pt. 4	Monthly discharge. . . . .	1899.
WSP 47 to 52	Descriptions, measurements, gage heights, and ratings . . . .	1900.
22nd A, pt. 4	Monthly discharge. . . . .	1900.
WSP 65, 66. .	Descriptions, measurements, gage heights, and ratings . . . .	1901.
WSP 75. . . .	Monthly discharge. . . . .	1901.

Reports on surface water supply containing records from 1899 to date for drainage basins in this report are listed below. The data for any particular gaging station will, in general, be found in the reports covering the years during which the station was maintained.

Numbers of water-supply papers containing results of stream measurements in Hudson Bay basin, 1899-1960

Year	WSP	Year	WSP	Year	WSP	Year	WSP	Year	WSP
1899	36	1912	325	1925	605	1937	825	1949	1145
1900	49	1913	355	1926	625	1938	855	1950	1175
1901	66, 75	1914	385	1927	645	1939	875	1951	1208
1902	85	1915	405	1928	665	1940	895	1952	1238
1903	99, 100	1916	435	1929	685	1941	925	1953	1278
1904	130	1917	455	1930	700	1942	955	1954	1338
1905	171	1918	475	1931	715	1943	975	1955	1388
1906	207	1919-20	505	1932	730	1944	1005	1956	1438
1907-8	245	1921	525	1933	745	1945	1035	1957	1508
1909	265	1922	545	1934	760	1946	1055	1958	1558
1910	285	1923	565	1935	785	1947	1085	1959	1628
1911	305	1924	585	1936	805	1948	1115	1960	1708

Records for the area covered by this report have been compiled through September 1950 and for the period October 1950 to September 1960 and published in Water-Supply Papers 1308 and 1723, respectively. These reports contain a summary of monthly and annual discharges for all previously published records as well as some records not contained in the annual series of water-supply papers. All records were re-examined and revised where warranted. Estimates of discharge were made to fill short gaps whenever practical.

The reports listed in the foregoing tables contain the customary records of discharge collected during the systematic operation of gaging stations. Detailed information on the stage and discharge of many streams during major floods has been included in special reports on these floods published by the Geological Survey. The more recent of these special reports also contain other pertinent hydrologic information and analyses and compilations of data relating to earlier notable floods. The following list gives the numbers and titles of these reports:

<u>WSP</u>	<u>Title</u>
162. . . . .	Destructive flood in the United States in 1905.
771. . . . .	Floods in the United States, magnitude and frequency.
847. . . . .	Maximum discharges at stream-measurement stations through September 1938.
1137-B. . . .	Floods of 1950 in the Red River of the North and Winnipeg River basins.
1260-C. . . .	Floods of 1952 in the upper Mississippi River and Red River of the North basins.
1320-E. . . .	Summary of floods in the United States during 1953.
1455-B. . . .	Summary of floods in the United States during 1955.
1678. . . . .	Magnitude and frequency of floods in the United States.
1820. . . . .	Summary of floods in the United States during 1962.
1840-B. . . .	Floods of June 1964 in Northwestern Montana.
1850-E. . . .	Summary of floods in the United States during 1965.

Reports giving records of chemical quality and temperature of surface water and suspended-sediment loads of streams in the area covered by this volume for the water years 1941-65 are listed below:

Numbers of water-supply papers containing water-quality records  
in Hudson Bay basin, 1941-65

Year	WSP	Year	WSP	Year	WSP	Year	WSP	Year	WSP
1941	942	1946	1050	1951	1198	1956	1451	1961	1883
1942	950	1947	1102	1952	1251	1957	1521	1962	1943
1943	970	1948	1132	1953	1291	1958	1572	1963	1949
1944	1022	1949	1162	1954	1351	1959	1643	1964	1956
1945	1030	1950	1187	1955	1401	1960	1743	1965	1963

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

Records of discharge have been collected by other agencies at numerous sites throughout the United States that are not published by the Geological Survey. The Office of Water Data Coordination, Water Resources Division, U.S. Geological Survey, Washington, D. C. 20242, maintains an index of such sites. Information on records available in specific sites can be obtained upon request.

## GAGING-STATION RECORDS

## HUDSON BAY BASIN

## SASKATCHEWAN RIVER BASIN

5-0100. Belly River at international boundary

(International gaging station)

Location.--Lat 48°59'50", long 113°40'50", in NW $\frac{1}{4}$  sec.2, T.37 N., R.16 W. (unsurveyed), on right bank 200 ft upstream from international boundary, 11 miles southeast of Waterton Park, Alberta, and 15 miles northwest of Babb, Mont.

Drainage area.--74.8 sq mi.

Records available.--May 1947 to September 1964, discontinued (no winter records after 1957). Prior to May 20, 1964, records above 1,000 cfs may be in error owing to undetermined amount of bypass flow.

Gage.--Water-stage recorder. Altitude of gage is 4,500 ft (from topographic map). Prior to Sept. 26, 1947, staff gage at same site and datum.

Average discharge.--10 years (1947-57), 262 cfs (189,700 acre-ft per year).

Extremes.--Maximums (discharge in cubic feet per second, gage height in feet), for the water years 1961-64 are contained in the following table:

Water year	Date	Discharge	Gage height	Water year	Date	Discharge	Gage height
1961	May 28, 1961	1,630	5.42	1963	June 11, 1963	1,320	4.90
1962	June 19, 1962	790	3.91	1964	June 8, 1964	a 12,070	10.16

a About.

Minimum discharge not determined.

1947-64: Maximum discharge, about 12,000 cfs June 8, 1964 (gage height, 10.16 ft), from rating curve extended above 2,000 cfs by logarithmic plotting and comparison with station near Mountain View, Alberta; minimum daily recorded, 12 cfs Feb. 12, 13, 1949.

Remarks.--Records good except those for winter periods and those above 1,000 cfs, which are poor. No regulation or diversion.

Cooperation.--This is one of a number of stations which are maintained jointly by the United States and Canada.

Revisions (water years).--WSP 1308: 1947.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	84	84						-	1,250	461	230	152
2	82	82						-	1,210	426	226	170
3	79	80						-	1,180	409	222	160
4	79	78						-	1,190	404	222	141
5	73	72						-	1,280	417	226	141
6	72	70						-	1,400	457	230	141
7	76	68						-	1,450	461	226	141
8	79	66						-	1,340	466	222	138
9	78	64						-	1,160	457	226	129
10	78	63						-	954	439	214	129
11	79	60						-	844	426	198	131
12	85	60						-	856	413	180	124
13	82	56						-	883	382	174	* 118
14	79	56						-	856	369	174	112
15	78	50						-	856	369	170	107
16	74	54						* 422	900	426	174	104
17	72	46						439	* 972	417	170	100
18	70	46						404	1,050	395	166	111
19	70	48						400	1,060	360	163	114
20	67	44						466	1,010	329	160	124
21	68	46						599	938	316	157	129
22	66	55						817	844	312	155	127
23	68	58						1,040	734	321	155	127
24	70	75						1,250	670	321	160	124
25	76	100						1,430	655	307	170	127
26	76	105						1,510	660	294	166	124
27	80	100						1,600	655	268	157	120
28	84	95						1,540	612	264	152	122
29	84	90						1,310	563	268	143	127
30	85	85			-----			1,310	519	255	141	124
31	80	-----			-----		-----	1,330	-----	242	143	-----
TOTAL	2,373	2,053	-	-	-	-	-	-	28,551	11,451	5,672	3,838
MEAN	76.5	68.4	-	-	-	-	-	-	952	369	183	128
MAX	85	105	-	-	-	-	-	-	1,450	466	230	170
MIN	66	44	-	-	-	-	-	-	519	242	141	100
CFSM	1.02	.91	-	-	-	-	-	-	12.7	4.94	2.45	1.71
IN	1.18	1.02	-	-	-	-	-	-	14.20	5.69	2.92	1.91
AC-FT	4,710	4,070	-	-	-	-	-	-	56,630	22,710	11,250	7,610

\* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 4, 8-30.

## 5-0100. Belly River at international boundary--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DAY	UCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	114	b 140	50					-	655	527	312	124
2	111	b 135	55					-	617	514	294	129
3	112	b 125	50					-	604	470	290	124
4	120	b 120	50					-	586	422	281	120
5	143	b 105	50					-	536	382	281	114
6	163	b 95	50					-	479	365	290	111
7	184	b 105	50					-	435	343	281	116
8	184	107	45					-	435	338	272	114
9	180	107	45					-	541	343	251	112
10	177	104	40					-	605	360	234	114
11	191	107	40					-	696	373	226	135
12	194	102	45					-	665	387	222	149
13	198	b 105	-					-	685	382	213	149
14	222	91	-					-	756	373	210	149
15	268	b 90	-					-	* 724	356	206	149
16	312	b 80	-					* 479	680	343	194	141
17	360	b 85	-					497	707	334	* 191	138
18	343	b 85	-					554	768	316	188	135
19	321	b 80	-					640	778	299	177	133
20	261	b 75	-						756	277	163	131
21	242	b 60	-					645	718	264	157	129
22	222	b 65	-					617	680	264	157	127
23	202	b 60	-					630	635	281	157	124
24	191	b 60	-					635	630	299	149	122
25	177	b 55	-						645	316	133	120
26	184	b 55	-					622				
27	184	b 60	-					612	680	325	133	118
28	166	b 55	-					645	670	338	135	118
29	b 152	b 50	-					712	608	369	133	118
30	138	b 55	-					756	941	391	143	127
31	135	-	-					724	523	365	138	122
TOTAL	6,171	2,598	-	-	-	-	-	-	19,098	11,050	6,341	3,812
MEAN	199	86.6	-	-	-	-	-	-	637	456	205	127
MAX	360	140	-	-	-	-	-	-	778	527	312	149
MIN	111	50	-	-	-	-	-	-	435	264	131	111
CFSM	2.66	1.16	-	-	-	-	-	-	8.51	4.77	2.73	1.70
IN+	3.07	1.29	-	-	-	-	-	-	9.50	5.49	3.15	1.90
AL-FI	12,240	5,150	-	-	-	-	-	-	37,880	21,920	12,580	7,560

\* Discharge measurement made on this day.

b Stage-discharge relation affected by ice.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963

DAY	UCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	118	143	169					-	905	784	243	118
2	* 116	138	b 155					-	828	707	232	118
3	114	133	b 145					-	812	660	222	120
4	107	129	b 130					-	916	680	218	118
5	102	127	108					-	978	696	215	120
6	100	123	125					-	1,060	712	215	120
7	97	118	112					-	938	712	218	123
8	102	123	105					-	844	712	222	125
9	100	110	100					-	806	675	229	127
10	99	116	b 95					-	1,200	612	240	127
11	97	118	b 95					-	1,270	550	258	138
12	114	120	b 90					-	1,150	497	254	138
13	169	118	88					-	1,130	453	246	136
14	215	108	88					* 326	1,070	426	243	145
15	226	102	93					362	1,030	417	* 236	141
16	212	b 95	114					396	966	400	222	143
17	196	b 90	129					435	944	379	209	138
18	172	b 85	136					483	910	354	193	127
19	195	b 95	136					475	878	342	186	120
20	153	131	b 130					461	812	338	183	114
21	153	150	b 120					483	762	342	172	108
22	172	150	-					523	762	350	161	108
23	205	b 135	-					568	685	346	150	116
24	212	b 130	-					650	599	334	141	110
25	205	150	-					724	554	318	141	108
26	196	205	-					800	545	290	138	105
27	175	215	-					790	527	266	131	105
28	166	b 200	-					734	527	254	127	105
29	155	b 185	-					729	645	243	120	105
30	150	180	-					817	795	236	118	107
31	145	-	-					910	-	229	118	-
TOTAL	4,998	4,022	-	-	-	-	-	-	25,848	14,314	6,001	3,633
MEAN	152	134	-	-	-	-	-	-	862	462	194	121
MAX	226	215	-	-	-	-	-	-	1,270	784	258	145
MIN	97	85	-	-	-	-	-	-	527	229	118	105
CFSM	2.03	1.79	-	-	-	-	-	-	11.5	6.17	2.59	1.62
IN+	2.34	2.00	-	-	-	-	-	-	12.85	7.12	2.98	1.81
AL-FI	9,320	7,980	-	-	-	-	-	-	51,270	28,390	11,900	7,210

\* Discharge measurement made on this day.

b Stage-discharge relation affected by ice.

## 5-0100. Belly River at international boundary--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DAY	UCI.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	105	49	b 90	b 55	b 45			-	635	665	322	143
2	* 102	63	b 89					-	758	685	310	145
3	100	79	83					-	934	823	278	158
4	97	76	77					-	* 1,200	830	250	175
5	97	75	75					-	1,350	810	260	180
6	97	74	b 75					-	1,410	764	250	177
7	93	75	b 70					-	1,570	721	240	177
8	88	75	b 65	b 45				-	6,200	721	236	169
9	83	72	b 60					-	7,830	758	236	158
10	80	71	b 55					-	3,520	758	243	150
11	77	67	b 50					-	2,080	763	232	143
12	76	65	b 50					* 400	1,810	660	220	136
13	75	66	b 50	b 40	b 40			466	1,740	650	218	129
14	74	66	b 55					485	1,690	600	215	123
15	74	77	b 55					466	1,500	665	205	116
16	72	37	b 55					457	1,310	630	196	114
17	72	90	b 55					527	1,180	* 58	189	114
18	74	86	b 55	b 35	b 35			691	1,100	527	186	127
19	71	68	b 50					830	* 1,010	510	180	133
20	71	b 50	b 50					1,050	940	483	183	138
21	70	b 60	b 45					1,210	888	448	* 175	141
22	61	b 75	b 45					1,040	856	431	161	138
23	107	b 60	b 50	b 40				771	668	417	155	136
24	118	b 40	b 55					612	1,000	392	153	136
25	120	b 46	b 55		b 30			510	1,110	362	148	148
26	118	97	b 55					461	1,080	346	148	163
27	107	107	b 50					457	1,020	348	148	163
28	104	b 55	b 50	b 55				510	948	330	145	161
29	100	b 45	b 43					604	842	330	145	158
30	93	b 90	b 50					645	715	334	138	180
31	88	-----	b 50					655	-----	350	143	-----
TOTAL	2,795	2,457	1,810	1,405	1,095	-	-	-	51,200	17,650	6,343	4,431
MEAN	90.2	78.6	58.4	45.3	37.8	-	-	-	1,707	570	205	148
MAX	125	107	90	-	-	-	-	-	8,200	830	322	180
MIN	71	50	45	-	-	-	-	-	685	330	138	114
LFSD	1.21	1.05	.78	.61	.50	-	-	-	22.8	7.62	2.74	1.97
FW	1.39	1.17	.90	.70	.54	-	-	-	25.46	8.78	3.15	2.20
AL-FW	5,580	4,680	3,590	2,790	2,170	-	-	-	101,600	35,030	12,580	8,790

\* Discharge measurement made on this day.

b Stage-discharge relation affected by ice.

## 5-0107. Mountain View Irrigation District Canal near Mountain View, Alberta

(International gaging station)

Location.--Lat 49°06'00", long 113°41'30", in NW $\frac{1}{4}$  sec.4, T.2, T.28 W., fourth meridian, in Alberta, on left bank  $\frac{1}{2}$  miles downstream from headgate, 5 miles southwest of Mountain View, and 7 miles north of international boundary.

Records available.--May 1935 to November 1965 (seasonal records only). Monthly discharge only for some periods, published in WSP 1308.

Gage.--Water-stage recorder. Datum of gage is 4,377.26 ft above mean sea level (Irrigation Surveys datum). Prior to May 12, 1950, staff gage at site about 600 ft upstream at different datum. May 12, 1950, to May 22, 1952, staff or chain gages at site a quarter of a mile upstream at different datums.

Extremes.--1935-65: Maximum daily discharge, 162 cfs June 8, 1964; no flow at times in each year.

Remarks.--Records good. Canal diverts water from Belly River on right bank for irrigation in Belly and St. Mary River basins in Alberta.

Cooperation.--This is one of a number of stations which are maintained jointly by Canada and the United States.

## DISCHARGE, IN CUBIC FEET PER SECOND, MARCH TO NOVEMBER 1961

DAY	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	
1			a 0.4	1.2	72	17.4	128	22.7	0	34.6	** 0.4	
2				1.6	77	17.8	127	22.7	.2	34.6	** .4	
3				1.6	75	17.4	125	22.0	0	34.6	-	
4				1.0	79	17.4	116	22.0	0	34.6	-	
5				.9	80	16.9	102	21.3	22.9	36.2	-	
6			a .3									
7				.9	80	73	102	22.0	67	38.6	-	
8			** .3	.9	79	99	101	8.3	68	38.6	-	
9			a .4	.6	64	126	101	1.6	67	37.8	-	
10	** 1		a .4	.6	61	155	86	1.4	66	37.8	-	
11			a .4	.7	63	111	41.1	1.0	66	37.8	-	
12			a .5	.9	35.4	110	47.4	.9	66	37.8	-	
13			a .5	.9	80	108	43.8	9.0	65	37.8	-	
14			a .6	1.0	76	109	42.9	53	64	37.8	-	
15			** .6	.9	81	133	52	53	66	37.0	-	
16			.6	1.0	83	139	52	77	66	35.4	-	
17				1.2	86	* 141	52	90	66	36.2	** .1	
18			a .7	1.0	85	144	52	90	65	36.2	-	
19				9.4	80	144	49.2	90	66	36.2	-	
20			a .8	* 17.8	77	144	* 51	90	66	34.6	-	
21				17.8	31.9	143	51	89	68	31.8	-	
22			a .9	17.8	7.2	141	51	89	67	31.8	-	
23			* .9	18.9	7.2	137	52	89	67	31.8	-	
24			a .9	32.6	6.9	135	51	88	60	23.2	-	
25			1.0	59	6.6	135	49.2	88	36.2	11.4	-	
26			.9	72	6.3	134	47.4	80	36.2	11.4	-	
27			.7	71	6.3	135	47.4	74	36.2	12.2	-	
28		* 0.4	* 72	6.0	134	45.6	74	36.2	36.2	11.8	-	
29			.7	72	5.1	131	48.3	75	34.6	11.8	-	
30		-----	.9	69	4.8	128	48.3	* 30.4	35.4	13.0	-	
31		-----	1.0	73	4.8	110	48.3	.2	35.4	6.8	-	
			.9	-----	11.8	-----	44.7	0	-----	.7	-----	
TOTAL			19.4	619.2	1,518.3	3,285.9	2,055.6	1,473.5	1,459.3	891.9	-	
MEAN			0.63	20.6	49.0	110	66.3	47.5	48.6	28.8	-	
MAX			1.0	73	86	155	128	90	68	38.6	-	
MIN			-	.6	4.8	16.9	41.1	0	0	.7	-	
AC-FT			38	1,230	3,010	6,520	4,080	2,920	2,890	1,770	-	

THE SEASON MARCH TO NOVEMBER : MAX MAX - MIN MIN - MEAN MEAN - AC-FT AC-FT 22,460

\* Discharge measurement made on this day.

\*\* Field estimate made on this day.

a No gage-height record.

## 5-0107. Mountain View Irrigation District Canal near Mountain View, Alberta--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, MARCH TO NOVEMBER 1962

DAY	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.
1	N11	7.9	1.0	27.4	117	2.0	46.1	* N11	0.1
2	"	24.8	1.0	60.0	116	0.9	66.0	"	0.0
3	"	21.3	0.9	58.0	114	0.9	113	"	"
4	"	20.1	1.0	60.0	114	0.7	112	"	"
5	"	** 7.6	0.7	59.0	114	0.3	110	"	"
6	"	3.2	1.0	58.0	113	0.0	109	"	"
7	"	2.9	1.8	* 58.0	110	N11	112	"	"
8	*	1.6	1.8	58.0	109	"	110	"	(*)
9	"	2.2	1.0	58.0	106	"	110	"	"
10	"	1.6	1.7	63.0	106	"	118	"	"
11	"	1.4	1.2	69.0	* 106	"	133	"	"
12	"	2.0	1.0	116	108	N11	134	"	"
13	"	4.2	0.9	116	108	28.8	* 134	"	"
14	"	5.1	2.2	102	108	85.0	134	"	"
15	"	4.2	3.4	68.1	106	85.0	134	"	(*)
16	"	3.2	4.5	85.0	83.0	85.0	133	"	"
17	"	2.7	2.4	84.0	68.0	* 85.0	132	"	"
18	"	2.7	1.8	84.0	68.0	* 86.0	129	"	"
19	"	2.7	1.8	84.0	68.0	105	83.5	"	"
20	"	2.7	2.4	84.0	68.0	75.5	0.2	"	"
21	** N11	2.0	2.0	84.0	68.0	5.6	0.1	"	"
22	0.0	2.0	2.2	83.0	67.0	9.3	0.2	"	"
23	0.1	1.8	1.6	83.0	67.0	8.9	N11	"	"
24	0.2	1.6	1.4	83.0	67.0	8.6	"	"	"
25	0.4	1.4	1.2	78.0	54.2	5.0	"	"	"
26	4.2	1.2	1.0	86.0	0.6	N11	"	"	"
27	12.2	1.8	0.9	* 86.0	0.3	N11	"	"	"
28	13.4	1.6	1.0	85.0	7.6	28.6	"	"	"
29	10.7	1.2	0.9	83.0	2.9	62.0	"	N11	"
30	8.2	1.2	0.9	102	2.2	81.0	N11	1.9	"
31	6.0	-----	0.7	-----	2.2	69.0	-----	2.0	"
TOTAL	55.4	139.3	48.5	2,304.5	2,344.0	918.1	2,153.1	3.9	-
MEAN	1.79	4.64	1.56	76.8	75.6	29.6	71.8	0.13	-
MAX	13.4	24.8	4.5	116	117	105	134	2.0	-
MIN	N11	1.2	0.7	27.4	0.3	N11	N11	N11	-
AC-FT	110	276	96	4,570	4,650	1,820	4,270	7.7	-

THE SEASON MARCH  
TO NOVEMBER :MAX  
MAXMIN  
MINMEAN  
MEANAC-FT  
AC-FT

15,800

\* Discharge measurement made on this day.

\*\* Field estimate made on this day.

g Discharge computed from staff gage readings.

Note.--Stage-discharge relation affected by ice Mar. 20 to Apr. 7. No gage-height record Mar. 22-24, May 10, 12, 14. The expressions "n11" and "0.0" represent "no flow" and "less than 0.05 cfs", respectively.

DISCHARGE, IN CUBIC FEET PER SECOND, MARCH TO NOVEMBER 1963

DAY	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.
1	N11	0.3	84.0	142	2.5	84.0	75.8	1.5	67.0
2	"	** 0.2	84.0	141	1.8	82.8	75.8	1.1	73.6
3	"	0.3	84.0	143	1.3	82.8	75.8	1.1	80.4
4	*	0.4	81.6	145	1.3	81.6	75.8	1.1	79.2
5	"	0.7	79.2	145	1.0	81.6	75.8	2.0	79.2
6	"	0.7	79.2	148	1.1	81.6	75.8	2.5	76.9
7	"	0.8	84.0	146	1.0	81.6	72.5	2.2	78.0
8	"	0.4	84.0	142	2.2	81.6	68.1	20.1	62.6
9	"	0.6	84.0	143	4.8	82.8	69.2	37.8	21.5
10	"	0.6	82.8	134	4.8	84.0	70.3	37.8	22.6
11	"	0.4	82.8	116	5.3	104	71.4	18.5	22.0
12	*	0.8	81.6	113	6.0	102	70.3	2.2	12.2
13	"	0.4	80.4	110	6.7	102	78.0	2.3	1.1
14	"	0.1	76.9	* 109	17.3	101	94.8	2.2	1.3
15	"	26.0	97.2	109	52.7	* 101	96.0	2.2	1.3
16	"	48.3	122	108	52.7	101	* 96.0	4.0	1.1
17	"	50.5	122	79.2	51.6	101	94.8	* 8.1	1.8
18	"	* 49.4	122	60.4	* 51.6	105	94.8	8.1	0.2
19	"	49.4	122	62.6	51.6	125	94.8	6.7	1.1
20	"	48.3	122	68.1	51.6	125	93.6	5.3	0.0
21	* N11	48.3	98.4	68.1	51.6	124	93.6	48.1	* 0.0
22	0.2	48.3	88.3	74.7	78.0	86.5	92.4	73.1	* 0.0
23	0.6	44.1	128	69.2	110	29.0	92.4	26.4	0.0
24	0.0	49.4	115	65.9	110	14.7	92.4	48.2	0.1
25	N11	65.9	141	64.8	109	2.0	75.6	71.4	** 0.1
26	N11	76.9	143	* 35.3	108	1.3	0.4	70.3	0.2
27	** 0.3	78.0	142	34.6	104	1.3	0.1	70.3	0.1
28	0.6	80.4	* 141	34.6	89.0	1.3	1.6	69.2	0.0
29	0.4	80.4	140	26.6	82.8	8.4	1.6	69.2	0.1
30	0.4	82.8	140	4.0	82.8	75.8	1.6	69.2	0.1
31	0.2	-----	142	-----	82.8	76.9	-----	68.1	-----
TOTAL	2.7	933.1	3,274.4	2,842.1	1,371.9	2,312.6	2,071.1	850.3	682.8
MEAN	0.09	31.1	106	94.7	44.3	74.6	69.0	27.4	22.8
MAX	0.6	82.8	143	148	110	125	96.0	73.1	80.4
MIN	N11	0.1	76.9	4.0	1.0	1.3	0.1	1.1	0.0
AC-FT	5.4	1,850	6,490	5,640	2,720	4,590	4,110	1,690	1,350

THE SEASON MARCH  
TO NOVEMBER :MAX  
MAXMIN  
MINMEAN  
MEANAC-FT  
AC-FT

28,450

\* Discharge measurement or observation of no flow made on this day.

\*\* Field estimate made on this day.

Note.--No gage-height record Nov. 19-21, 22, 23, 26-30. The expressions "n11" and "0.0" represent "no flow" and "less than 0.05 cfs", respectively.

## 5-0107. Mountain View Irrigation District Canal near Mountain View, Alberta--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, MARCH TO NOVEMBER 1964										
DAY	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	
1	Nil	** 0.1	2.3	4.0	4.2	132	85.8	23.9	82.8	
2	"	0.8	14.7	3.5	3.8	120	* 104	24.5	82.8	
3	"	0.7	33.2	3.5	4.2	117	82.5	24.5	82.8	
4	*	0.6	19.2	32.8	4.2	130	122	24.5	82.8	
5	"	0.3	12.4	65.9	5.0	130	124	23.9	* 80.4	
6	"	0.3	7.4	* 64.8	3.8	104	122	22.6	64.8	
7	"	0.3	8.8	71.4	3.2	73.5	122	16.9	45.0	
8	"	** 0.3	7.7	162	5.2	96.0	122	16.9	45.0	
9	"	0.4	7.7	63.4	24.4	91.2	121	16.4	44.1	
10	"	0.7	7.7	25.2	35.3	92.4	121	16.0	44.1	
11	"	1.0	* 8.4	20.9	32.5	90.0	118	15.6	44.1	
12	"	0.3	7.0	19.8	27.1	* 90.0	118	15.6	43.2	
13	"	0.2	6.7	17.5	25.2	90.0	117	13.8	23.0	
14	"	0.4	6.4	15.1	28.4	90.0	116	* 13.3	1.0	
15	"	1.0	5.3	13.8	31.1	88.8	113	13.8	0.8	
16	"	0.3	5.3	13.8	27.7	87.6	102	13.8	0.7	
17	"	0.3	5.3	12.4	* 20.3	86.4	90.0	13.3	0.4	
18	"	0.4	4.8	10.4	15.6	86.4	* 81.6	12.8	00.3	
19	*	0.3	5.3	10.8	13.3	86.4	73.6	12.8	* 0.1	
20	"	0.6	5.3	6.4	10.4	113	74.7	12.0	0.0	
21	"	0.6	5.3	6.4	50.1	86.0	74.7	10.4	Nil	
22	"	0.6	5.3	5.0	126	10.1	74.7	10.0	"	
23	"	0.3	5.0	4.5	133	1.5	73.6	9.2	"	
24	"	0.2	5.0	* 3.8	140	1.5	73.6	9.2	"	
25	"	0.7	4.8	36.3	138	0.8	74.7	9.2	"	
26	"	1.1	4.8	41.4	136	9.4	75.8	47.0	* "	
27	"	0.6	4.8	29.7	134	60.4	74.7	86.4	"	
28	"	1.1	5.3	23.2	136	60.4	44.5	86.4	"	
29	0.1	* 1.8	5.0	7.0	* 134	60.4	22.6	86.4	"	
30	0.1	2.3	4.5	4.8	132	61.5	22.6	84.0	Nil	
31	0.1	-----	4.5	-----	133	64.8	-----	82.8	-----	
TOTAL	0.3	18.6	235.2	799.5	1,717.0	2,411.5	2,741.7	867.9	768.2	
MEAN	0.01	0.62	7.59	26.6	55.4	77.8	91.4	28.0	25.6	
MAX	0.1	2.3	35.2	162	140	132	124	86.4	82.8	
MIN	Nil	0.1	2.3	3.5	3.2	0.8	22.6	0.5	Nil	
AC-FT	0.6	37	467	1,590	3,410	4,780	5,440	1,720	1,520	
THE SEASON MARCH TO NOVEMBER : MAX MIN MEAN AC-FT AC-FT 18,960										

\* Discharge measurement or observation of no flow made on this day.

\*\* Field estimate made on this day.

Note.--Stage-discharge relation affected by ice Mar. 1 to Apr. 4. The expressions "nil" and "0.0" represent "no flow" and "less than 0.05 cfs", respectively.

DISCHARGE, IN CUBIC FEET PER SECOND, MARCH TO NOVEMBER 1965										
DAY	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	
1			4.9	21.0	* 5.4	145	77.2	0.5	36.2	
2			4.1	20.4	4.0	145	52.3	0.7	59.1	
3			3.8	21.0	4.6	145	37.6	0.7	59.1	
4			3.3	21.0	4.6	145	37.6	0.7	60.5	
5			2.8	21.0	4.4	148	35.8	0.5	61.9	
6		0 (*)	3.1	21.0	3.8	112	33.8	0.3	48.4	
7			2.8	21.6	3.8	89.0	40.5	0.5	1.7	
8			2.6	19.8	3.6	87.5	41.7	0.3	1.5	
9			2.6	19.2	3.8	87.5	47.5	0.4	1.3	
10		(*)	2.6	19.2	4.6	87.5	45.2	0.5	1.3	
11			2.4	19.2	3.8	87.5	26.5	0.5	1.1	
12			* 2.4	19.2	3.6	87.5	6	0.5	1.1	
13		a 0.1	2.4	19.2	3.3	87.5	5.7	0.7	a 0.9	
14			2.2	18.6	2.8	87.5	5.4	0.5	a 0.6	
15		** 0.1	2.0	24.7	2.6	86.0	6.0	0.5	a 0.6	
16			2.0	68.8	2.4	84.5	5.7	0.5	** 0.5	
17			2.0	42.3	2.2	84.5	5.7	0.4		
18			2.0	8	1.8	83.0	5.7	0.5	a 0.5	
19			22.1	8.0	1.8	83.0	6.0	0.5		
20		a 0.5	56.3	7.0	1.8	81.5	7.0	0.5		
21			53.6	5.7	1.8	80.0	2.8	* 0.4	Nil	
22			52.2	5.1	1.7	83.0	3.6	0.5	"	
23		a 1.0	53.6	4.9	1.3	83.0	2.8	0.5	"	
24			46.2	4.6	1.3	84.5	2.0	0.5	"	
25		46.2	32.9	7.3	1.3	84.5	1.7	0.5	"	
26			7.0	31.0	13.5	1.1	84.5	1.8	"	
27			7.2	28	6.4	2.2	83.0	1.8	"	
28		* 8.6	29.5	* 5.4	* 4.9	81.5	1.7	0.4	"	
29			7.3	29.5	7.6	4.6	81.5	* 1.5	0.3	
30		(*)	6.0	26.4	7.0	4.6	80.0	0.9	0.4	Nil
31		-----	* 21.6	-----	60.6	78.6	-----	0.4	-----	
TOTAL	0	93.2	531.3	507.7	155.0	2,948.1	549.5	15.3	337.8	
MEAN	0	3.11	17.1	16.9	5.00	95.1	18.3	0.9	11.3	
MAX	0	46.2	56.3	68.8	60.6	148	77.2	0.7	61.9	
MIN	0	-	2.0	4.6	1.1	78.6	0.9	0.3	Nil	
AC-FT	0	185	1,050	1,010	307	5,850	1,090	30	670	
THE SEASON MARCH TO NOVEMBER : MAX MIN MEAN AC-FT AC-FT 10,190										

\* Discharge measurement or observation of no flow made on this day.

\*\* Field estimate made on this day

a No gage-height record.

Note.--The expression "nil" represents "no flow".

## 5-0110. Belly River near Mountain View, Alberta

(International gaging station)

Location.--Lat 49°06', long 113°42', in NE $\frac{1}{4}$  sec.5, T.2, R.28 W., fourth meridian, in Alberta, on right bank 2 miles downstream from intake of Mountain View Irrigation District Canal, 5 miles southwest of Mountain View, and 7 miles north of international boundary.

Drainage area.--121 sq mi.

Records available.--November 1911 to September 1965. Monthly discharge only for some periods, published in WSP 1308.

Gage.--Water-stage recorder. Datum of gage is 4,344.90 ft above mean sea level (Irrigation Surveys datum). Prior to Apr. 6, 1949, staff or chain gage at site 20 ft upstream at same datum.

Average discharge.--22 years (1912-34), prior to operation of Mountain View Irrigation District Canal, 327 cfs (236,700 acre-ft per year); 31 years (1934-65), 303 cfs (219,400 acre-ft per year).

Extremes.--Maximum and minimum discharges for the water years 1961-65 are contained in the following table:

Water year	Maximum			Minimum		
	Date	Discharge (cfs)	Gage height (feet)	Date	Discharge (cfs)	Gage height (feet)
1961	May 27, 1961	1,950	4.40	Dec. 27, 1960	a 28	-
1962	June 14, 1962	1,130	3.52	Mar. 5, 1962	a 46.5	-
1963	June 10, 1963	1,810	4.18	Nov. 19, 1962	41.0	1.29
1964	June 8, 1964	16,400	b 11.40	Oct. 22, 1963	.50	.77
1965	June 19, 1965	2,540	4.12	Dec. 31, 1964	a 40.3	-

a Minimum daily.

b From floodmarks.

1911-65: Maximum discharge, 16,400 cfs June 8, 1964 (gage height, 11.40 ft. from floodmarks); minimum, 0.50 cfs Oct. 22, 1963 (gage height, 0.77 ft.), result of upstream diversion. Flood in June 1908 reached a stage of about 12 ft.

Remarks.--Records good except those for winter periods, which are poor. Natural flow of stream affected by diversion to Mountain View Irrigation District Canal 2 miles upstream from station. (see station 5-0107).

Cooperation.--This is one of a number of stations which are maintained jointly by Canada and the United States.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	52	61	70	48	43	67	76	73	1,590	444	267	183
2	49.9	58	65	56	49	45	95	89	1,520	402	259	212
3	47.6	79	62	60	49	51	120	117	1,490	372	259	198
4	45.4	99	60	60	50	56	149	143	1,500	377	259	183
5	41.0	91	60	57	56	57	160	179	1,570	402	259	149
6	35.0	87	61	54	61	60	166	215	1,620	461	259	107
7	40.0	83	62	56	62	56	* 163	212	1,640	461	271	110
8	43.2	83	60	65	* 54	56	154	218	1,500	461	271	107
9	46.5	77	62	62	58	60	149	244	1,280	456	283	99
10	45.4	76	58	64	58	61	141	325	1,120	473	267	101
11	46.5	62	65	56	57	62	133	396	1,000	456	248	107
12	51	58	71	55	57	67	133	367	1,050	439	218	99
13	49.9	54	70	54	58	67	138	381	1,060	407	163	93
14	47.6	56	* 60	50	56	* 64	135	402	1,010	381	160	* 85
15	46.5	49	41	55	54	68	127	456	1,000	386	133	80
16	42.1	* 47	36	61	41	71	122	553	1,060	444	127	74
17	41.0	55	37	* 44	52	67	133	* 566	* 1,120	439	127	70
18	32.2	48	43	51	57	65	143	496	1,170	412	120	87
19	* 40.0	48	42	57	55	62	149	490	1,210	* 372	112	97
20	39.0	52	44	58	55	65	146	662	1,140	343	112	115
21	39.0	46	49	51	68	65	141	894	1,060	330	107	122
22	39.0	51	56	42	93	64	138	1,190	945	330	105	117
23	38.5	50	61	41	91	* 64	125	1,400	804	330	105	122
24	38.0	67	60	35	89	68	93	1,570	728	330	107	141
25	45.0	115	51	37	95	70	82	1,700	705	317	122	149
26	52	117	43	32	103	67	78	1,790	712	299	127	149
27	54	117	28	37	* 95	73	* 73	1,930	698	279	122	141
28	58	107	39	39	91	65	68	1,840	641	275	107	146
29	60	99	54	31	-----	71	67	1,590	573	267	* 146	152
30	55	95	51	31	-----	73	68	* 1,600	528	271	166	143
31	56	-----	38	36	-----	73	-----	1,730	-----	255	169	-----
TOTAL	1,416.3	2,187	1,659	1,535	1,807	1,980	3,665	23,818	33,044	11,691	5,557	3,738
MEAN	45.7	72.9	53.5	49.5	64.5	63.9	122	768	1,101	377	179	125
MAX	60	117	71	65	103	73	166	1,930	1,640	473	293	212
MIN	32.2	46	28	31	41	45	67	73	528	255	105	70
AC-FT	2,810	4,340	3,290	3,040	3,580	3,930	7,270	47,240	65,540	23,190	11,020	7,410

CALENDAR YEAR 1960: MAX 1,520 MIN 28 MEAN 245 AC-FT 178,100  
WATER YEAR 1960-61: MAX 1,930 MIN 28 MEAN 252 AC-FT 182,700

\* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 9 to Mar. 22.

5-0110. Belly River near Mountain View, Alberta--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	133	187	59.8	93.0	* 91.0	49.9	103	367	894	536	352	125
2	127	* 172	63.8	97.0	115	48.2	101	338	809	524	338	115
3	130	176	66.6	89.0	112	46.5	91.0	320	784	469	329	69.2
4	157	160	58.5	74.5	91.0	50.6	100	367	751	397	324	64.7
5	204	154	61.1	77.9	77.9	54.7	* 125	367	660	367	320	58.2
6	240	130	61.1	76.2	79.7	59.2	138	343	569	352	320	53.0
7	244	152	61.1	71.2	79.7	63.8	155	338	* 517	320	311	66.0
8	229	143	61.1	54.7	81.5	* 66.6	154	324	536	311	307	62.1
9	222	143	54.7	52.3	87.1	65.2	133	324	720	320	289	64.7
10	215	143	53.5	58.5	89.0	63.8	136	347	877	333	277	72.4
11	229	143	54.7	* 63.8	85.2	62.4	133	397	886	* 343	265	87.4
12	226	143	55.9	57.2	87.0	59.8	130	429	800	* 352	261	102
13	233	138	59.8	54.7	87.1	59.8	152	492	868	357	224	* 96.4
14	267	133	68.1	51.1	89.0	65.2	181	517	1,110	343	172	91.0
15	321	117	68.1	47.6	85.2	66.6	235	530	1,040	324	164	89.2
16	377	* 115	* 68.1	52.3	* 97.0	68.1	273	* 667	928	329	158	80.4
17	423	117	68.1	47.6	93.0	68.1	277	681	928	324	152	75.6
18	* 391	120	63.8	51.1	87.1	78.7	311	712	988	307	149	72.4
19	367	112	61.1	57.2	77.9	83.3	392	818	970	289	122	103
20	334	112	63.8	57.2	77.9	87.1	530	962	945	269	136	175
21	291	76.2	65.2	51.1	79.7	81.5	569	945	894	253	197	172
22	263	81.5	63.8	48.7	79.7	56.9	886	834	253	197	172	166
23	252	79.7	69.6	53.5	72.8	87.1	555	894	784	265	191	166
24	248	77.9	76.2	57.2	63.8	85.2	645	911	759	277	175	161
25	233	74.5	72.8	55.9	61.1	89.0	775	911	784	307	169	158
26	237	71.2	68.1	53.5	61.1	99.0	736	886	809	367	172	155
27	244	72.8	65.2	51.1	94.7	110	645	886	* 784	381	175	152
28	229	66.6	69.6	53.5	52.3	105	555	936	689	402	149	152
29	215	59.8	79.7	55.9	-----	103	480	1,010	609	440	128	158
30	198	65.2	89.0	69.6	-----	105	413	1,050	542	418	102	155
31	198	-----	95.0	89.0	-----	101	-----	1,000	-----	376	108	-----
TOTAL	7,677	3,535.4	2,047.0	1,923.1	2,315.4	2,321.5	9,775.0	19,917	24,068	10,905	6,733	3,317.7
MEAN	248	118	66.0	62.0	82.7	74.9	326	642	802	352	217	111
MAX	423	187	95.0	97.0	115	110	775	1,050	1,110	536	352	175
MIN	127	59.8	53.5	47.6	52.3	46.5	91.0	320	517	253	102	53.0
AC-FT	15,230	7,010	4,060	3,810	4,590	4,600	19,390	39,500	47,740	21,630	13,350	6,580

CALENDAR YEAR 1961: MAX 1,930 MIN 31 MEAN 274 AC-FT 198,500  
 WATER YEAR 1961-62: MAX 1,110 MIN 46 MEAN 259 AC-FT 187,500

\* Discharge measurement made on this day.

Note.--Stage-discharge relation effected by ice Nov. 1 to Apr. 2.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	152	175	191	89.2	56.9	87.4	100	323	1,120	1,140	206	70.2
2	147	169	178	93.8	53.0	89.2	92.8	332	1,020	1,040	196	70.2
3	144	164	172	94.6	59.5	78.8	92.8	304	1,020	963	183	73.4
4	141	158	152	89.2	172	* 96.4	92.8	265	1,240	980	173	71.8
5	133	158	147	85.6	224	94.6	94.6	236	1,270	980	170	71.8
6	128	155	144	85.6	231	92.8	115	273	1,380	998	170	71.8
7	125	149	155	75.6	207	85.6	112	440	1,200	989	173	73.4
8	130	152	141	69.2	223	78.8	108	483	1,060	989	180	78.0
9	128	141	133	62.1	* 200	77.2	108	465	998	938	183	84.0
10	128	147	118	67.6	187	77.2	105	406	1,690	852	193	86.0
11	122	147	115	72.4	187	66.0	102	378	* 1,650	742	199	98.0
12	147	149	* 110	72.4	172	75.6	100	342	1,500	653	190	98.0
13	210	147	110	69.2	166	70.8	102	327	1,440	585	183	86.0
14	273	136	96.4	72.4	155	66.0	118	* 347	* 1,380	529	180	82.0
15	273	* 128	96.4	67.6	155	69.2	128	394	1,300	471	* 176	84.0
16	257	120	128	* 66.0	152	58.2	130	394	1,230	452	165	* 86.0
17	238	100	141	67.6	155	58.2	138	459	1,230	417	151	78.0
18	* 220	70.8	149	64.7	155	55.6	* 136	536	1,200	* 378	135	67.2
19	200	62.1	149	53.0	152	54.3	130	502	1,150	358	109	59.8
20	194	66.0	141	55.6	149	54.3	130	496	1,070	352	107	52.9
21	194	89.2	130	50.8	144	* 58.2	118	556	1,010	352	98.0	47.7
22	210	164	98.2	50.8	152	* 66.0	105	630	1,060	332	113	46.5
23	242	178	120	55.6	130	70.8	102	669	929	304	151	52.9
24	253	172	110	51.9	115	72.4	98.2	818	802	286	153	50.2
25	249	175	98.2	53.0	120	70.8	80.4	912	725	269	165	59.6
26	235	231	91.0	51.9	122	72.4	80.4	1,010	742	240	162	125
27	217	249	92.8	49.7	110	72.4	102	980	709	217	156	122
28	207	242	82.0	54.3	91.0	89.2	158	912	685	221	151	122
29	191	203	92.8	54.3	-----	91.0	175	912	929	210	138	120
30	181	191	91.0	54.3	-----	96.4	242	1,040	1,180	199	74.9	-----
31	175	-----	87.4	55.6	-----	105	-----	1,150	-----	193	71.8	-----
TOTAL	5,844	4,588.1	3,860.2	2,054.6	4,195.4	2,350.8	3,496.0	17,291	33,919	17,629	4,855.7	2,408.4
MEAN	189	153	125	66.3	150	75.8	117	556	1,131	569	157	80.3
MAX	273	249	191	94.6	231	105	242	1,150	1,690	1,140	206	125
MIN	122	62.1	82.0	49.7	53.0	54.3	80.4	238	685	193	71.8	46.5
AC-FT	11,590	9,100	7,660	4,080	8,320	4,660	4,930	34,300	67,280	34,970	9,630	4,780

CALENDAR YEAR 1962: MAX 1,110 MIN 46.5 MEAN 262 AC-FT 189,500  
 WATER YEAR 1962-63: MAX 1,690 MIN 46.5 MEAN 281 AC-FT 203,300

\* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 17, 18, 21-24, 29, 30, Dec. 4, 5, Dec. 8 to Apr. 2.

## 5-0110. Belly River near Mountain View, Alberta--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	122	37.5	102	80.0	47.7	33.3	70.2	225	1,030	* 964	280	105
2	118	30.2	100	82.0	52.9	31.2	67.2	368	1,140	* 992	269	* 91.8
3	116	16.6	94.0	67.2	57.0	28.0	62.5	693	1,340	1,150	239	130
4	116	12.5	94.0	62.5	57.0	29.1	68.7	653	1,550	1,150	208	107
5	113	9.6	90.0	57.0	54.3	30.2	64.0	550	1,660	1,110	212	117
6	111	7.9	80.0	57.0	52.9	29.1	58.4	465	* 1,730	1,050	218	114
7	109	* 10.7	73.4	50.2	54.3	29.1	88.0	429	1,970	1,010	239	112
8	83.8	18.6	65.6	51.5	57.0	30.2	80.0	423	10,700	992	212	105
9	61.1	64.0	64.0	51.5	57.0	34.4	80.0	452	* 9,520	1,010	212	96.5
10	57.0	59.8	67.2	51.5	54.3	44.3	86.0	550	* 4,440	992	218	92.3
11	73.2	55.6	65.6	54.3	51.5	44.3	84.0	* 563	* 2,910	918	* 212	80.6
12	88.0	68.7	65.6	51.5	48.8	36.4	86.0	509	2,590	867	* 202	73.4
13	86.0	74.9	62.5	57.0	* 50.2	32.2	88.0	677	2,380	850	199	66.4
14	86.0	74.9	67.2	54.3	46.5	35.4	* 90.0	709	2,330	842	195	56.8
15	84.0	86.0	67.2	48.8	47.7	34.4	105	653	2,110	835	179	52.0
16	82.0	96.0	67.2	51.5	48.8	29.1	98.0	638	* 1,860	* 790	166	54.8
17	* 76.4	98.0	64.0	44.3	46.5	32.2	100	793	* 1,710	* 712	157	63.2
18	78.0	98.0	67.2	47.7	42.0	31.2	94.0	1,040	1,610	670	202	105
19	76.4	74.9	* 65.6	44.3	45.4	* 30.2	94.0	1,210	1,490	642	160	101
20	76.4	50.2	64.0	40.9	43.2	30.2	98.0	1,470	1,390	609	129	110
21	40.7	100	57.0	* 40.9	47.7	27.0	100	1,610	1,310	516	141	107
22	18.4	* 102	62.5	39.8	46.5	26.2	98.0	1,400	1,230	428	202	112
23	98.0	98.0	65.6	48.8	42.0	28.0	111	1,110	1,270	390	202	105
24	100	98.0	73.4	62.5	38.6	28.0	116	886	1,480	350	202	105
25	84.0	102	68.7	71.8	36.4	31.2	111	725	1,530	318	192	124
26	80.0	120	65.6	71.8	44.3	29.1	113	645	1,460	300	186	146
27	68.7	132	64.0	65.6	43.2	33.3	102	703	1,400	892	132	146
28	62.5	113	64.0	67.2	40.9	40.9	111	759	1,360	277	130	173
29	58.4	109	64.0	62.5	39.8	51.5	* 130	912	1,170	* 273	127	192
30	50.2	102	70.2	55.6	-----	54.3	180	972	1,030	280	122	222
31	42.0	-----	73.4	55.6	-----	64.0	-----	989	-----	292	122	-----
TOTAL	2,516.2	2,120.6	2,217.9	1,743.9	1,394.4	1,068.0	2,798.1	23,815	68,700	21,863	5,821	3,246.8
MEAN	81.2	70.7	71.5	56.3	48.1	34.5	93.3	768	2,290	705	188	108
MAX	122	132	102	82.0	57.0	64.0	180	1,610	10,700	1,150	280	222
MIN	18.4	7.9	57.0	39.8	36.4	26.2	58.4	225	1,030	273	122	52.0
AC-FT	4,990	4,210	4,400	3,460	2,770	2,120	5,550	47,240	136,300	43,360	11,550	6,440

CALENDAR YEAR 1963: MAX 1,690 MIN 7.9 MEAN 260 AC-FT 188,600  
 WATER YEAR 1963-64: MAX 10,700 MIN 7.9 MEAN 375 AC-FT 272,400

\* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 18, 19, Nov. 21 to Apr. 12, Apr. 16, 23, 24.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	309	61.6	75.2	42.9	49.4	63.2	55.2	812	1,260	* 910	380	122
2	327	58.4	80.6	45.5	52.0	66.4	58.4	733	1,150	892	365	130
3	327	60.0	81.6	41.6	52.0	66.4	63.2	642	1,330	964	375	170
4	296	63.2	86.0	44.2	60.0	66.4	64.8	564	1,060	1,060	365	182
5	269	* 56.8	90.2	42.9	60.0	73.4	64.8	492	1,480	1,060	370	166
6	257	71.6	84.2	41.6	56.8	73.4	* 68.0	444	1,470	1,090	380	160
7	269	88.1	84.2	41.6	58.4	69.8	68.0	400	1,360	1,160	360	146
8	273	78.8	82.3	42.9	64.8	69.8	69.8	370	1,130	1,150	327	149
9	284	80.6	92.3	44.2	64.8	66.4	73.4	380	1,060	1,140	309	222
10	292	82.4	90.2	48.1	63.2	* 64.8	82.4	422	1,200	1,130	309	218
11	288	82.4	84.2	49.4	56.8	61.6	77.0	534	1,430	1,050	309	229
12	277	77.0	75.2	52.0	60.0	60.0	84.2	* 705	1,650	935	309	236
13	277	90.2	71.6	58.4	55.2	55.2	103	876	1,670	820	322	225
14	277	112	68.0	* 61.6	60.0	55.2	130	954	1,440	* 761	304	225
15	284	107	61.6	58.4	63.2	52.0	* 114	964	1,160	747	280	239
16	273	101	* 53.6	60.0	66.4	49.4	117	964	1,590	768	254	239
17	254	105	55.2	68.0	66.4	50.7	114	954	2,190	782	236	229
18	232	103	56.8	68.0	73.4	42.9	110	876	* 2,170	775	222	218
19	218	* 101	58.4	60.0	82.4	45.5	112	754	2,440	754	* 212	218
20	202	98.6	53.6	63.2	86.0	45.5	146	740	2,300	726	208	254
21	192	94.4	49.4	58.4	92.3	49.4	218	691	1,740	663	205	304
22	179	94.4	48.1	58.4	96.5	48.1	250	628	1,450	649	199	400
23	170	92.3	48.1	52.0	92.3	45.5	269	616	1,330	609	212	350
24	163	* 101	48.1	52.0	86.0	44.2	300	663	1,330	564	232	327
25	154	86.1	52.0	50.7	80.6	44.2	345	754	1,440	528	215	345
26	112	84.2	52.0	49.4	* 73.4	44.2	385	805	1,910	510	205	336
27	73.4	80.6	48.1	46.8	66.4	42.9	468	768	1,730	510	186	309
28	73.4	75.2	45.5	49.4	63.2	* 552	584	884	1,440	516	179	288
29	75.2	77.0	44.2	55.2	-----	45.5	649	1,220	1,230	522	166	273
30	63.2	78.8	44.2	56.8	-----	* 46.8	782	* 1,540	1,040	522	152	265
31	61.6	-----	40.3	50.7	-----	50.7	-----	1,490	-----	462	135	-----
TOTAL	6,801.8	2,544.7	2,023.3	1,616.9	1,901.9	1,702.4	5,995.0	23,639	45,640	24,729	8,282	7,174
MEAN	219	84.8	65.3	52.2	67.9	54.9	200	763	1,521	798	267	239
MAX	327	112	92.3	66.0	96.5	73.4	782	1,540	2,440	1,160	380	400
MIN	61.6	56.8	40.3	41.6	49.4	42.9	55.2	370	1,040	462	135	122
AC-FT	13,490	5,050	4,010	3,210	3,770	3,380	11,890	46,890	90,530	49,050	16,430	14,230

CALENDAR YEAR 1964: MAX 10,700 MIN 26.2 MEAN 387 AC-FT 281,300  
 WATER YEAR 1964-65: MAX 2,440 MIN 40.3 MEAN 362 AC-FT 261,900

\* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 15, 16, Nov. 25 to Apr. 7.

## 5-0115. Waterton River near international boundary

(International gaging station)

Location.--Lat 48°57'20", long 113°54'00", in NW¼ sec.23, T.37 N., R.18 W. (unsurveyed), on right bank 100 ft downstream from Olson Creek, 3 miles south of international boundary, and 7 miles south of Waterton Park, Alberta.

Drainage area.--61.0 sq mi.

Records available.--May 1947 to September 1964, discontinued (no winter records after 1957).

Gage.--Water-stage recorder. Altitude of gage is 4,200 ft (from topographic map). Prior to Sept. 12, 1947, staff gage at bridge a quarter of a mile downstream at different datum.

Average discharge.--10 years (1947-57), 273 cfs (197,600 acre-ft per year).

Extremes.--Maximums and minimums (discharge in cubic feet per second, gage height in feet).

Annual maximum discharge (\*) and peak discharges above base (1,100 cfs), water years 1961-64

Date	Time	Discharge	Gage height	Date	Time	Discharge	Gage height	Date	Time	Discharge	Gage height
May 27, 1961	0900	* 2,520	6.31	June 18, 1962	0415	* 1,440	5.04	May 21, 1964	0730	1,490	5.19
June 6, 1961	0300	2,290	8.06					June 8, 1964	1700	* 12,400	11.55
June 18, 1961	0300	1,970	5.68	May 26, 1963	0600	1,220	4.75	June 25, 1964	0500	2,020	7.01
				May 31, 1963	0515	1,530	5.15	July 3, 1964	0530	1,350	6.34
May 29, 1962	0830	1,200	4.72	June 10, 1963	1200	* 1,840	5.53	July 9, 1964	0200	1,200	6.16
June 10, 1962	0530	1,370	4.95	June 29, 1963	1915	1,160	4.67				

Minimum discharge not determined.

1947-64: Maximum discharge, 12,400 cfs June 8, 1964 (gage height, 11.55 ft), from rating curve extended above 1,900 cfs on basis of slope-area measurement of peak flow; minimum recorded, 8.7 cfs Dec. 24, 1952 (gage height, 1.97 ft).

Remarks.--Records good. No regulation or diversion.

Cooperation.--This is one of a number of stations which are maintained jointly by the United States and Canada.

Revisions (water years).--WSP 1508: 1948, 1949(P).

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	46.4	86	62	30.8	48.0	-	-	-	1,830	480	135	82
2	44.8	77	58	30.8	46.4	-	-	-	1,830	455	129	91
3	43.2	70	56	29.6	43.2	-	-	-	1,790	465	125	77
4	43.2	64	54	27.2	40.0	-	-	-	1,910	445	129	75
5	41.6	64	41.6	30.8	38.4	-	-	-	2,040	450	125	75
6	41.6	62	41.6	38.4	38.4	-	-	-	2,150	545	138	77
7	43.2	60	44.8	35.2	38.4	-	-	-	2,120	505	129	73
8	52	58	46.4	33.6	-	-	-	-	1,700	475	119	70
9	50	54	48.0	30.8	-	-	-	-	1,430	418	116	68
10	44.8	58	44.8	28.4	-	-	-	-	1,220	382	108	68
11	44.8	62	43.2	29.6	-	-	-	-	1,210	372	97	70
12	46.4	56	46.4	29.6	-	-	-	-	1,420	336	91	66
13	44.8	54	46.4	29.6	-	-	-	-	1,280	314	89	62
14	43.2	54	44.8	29.6	-	-	-	-	1,210	310	89	60
15	43.2	50	35.2	38.4	-	-	-	-	1,460	328	86	* 58
16	43.2	50	33.6	58	-	-	-	-	* 1,670	354	89	54
17	43.2	46.4	41.6	52	-	-	-	* 530	1,770	328	89	54
18	43.2	58	41.6	46.4	-	-	-	475	1,760	273	86	58
19	43.2	52	35.2	36.8	-	-	-	505	1,630	241	84	60
20	43.2	52	36.8	38.4	-	-	-	711	1,560	225	84	64
21	44.8	58	40.0	40.0	-	-	-	987	1,400	217	82	64
22	62	50	41.6	40.0	-	-	-	1,280	1,120	225	82	64
23	105	50	40.0	33.6	-	-	-	1,510	987	225	82	64
24	135	64	38.4	30.8	-	-	-	1,740	1,030	237	80	62
25	125	108	36.8	30	-	-	-	1,760	1,020	214	82	64
26	111	84	33.6	30	-	-	-	1,990	1,020	183	80	64
27	102	70	29.6	32	-	-	-	2,370	881	165	77	64
28	94	68	28.4	30	-	-	-	1,800	728	165	73	64
29	86	66	30.8	29	-	-	-	1,550	1,645	165	70	64
30	77	68	30.8	32	-	-	-	1,770	570	148	70	64
31	75	-----	32.0	40	-	-	-	1,760	-----	141	70	-----
TOTAL	1,906.0	1,873.4	1,284.0	1,071.4	-	-	-	-	42,391	9,786	2,985	2,000
MEAN	61.5	62.4	41.4	34.6	-	-	-	-	1,363	316	96.3	66.7
MAX	135	108	62	58	-	-	-	-	2,150	545	138	91
MIN	41.6	46.4	28.4	27.2	-	-	-	-	570	141	70	54
CFSM	1.01	1.02	0.679	0.567	-	-	-	-	23.2	5.18	1.58	1.09
IN.	1.16	1.14	0.78	0.65	-	-	-	-	25.84	5.97	1.82	1.22
AC-FT	3,780	3,720	2,550	2,130	-	-	-	-	84,080	19,410	5,920	3,970
CALENDAR YEAR	:	MAX	MIN	MEAN	AC-FT							
WATER YEAR	:	MAX	MIN	MEAN	AC-FT							

\* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Jan. 25-31.

## 5-0115. Waterton River near international boundary--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	62	89	40	32	27	-	-	-	863	702	165	62
2	58	80	40	31	35	-	-	-	833	603	161	64
3	60	82	38	37	50	-	-	-	923	451	155	60
4	64	80	35	35	45	-	-	-	839	382	148	59
5	80	75	35	34	52	-	-	-	657	342	165	55
6	113	73	32	32	b 50	-	-	-	551	382	200	54
7	119	68	34	28	-	-	-	-	509	355	172	55
8	105	66	31	27	-	-	-	-	577	364	161	54
9	97	64	28	b 32	-	-	-	-	1,010	395	155	52
10	105	66	28	b 30	-	-	-	-	1,250	404	144	52
11	135	68	31	b 28	-	-	-	-	1,060	400	135	105
12	125	66	32	b 28	-	-	-	-	1,010	390	129	110
13	148	62	32	b 26	-	-	-	-	972	342	122	92
14	214	60	31	a 25	-	-	-	-	* 986	333	116	88
15	261	56	31	a 25	-	-	-	-	1,000	317	108	90
16	346	46	31	a 23	-	-	-	-	1,140	296	* 100	85
17	359	48	30	a 22	-	-	-	* 652	1,280	269	98	80
18	289	50	28	a 21	-	-	-	696	1,300	242	98	76
19	241	52	30	a 21	-	-	-	833	1,160	221	90	74
20	210	52	29	a 21	-	-	-	979	1,140	203	85	71
21	176	42	30	a 20	-	-	-	917	1,040	202	85	69
22	158	50	27	a 21	-	-	-	899	993	221	85	67
23	148	48	28	a 21	-	-	-	953	947	222	78	64
24	138	48	45	a 22	-	-	-	1,010	965	232	74	62
25	122	45	43	b 23	-	-	-	947	1,020	232	71	60
26	135	40	38	b 24	-	-	-	881	1,030	222	71	59
27	125	45	37	b 23	-	-	-	911	899	222	69	57
28	113	42	35	b 24	-	-	-	1,060	852	235	69	55
29	102	35	37	b 23	-	-	-	1,140	609	232	69	67
30	97	42	35	b 25	-	-	-	1,040	663	203	67	62
31	94	-----	32	26	-----	-	-----	935	-----	172	62	-----
TOTAL	4,599	1,740	1,035	810	-	-	-	-	27,878	9,805	3,507	2,060
MEAN	148	58.0	33.4	26.1	-	-	-	-	929	316	113	68.7
MAX	359	89	45	37	-	-	-	-	1,300	702	200	110
MIN	58	35	27	20	-	-	-	-	509	172	62	52
CFSM	2.43	.95	.55	.43	-	-	-	-	15.2	5.19	1.85	1.13
IN-	2.80	1.06	.63	.49	-	-	-	-	17.00	5.99	2.14	1.26
AC-FT	9,120	3,450	2,050	1,610	-	-	-	-	55,300	19,450	6,960	4,090

CALENDAR YEAR 1961 : MAX MIN MEAN CFSM IN AC-FT  
 WATER YEAR 1961-62 : MAX MIN MEAN CFSM IN AC-FT

\* Discharge measurement made on this day.

a No gage-height record.

b Stage-discharge relation affected by ice.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	59	129	151	69	-	-	-	-	1,220	881	148	62
2	* 59	119	138	64	-	-	-	-	1,060	821	132	62
3	59	110	126	71	-	-	-	-	1,060	833	126	62
4	57	102	110	78	-	-	-	-	1,260	982	122	60
5	57	105	105	64	-	-	-	-	1,260	917	126	60
6	55	105	116	59	-	-	-	-	1,300	903	126	60
7	54	98	102	57	-	-	-	-	1,100	851	126	59
8	60	98	98	54	-	-	-	-	1,080	863	129	60
9	60	105	92	44	-	-	-	-	1,190	702	126	60
10	62	122	85	38	-	-	-	-	1,660	561	132	62
11	59	122	83	-	-	-	-	-	1,440	512	138	67
12	90	113	78	-	-	-	-	-	1,350	502	132	64
13	189	105	74	-	-	-	-	-	* 1,410	441	126	62
14	210	95	74	-	-	-	-	-	1,350	413	* 126	83
15	182	88	92	-	-	-	-	* 441	1,430	382	119	76
16	155	83	158	-	-	-	-	475	1,350	344	105	74
17	138	78	168	-	-	-	-	572	1,280	317	95	78
18	132	74	155	-	-	-	-	636	1,240	292	88	78
19	126	76	141	-	-	-	-	636	1,230	282	95	74
20	122	214	126	-	-	-	-	679	1,100	280	88	69
21	168	235	119	-	-	-	-	761	917	272	83	67
22	261	203	102	-	-	-	-	833	923	280	76	64
23	242	168	83	-	-	-	-	899	725	261	71	71
24	217	144	71	-	-	-	-	1,030	593	222	71	67
25	200	172	74	-	-	-	-	1,070	652	202	74	64
26	182	304	80	-	-	-	-	1,160	696	182	71	60
27	165	265	80	-	-	-	-	1,010	708	165	69	59
28	148	217	69	-	-	-	-	959	725	165	64	59
29	141	182	71	-	-----	-	-	972	725	151	67	59
30	141	165	76	-	-----	-	-	1,330	1,060	143	67	57
31	135	-----	76	-	-----	-	-----	1,420	-----	132	64	-----
TOTAL	3,985	4,196	3,173	-	-	-	-	-	33,341	14,317	3,182	1,959
MEAN	129	140	102	-	-	-	-	-	1,111	462	103	65.3
MAX	261	304	168	-	-	-	-	-	1,660	982	148	83
MIN	54	74	69	-	-	-	-	-	593	132	64	57
CFSM	2.11	2.29	1.68	-	-	-	-	-	18.2	7.57	1.68	1.07
IN-	2.43	2.56	1.93	-	-	-	-	-	20.33	8.73	1.94	1.19
AC-FT	7,990	8,320	6,290	-	-	-	-	-	66,130	28,400	6,310	3,890

CALENDAR YEAR : MAX MIN MEAN CFSM IN AC-FT  
 WATER YEAR : MAX MIN MEAN CFSM IN AC-FT

\* Discharge measurement made on this day.

## 5-0115. Waterton River near international boundary--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964												
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	55	44	59	44				-	1,020	953	189	67
2	54	44	55	52				-	1,080	1,140	165	105
3	* 50	42	54	42				-	1,290	1,220	144	182
4	48	42	50	39				-	1,550	1,060	138	168
5	50	42	50	36				-	* 1,400	1,080	161	148
6	50	42	57	34				-	1,490	911	148	126
7	48	42	47	34				-	1,470	905	132	113
8	45	42	b 42	33				-	* 7,280	1,010	126	105
9	44	40	b 38	32				-	5,850	1,100	132	100
10	42	38	b 37	32				-	2,500	947	138	95
11	42	38	b 36	30				-	1,660	785	122	88
12	40	36	b 35	30				-	1,760	737	110	85
13	39	36	b 35	30				* 480	1,680	749	108	80
14	38	40	b 35	32				556	1,670	691	108	78
15	38	55	b 35	30				535	1,590	657	100	76
16	36	54	b 34	30				530	1,460	572	92	74
17	34	55	b 35	27				663	1,370	455	88	76
18	34	54	b 35	27				869	1,200	465	85	78
19	33	b 44	b 34	27				979	1,100	460	88	78
20	33	b 38	b 32	27				1,280	* 1,090	395	80	78
21	33	42	b 32	27				1,410	1,010	364	71	83
22	34	52	b 30	-				1,010	1,010	338	67	90
23	59	54	b 28	-				691	1,290	309	62	95
24	59	55	b 29	-				514	1,750	273	59	98
25	59	54	34	-				427	1,720	250	55	119
26	55	64	34	-				380	1,470	232	62	126
27	52	88	33	-				436	1,380	228	64	116
28	50	74	32	-				646	1,130	214	64	113
29	50	69	30	-				773	887	* 206	64	113
30	48	62	29	-				827	* 861	210	62	175
31	45	-----	30	-	-----		-----	905	-----	224	64	-----
TOTAL	1,397	1,482	1,176	-	-	-	-	-	52,010	19,140	3,148	3,128
MEAN	45.1	49.4	37.9	-	-	-	-	-	1,734	617	102	104
MAX	59	88	59	-	-	-	-	-	7,280	1,220	189	182
MIN	33	36	28	-	-	-	-	-	863	206	55	67
CFSM	.74	.81	.62	-	-	-	-	-	28.4	10.1	1.66	1.71
IN.	.85	.90	.72	-	-	-	-	-	31.71	11.67	1.92	1.91
AC-FT	2,770	2,940	2,330	-	-	-	-	-	103,200	37,960	6,240	6,200
CALENDAR YEAR	: MAX		MIN	MEAN	CFSM	IN	AC-FT					
WATER YEAR	: MAX		MIN	MEAN	CFSM	IN	AC-FT					

\* Discharge measurement made on this day.

b Stage-discharge relation affected by ice.

## SASKATCHEWAN RIVER BASIN

5-0125. Boundary Creek at international boundary

(International gaging station)

Location.--Lat 48°59'50", long 113°54'20", in NE<sup>1</sup> sec.3, T.37 N., R.18 W. (unsurveyed), on right bank a quarter of a mile upstream from mouth, a quarter of a mile south of international boundary, and 4 miles south of Waterton Park, Alberta.

Drainage area.--21.0 sq mi.

Records available.--October 1947 to June 1964, discontinued (no winter records after 1957).

Gage.--Water-stage recorder. Altitude of gage is 4,300 ft (from topographic map).

Average discharge.--10 years (1947-57), 78.0 cfs (56,470 acre-ft per year).

Extremes.--Maximums and minimums (discharge in cubic feet per second, gage height in feet).

Annual maximum discharge (*) and peak discharges above base (270 cfs), October 1960 to June 1964											
Date	Time	Discharge	Gage height	Date	Time	Discharge	Gage height	Date	Time	Discharge	Gage height
May 27, 1961	0200	517	4.50	June 17, 1962	2300	* 350	4.00	May 21, 1964	0330	418	4.10
June 5, 1961	2130	* 524	4.43								
May 29, 1962	0600	308	3.94	June 10, 1963	0700	* 618	4.65				
				June 30, 1963	0900	290	3.88				

Minimum discharge not determined.

1947-64: Maximum discharge, 904 cfs June 4, 1953; maximum gage height, 5.34 f; June 21 or 22, 1950, from floodmarks; minimum discharge recorded, 4.0 cfs Mar. 15, 1952, but may have been less during periods of ice effect or no gage-height record.

Flood of June 8, 1964, reached a discharge of 5,930 cfs, from slope-area measurement of peak flow.

Remarks.--Records good prior to Oct. 1, 1962, and fair thereafter. No regulation or diversion. Station completely destroyed by flood of June 8, 1964.

Cooperation.--This is one of a number of stations which are maintained jointly by the United States and Canada.

Revisions (water years).--WSP 1728: 1951(M).

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961												
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	16.2	22.2	21.0					-	413	112	45.0	33.6
2	16.2	20.3	19.6					-	433	108	44.0	40.0
3	15.2	19.0	19.0					-	441	105	44.0	33.6
4	15.2	17.9	-					-	465	103	45.0	30.2
5	14.6	17.4	-					-	483	110	46.0	30.2
6	14.6	17.4	-					-	453	124	47.0	29.6
7	14.0	16.8	-					-	437	120	45.0	28.4
8	14.6	b 16	-					-	374	118	42.0	27.8
9	14.6	b 15	-					-	326	106	42.0	25.4
10	14.6	15.7	-					-	306	100	37.6	26.0
11	14.6	15.7	-					-	306	96	34.4	26.6
12	14.6	15.7	-					-	315	91	32.0	25.4
13	14.6	16.2	-					-	300	86	31.4	24.2
14	14.6	16.2	-					-	297	88	31.4	23.0
15	14.6	16.2	-					-	318	91	32.0	* 23.0
16	14.0	16.2	-					-	336	93	36.0	21.8
17	13.5	16.2	-					* 121	346	86	36.0	20.6
18	13.5	17.4	-					110	326	75	* 32.8	21.8
19	13.5	17.9	-					125	318	70	30.8	21.8
20	13.0	22.9	-					193	303	67	30.2	25.4
21	13.0	22.9	-					262	273	67	29.0	26.6
22	13.5	24.2	-					323	240	71	29.0	27.2
23	13.5	22.9	-					370	215	71	29.0	27.2
24	17.9	27.4	-					422	212	74	29.0	26.6
25	22.2	34.4	-					411	210	70	30.2	27.2
26	22.2	b 31	-					438	205	61	29.0	26.6
27	23.6	b 28	-					483	* 185	56	27.8	25.4
28	23.6	b 23	-					433	162	54	26.6	26.0
29	22.2	b 22	-					385	143	51	26.0	27.2
30	21.0	b 21	-					405	130	49.0	28.4	27.2
31	20.3	-----	-					389	-----	46.0	-----	-----
TOTAL	503.3	605.1	-	-	-	-	-	-	9,271	2,619.0	1,075.2	805.6
MEAN	16.2	20.2	-	-	-	-	-	-	309	84.5	34.7	26.9
MAX	23.6	34.4	-	-	-	-	-	-	483	124	47.0	40.0
MIN	13.0	15	-	-	-	-	-	-	130	46.0	26.0	20.6
CFSM	0.771	0.962	-	-	-	-	-	-	14.7	4.02	1.65	1.28
IN.	0.89	1.07	-	-	-	-	-	-	16.42	4.64	1.90	1.43
AC-FT	998	1,200	-	-	-	-	-	-	18,390	5,190	2,130	1,600
CALENDAR YEAR	:	MAX		MIN		MEAN		CFSM	IN		AC-PT	
WATER YEAR	:	MAX		MIN		MEAN		CFSM	IN		AC-PT	

\* Discharge measurement made on this day.

b stage-discharge relation affected by ice.

## 5-0125. Boundary Creek at international boundary--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	26	32	b 19	15				-	* 243	160	58	23
2	25	b 35	b 18	15				-	227	146	57	23
3	26	b 32	18	17				-	248	120	56	22
4	32	31	b 18	17				-	217	103	57	22
5	44	30	17	b 16				-	178	98	65	21
6	60	28	b 16	b 15				-	162	103	63	20
7	52	28	b 17	b 14				-	157	96	58	21
8	46	27	b 16	b 13				-	204	94	57	20
9	42	28	b 14					-	296	98	54	21
10	44	28	b 14	-				-	305	100	51	23
11	47	29	b 15	-				-	276	100	48	36
12	47	28	b 16	-				-	267	98	46	38
13	57	27	b 16	-				-	273	94	45	34
14	81	26	b 15	-				-	* 303	93	42	34
15	96	24	b 15	-				-	276	88	39	36
16	106	b 20	a 15	-				* 206	294	81	* 37	34
17	112	b 22	a 16	-				211	329	75	36	32
18	91	b 24	a 15	-				235	322	70	37	30
19	80	b 24	a 16	-				267	294	63	34	29
20	71	21	a 15	-					276	58	32	28
21	65	b 18	a 16	-				230				
22	60	b 22	a 14	-				227	258	58	32	27
23	56	20	a 15	-				248	243	62	32	27
24	54	20	a 21	-				259	231	65	30	25
25	48	19	a 20	-				243	228	72	27	25
26	50	b 17	a 19	-					228	70	26	24
27	49	b 19	b 18	-				227	240	70	25	24
28	46	18	b 19	-				240	202	71	25	22
29	41	b 16	17	-				282	168	77	25	23
30	38	b 20	16	-				284	155	78	26	27
31	37		15	-				259	155	68	25	25
-----												
TOTAL	1,729	733	511	-	-	-	-	-	7,243	2,691	1,269	796
MEAN	55.8	24.4	16.5	-	-	-	-	-	241	86.8	40.9	26.5
MAX	112	35	21	-	-	-	-	-	329	160	65	38
MIN	25	16	14	-	-	-	-	-	155	58	24	20
CFSM	2.66	1.16	0.786	-	-	-	-	-	11.5	4.13	1.95	1.26
IN.	3.06	1.30	0.90	-	-	-	-	-	12.83	4.77	2.25	1.41
AC-FT	3,430	1,450	1,010	-	-	-	-	-	14,370	5,340	2,520	1,580
-----												
CALENDAR YEAR 1961 :	MAX		MIN		MEAN		CFSM		IN		AC-FT	
WATER YEAR 1961-62 :	MAX		MIN		MEAN		CFSM		IN		AC-FT	

\* Discharge measurement made on this day.

a No gage-height record.

b Stage-discharge relation affected by ice.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	24	35	42					-	294	251	45	21
2	* 22	33	38					-	267	227	42	21
3	22	31	37					-	279	214	41	21
4	21	30	34					-	315	214	40	22
5	20	33	35					-	312	201	40	21
6	20	33	34					-	329	188	40	20
7	19	30	31					-	282	183	41	20
8	21	30	29					-	267	188	42	20
9	22	30	28					-	282	164	42	21
10	23	32	27					-	532	138	46	22
11	22	32	26					-	401	132	47	26
12	30	31	25					-	360	123	45	25
13	68	31	24					-	* 340	112	* 44	27
14	67	28	23					-	329	104	* 45	38
15	57	26	28					* 132	312	97	43	32
16	49	25	41					146	306	90	38	31
17	43	24	41					175	297	82	34	31
18	40	23	38					178	279	78	32	28
19	38	27	36					160	264	74	33	26
20	38	72	33					178	237	70	31	24
21	49	67	24					200	212	70	29	22
22	65	55	-					215	218	70	26	21
23	63	48	-					231	183	65	25	24
24	58	44	-					155	155	59	24	23
25	54	47	-					267	169	56	25	22
26	49	85	-					270	166	51	26	21
27	45	77	-					261	* 151	48	24	20
28	41	63	-					264	151	47	23	19
29	40	52	-					282	230	46	22	19
30	38	48	-					322	282	44	22	19
31	37		-					326		43	21	
-----												
TOTAL	1,205	1,222	-	-	-	-	-	-	8,201	3,529	1,078	708
MEAN	38.9	40.7	-	-	-	-	-	-	273	114	34.8	23.6
MAX	68	85	-	-	-	-	-	-	532	251	47	38
MIN	19	23	-	-	-	-	-	-	151	43	21	19
CFSM	1.85	1.94	-	-	-	-	-	-	13.0	5.42	1.66	1.12
IN.	2.13	2.16	-	-	-	-	-	-	14.52	6.25	1.91	1.25
AC-FT	2,390	2,420	-	-	-	-	-	-	16,270	7,000	2,140	1,400
-----												
CALENDAR YEAR	MAX		MIN		MEAN		CFSM		IN		AC-FT	
WATER YEAR	MAX		MIN		MEAN		CFSM		IN		AC-FT	

\* Discharge measurement made on this day.

## 5-0125. Boundary Creek at international boundary--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, OCTOBER 1963 TO JUNE 1964

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	18	16	24	13				-	293			
2	18	16	23	13				-	333			
3	16	16	21	12				-	411			
4	16	15	20	12				-	450			
5	16	15	18	12				-	* 434			
6	16	15	18	12				-	475			
7	16	15	16	b 12				-	525			
8	15	15	15	b 10				-	(4)			
9	15	15	14	b 10				-	-			
10	14	15	13	b 10				-	-			
11	14	14	12	b 9				-	-			
12	13	14	11	b 9				-	-			
13	13	14	10	b 9				* 164	-			
14	13	15	10	b 11				162	-			
15	12	17	11	b 11				140	-			
16	12	19	11	b 11				140	-			
17	12	21	12	b 11				191	-			
18	12	24	12	b 11				237	-			
19	12	14	11	b 11				264	-			
20	12	10	10	9.5				349	-			
21	12	14	10	b 9				363	-			
22	13	15	9.0	b 12				232	-			
23	23	20	8.0	b 17				178	-			
24	27	23	9.0	-				149	-			
25	27	22	12	-				132	-			
26	24	24	12	-				129	-			
27	22	35	12	-				155	-			
28	20	34	12	-				188	-			
29	20	31	11	-				209	-			
30	18	27	11	-	-----			224	-			
31	17	-----	12	-	-----			254	-----			-----
TOTAL	508	560	410.0	-	-	-	-	-	-			
MEAN	16.4	18.7	13.2	-	-	-	-	-	-			
MAX	27	35	24	-	-	-	-	-	-			
MIN	12	10	8.0	-	-	-	-	-	-			
CFSM	.78	.89	.63	-	-	-	-	-	-			
IN.	.90	.99	.73	-	-	-	-	-	-			
AC-FT	1,010	1,110	813	-	-	-	-	-	-			
CALENDAR YEAR	:	MAX	MIN	MEAN	AC-FT							
WATER YEAR	:	MAX	MIN	MEAN	AC-FT							

\* Discharge measurement made on this day.  
 b Stage-discharge relation affected by ice.  
 Note.--No gage-height record June 6, 7.

5-0130. Waterton River near Waterton Park, Alberta

(International gaging station)

Location.--Lat 49°07', long 113°50', in NE $\frac{1}{4}$  sec.8, T.2, R.29 W., fourth meridian, in Alberta, on right bank 300 ft downstream from highway bridge, a quarter of a mile upstream from Crooked Creek, and 5 miles northeast of Waterton Park.

Drainage area.--238 sq mi.

Records available.--June to September 1908, April to November 1909, April to November 1910, May to October 1911, March 1912 to May 1931, September 1932, June to August 1933, April 1918 to September 1965. Monthly discharge only for some periods, published in WSP 1308.

Gage.--Water-stage recorder. Datum of gage is 4,154.19 ft above mean sea level (Irrigation Surveys datum). Prior to Feb. 7, 1917, staff gages at various sites and datums within 200 ft of present site. Feb. 7, 1917, to Aug. 26, 1933, and Mar. 19, 1948, to Mar. 18, 1949, chain gage on downstream side of old bridge 200 ft upstream at present datum.

Average discharge.--35 years (1912-30, 1948-65), 672 cfs (486,500 acre-ft per year).

Extremes.--Maximum and minimum discharges for the water years 1961-65 are contained in the following table:

Water year	Maximum			Minimum		
	Date	Discharge (cfs)	Gage height (feet)	Date	Discharge (cfs)	Gage height (feet)
1961	May 27, 1961	5,300	4.37	Jan. 23, 1961	39.7	0.53
1962	June 14, 1962	2,730	3.36	Jan. 23, 1962	35.2	.49
1963	June 11, 1963	4,650	4.09	Jan. 23, 1963	55	.69
1964	June 9, 1964	25,700	9.22	Feb. 21, 1964	31.4	.43
1965	June 19, 1965	5,630	4.53	Jan. 1, 1965	53	.67

1908-33, 1948-65: Maximum discharge, 25,700 cfs June 9, 1964 (gage height, 9.22 ft); minimum observed, 14 cfs Feb. 4, 1955, caused by temporary storage behind ice jam upstream.

Remarks.--Records excellent except those for winter periods, which are fair. No regulation or diversion.

Cooperation.--This is one of a number of stations which are maintained jointly by Canada and the United States.

Revisions (water years).--WSP 1308: 1908(M).

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	124	141	b 145	100	101	197	170	317	4,150	1,200	396	173
2	126	132	153	103	109	185	150	375	4,180	1,100	375	197
3	128	124	160	105	106	176	165	389	4,210	1,020	354	210
4	124	134	156	105	105	165	200	424	4,270	948	335	185
5	121	139	153	103	108	165	229	504	4,410	909	329	188
6	121	126	162	100	105	155	258	573	4,640	935	329	173
7	114	116	151	97	101	152	278	591	4,810	922	305	170
8	116	112	145	97	103	* 147	311	591	4,580	896	293	185
9	105	122	141	101	105	141	288	600	4,070	860	299	170
10	103	121	134	101	108	136	293	665	3,530	814	299	173
11	114	121	134	101	116	132	305	737	3,170	792	288	191
12	117	117	139	101	124	136	288	770	3,090	770	273	191
13	106	119	* 136	97	124	136	278	814	3,020	737	263	188
14	108	119	132	98	126	122	278	872	2,850	705	253	185
15	121	111	b 126	b 98	126	120	278	935	2,800	675	245	185
16	103	* 100	122	b 88	134	126	258	* 1,130	2,950	665	241	185
17	93	124	121	* 103	* 132	122	263	1,200	3,090	665	237	185
18	95	114	116	98	132	119	258	1,190	3,190	645	229	188
19	* 105	130	114	98	136	119	* 299	1,200	3,240	* 618	225	206
20	103	124	114	97	147	126	299	1,380	3,140	591	225	225
21	108	116	114	93	153	126	288	1,720	* 2,950	564	217	245
22	103	114	121	93	160	119	288	2,260	2,660	547	210	249
23	106	119	121	83	166	* 119	317	2,850	2,370	547	203	253
24	109	119	119	106	184	122	317	3,500	2,140	529	197	288
25	119	132	116	95	181	124	329	3,900	2,020	512	197	253
26	119	139	112	90	193	126	317	4,410	1,920	495	194	258
27	136	b 136	111	89	196	138	311	5,080	1,830	471	191	268
28	126	b 134	108	85	190	150	317	5,080	1,650	471	182	268
29	119	b 134	111	85	-----	145	311	4,520	1,900	479	* 176	273
30	139	b 139	106	89	-----	136	311	* 4,290	1,410	447	173	283
31	139	-----	100	95	-----	145	-----	4,210	-----	417	173	-----
TOTAL	3,570	3,728	3,993	2,994	3,771	4,327	8,252	57,077	93,840	21,946	7,906	6,386
MEAN	115	124	129	96.6	135	140	275	1,841	3,128	708	255	213
MAX	139	141	162	106	106	197	329	5,080	4,810	1,200	396	283
MIN	93	100	100	83	101	119	150	317	1,410	417	173	170
CFSM	.48	.52	.54	.41	.57	.59	1.16	7.74	13.1	2.97	1.07	.89
IN.	.56	.58	.62	.47	.59	.68	1.29	8.92	14.66	3.43	1.24	1.00
AC-FT	7,080	7,390	7,920	5,940	7,480	8,580	16,370	113,200	186,100	43,530	15,680	12,670
CALENDAR YEAR 1960:			MAX 3,800	MIN 93		MEAN 552	CFSM 2.32	IN 31.54	AC-FT 470,400			
WATER YEAR 1960-61:			MAX 5,080	MIN 83		MEAN 597	CFSM 2.51	IN 34.03	AC-FT 431,900			

\* Discharge measurement made on this day.  
b Stage-discharge relation affected by ice.

## 5-0130. Waterton River near Waterton Park, Alberta--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962												
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	273	396	173	134	114	a 138	134	1,010	2,290	1,400	468	198
2	253	* 361	176	147	109	g 136	136	917	2,180	1,350	437	204
3	259	354	173	147	120	a 136	140	878	2,120	1,240	421	204
4	283	323	179	136	141	g 138	148	826	2,080	1,140	421	198
5	323	382	173	150	138	138	164	789	1,930	1,030	445	195
6	329	361	165	130	145	134	211	767	1,690	1,000	400	189
7	347	288	162	122	155	130	234	734	1,560	917	373	192
8	389	299	147	120	162	* 132	251	712	1,450	865	386	204
9	403	283	143	119	167	126	260	701	1,800	926	359	201
10	347	273	134	126	170	124	275	690	1,930	813	346	198
11	361	263	116	* 124	170	123	275	723	2,120	* 813	335	223
12	410	249	112	120	167	121	280	756	2,140	* 789	329	219
13	403	299	112	119	167	121	275	826	2,240	767	317	* 223
14	417	237	115	119	117	117	311	891	2,640	767	300	226
15	471	210	119	117	* 173	114	393	917	* 2,660	734	284	230
16	529	* 210	* 119	122	177	108	460	1,120	2,550	712	280	226
17	600	203	117	119	174	106	500	1,300	2,590	680	* 275	226
18	645	188	114	115	154	115	572	* 1,430	2,630	640	265	215
19	636	152	114	114	167	108	680	1,600	2,660	610	260	215
20	627	165	117	112	164	112	851	1,850	2,570	572	246	215
21	618	114	130	110	167	112	986	2,010	2,480	527	230	211
22	618	114	130	110	162	112	1,000	2,330	2,480	546	215	215
23	591	165	141	55.5	162	115	1,080	2,120	2,200	492	238	201
24	547	191	147	140	150	121	1,200	2,200	2,080	484	226	201
25	521	191	152	145	148	115	1,420	2,260	2,030	500	219	198
26	521	185	150	110	g 146	119	1,520	2,220	2,030	500	207	198
27	495	188	150	119	g 142	123	1,510	1,160	1,970	492	204	192
28	463	188	150	104	g 140	134	1,430	2,240	1,790	500	198	195
29	504	182	143	110	-----	134	1,270	2,390	1,580	500	211	204
30	455	176	136	114	-----	132	1,140	2,460	1,450	492	215	198
31	417	-----	138	109	-----	132	-----	2,390	-----	476	207	-----
TOTAL	14,054	7,147	4,355	3,715.0	4,329	3,819	19,167	43,767	63,620	23,128	9,335	6,214
MEAN	453	224	143	120	155	123	639	1,418	2,121	746	301	207
MAX	645	396	179	150	177	138	1,420	2,660	2,680	1,400	468	230
MIN	253	71	112	55.5	109	106	134	690	1,450	476	198	189
CFSM	1.90	1.00	.59	0.50	.65	.52	2.68	5.96	8.91	3.13	1.27	.87
IN-	2.20	1.12	.68	0.58	.68	.60	3.00	6.87	9.94	3.61	1.46	.97
AC-FT	27,880	14,180	8,640	7,370	8,590	7,570	38,020	87,210	126,200	45,870	18,520	12,330
CALENDAR YEAR 1961:	MAX 5,080		MIN 70.5		MEAN 636		CFSM 2.32		IN 36.28		AC-FT 460,200	
WATER YEAR 1961-62:	MAX 2,680		MIN 55.5		MEAN 556		CFSM 2.34		IN 31.71		AC-FT 402,400	

\* Discharge measurement made on this day.

a No gage-height record.

g Discharge computed from wire-weight gage readings.

Note.--Stage-discharge relation affected by ice Nov. 15-17, Dec. 11 to Jan. 22, Jan. 24, 25.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963												
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	183	306	468	195	110	170	162	660	2,890	2,570	429	177
2	174	300	407	174	104	155	* 167	712	2,770	2,570	407	177
3	180	284	380	167	128	174	177	734	2,700	2,460	380	172
4	174	270	366	167	146	174	180	723	2,870	2,350	366	167
5	170	280	352	174	192	170	174	712	2,990	2,260	346	160
6	164	265	329	172	223	* 170	183	767	3,180	2,180	335	152
7	172	275	300	150	265	157	180	891	3,080	2,060	329	150
8	174	270	294	172	* 300	164	189	1,010	2,870	1,990	311	144
9	170	230	256	142	311	157	198	1,060	2,770	1,890	311	142
10	162	246	256	130	323	157	201	1,070	3,880	1,690	317	142
11	160	246	256	124	329	148	207	1,040	4,520	1,520	317	146
12	180	242	* 246	138	329	144	207	1,010	* 4,240	1,360	317	148
13	195	246	230	146	340	152	204	1,000	3,910	1,250	311	150
14	219	230	234	138	323	142	204	986	3,600	1,160	* 317	160
15	251	* 226	223	138	294	134	256	* 1,030	3,390	1,080	311	148
16	284	219	219	* 140	284	130	280	1,060	3,260	1,000	300	164
17	289	223	226	134	270	130	289	1,140	3,080	944	284	167
18	* 275	234	234	121	260	132	* 335	1,150	2,920	876	280	* 167
19	280	275	242	138	246	130	329	1,300	2,850	* 800	284	162
20	289	215	256	329	226	126	335	1,360	2,660	745	275	157
21	280	251	275	192	223	126	340	1,470	2,440	712	265	157
22	270	280	260	146	215	123	346	1,620	2,460	680	238	162
23	300	246	251	140	207	119	346	1,790	2,290	640	230	167
24	317	352	238	150	192	128	323	1,990	2,100	610	223	167
25	346	393	226	134	192	123	306	2,200	1,930	610	230	162
26	352	352	242	123	195	132	306	2,370	1,830	563	230	150
27	346	286	231	123	177	138	323	2,440	* 1,730	518	219	166
28	335	393	201	121	144	146	414	* 2,410	1,670	492	198	144
29	323	387	201	114	-----	142	453	2,410	1,990	468	192	146
30	306	527	223	115	-----	150	572	2,610	2,390	445	186	146
31	300	-----	201	114	-----	167	-----	2,840	-----	421	183	-----
TOTAL	7,620	8,649	8,303	4,661	6,578	4,510	8,198	43,665	85,170	38,916	8,921	4,699
MEAN	246	286	268	150	235	145	273	1,409	2,819	1,255	288	157
MAX	352	527	468	329	340	174	572	2,840	4,520	2,570	429	177
MIN	160	215	201	114	104	119	162	660	1,670	421	183	142
CFSM	1.03	1.21	1.13	.63	.99	.61	1.15	5.92	11.9	5.27	1.21	.66
IN-	1.19	1.35	1.30	.73	1.03	.70	1.28	6.82	13.31	6.08	1.39	.73
AC-FT	15,110	17,160	16,470	9,240	13,050	8,950	16,260	86,610	168,900	77,190	17,690	9,320
CALENDAR YEAR 1962:	MAX 4,520		MIN 55.5		MEAN 553		CFSM 2.32		IN 31.55		AC-FT 400,400	
WATER YEAR 1962-63:	MAX 4,520		MIN 104		MEAN 556		CFSM 2.65		IN 35.91		AC-FT 456,000	

\* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 23, 24, 29, 30, Dec. 3, 4, Dec. 9 to Mar. 4.

## 5-0130. Waterton River near Waterton Park, Alberta--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	148	120	184	120	94.7	78.0	* 74.7	331	2,340	2,220	554	220
2	142	112	173	110	99.8	72.5	75.9	495	2,620	* 2,220	528	238
3	132	118	156	105	96.4	71.4	81.0	966	2,940	2,340	486	229
4	126	112	153	93.0	94.7	* 70.3	85.5	1,140	* 3,370	2,300	462	247
5	126	110	164	102	88.5	70.3	87.0	1,130	3,690	2,260	462	256
6	130	107	148	98.1	93.0	72.5	107	1,130	* 3,670	2,160	423	256
7	132	* 120	146	103	90.0	74.7	114	1,080	4,130	2,020	409	271
8	126	114	139	107	85.5	75.8	122	1,040	13,700	1,950	402	281
9	120	110	139	107	88.5	74.7	130	1,030	* 22,700	1,980	395	286
10	118	110	137	107	85.5	75.8	142	1,080	* 13,400	1,960	367	292
11	118	102	98.1	103	85.5	75.8	130	* 1,140	* 8,220	1,850	361	292
12	116	99.8	b 110'	108	85.5	75.8	142	1,170	* 6,230	1,730	* 355	292
13	120	103	b 110	108	* 82.5	75.8	144	1,280	5,450	1,620	349	276
14	112	107	b 108	108	85.5	78.0	161	1,390	5,030	1,570	337	276
15	108	110	b 114	105	82.5	73.6	144	1,420	4,710	1,500	325	281
16	105	124	b 114	105	85.5	75.8	151	1,420	4,320	1,420	308	271
17	* 103	135	b 112	103	81.0	74.7	164	1,570	3,940	1,290	297	256
18	102	120	b 108	102	82.5	71.4	175	1,850	3,540	1,210	297	* 251
19	91.5	114	* 110	99.8	75.8	72.5	175	2,160	3,210	1,150	281	256
20	94.7	120	b 107	102	81.0	72.5	170	2,680	2,970	1,060	271	242
21	117	b 120	b 107	* 96.4	72.8	72.5	198	3,240	2,790	992	260	251
22	103	b 122	b 120	b 85.5	78.0	b 67.0	188	3,170	2,660	928	251	247
23	107	b 118	b 124	b 85.5	81.0	b 65.9	225	2,830	2,660	880	242	238
24	116	b 124	b 132	b 85.5	73.6	b 64.8	229	2,340	2,940	809	242	238
25	110	b 128	128	93.0	75.8	71.4	242	1,980	3,240	754	251	242
26	118	b 144	99.8	93.0	74.7	71.4	238	1,710	3,280	700	238	251
27	110	167	96.4	96.4	73.6	70.3	247	1,600	3,210	662	234	256
28	118	81.9	105	94.7	74.7	69.2	247	1,640	3,080	* 634	220	256
29	118	212	103	102	75.8	70.3	247	1,820	2,680	624	220	256
30	108	151	120	99.8	71.4	71.4	271	1,980	2,430	606	212	286
31	114	-----	-----	96.4	-----	72.5	-----	2,140	-----	634	212	-----
TOTAL	3,609.2	3,776.7	3,863.4	3,124.1	2,423.9	2,248.6	4,908.1	49,952	149,350	44,023	10,251	7,781
MEAN	116	126	125	101	72.5	72.5	164	1,410	4,778	1,420	312	251
MAX	148	202	184	120	99.8	78.0	271	3,240	22,700	2,340	554	292
MIN	91.5	81.9	96.4	85.5	72.8	64.8	74.7	331	2,340	606	212	220
CFSM	0.46	0.53	0.53	0.42	0.35	0.30	0.69	6.77	20.9	5.97	1.39	1.09
IN	0.56	0.59	0.60	0.49	0.38	0.35	0.77	7.81	23.34	6.88	1.60	1.22
AC-FT	7,160	7,490	7,660	6,200	4,810	4,460	9,740	99,080	296,200	87,320	20,330	15,430

CALENDAR YEAR 1963:

MAX 4,520

MIN 81.9

MEAN 593

CFSM 2.49

IN 33.82

AC-FT 429,500

WATER YEAR 1963-64:

MAX 22,700

MIN 64.8

MEAN 780

CFSM 3.28

IN 44.59

AC-FT 565,900

\* Discharge measurement made on this day.

b Stage-discharge relation affected by ice.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	337	271	b 161	95.5	111	* 131	118	1,330	* 2,900	1,960	682	285
2	402	260	b 161	109	109	122	132	1,390	* 2,680	1,870	662	262
3	431	265	b 161	147	109	120	124	1,360	2,770	1,930	653	271
4	445	281	b 167	141	127	131	122	1,220	3,120	2,060	644	280
5	470	* 251	170	b 129	129	124	122	1,110	3,280	2,140	644	276
6	486	236	181	b 136	124	127	124	1,040	3,330	2,180	634	276
7	* 453	274	173	b 136	131	124	124	979	3,280	2,240	606	271
8	486	220	173	b 127	118	124	127	904	2,940	2,280	580	267
9	503	238	159	b 124	122	129	129	868	2,660	2,280	554	305
10	511	229	153	b 141	122	134	139	892	2,720	2,240	528	320
11	537	229	151	b 141	120	129	158	953	3,140	2,160	513	315
12	520	220	b 151	b 139	124	b 127	170	1,130	3,740	1,960	505	310
13	511	216	b 153	b 129	122	b 124	177	1,410	4,000	1,760	528	310
14	537	b 220	b 144	* 131	111	b 139	205	1,740	3,690	* 1,590	467	310
15	537	b 225	b 137	b 136	118	b 127	220	2,000	3,190	1,490	445	330
16	537	b 202	* 132	b 131	111	b 127	249	2,160	3,490	1,420	432	330
17	511	198	b 137	136	120	b 127	262	2,180	4,400	1,390	412	330
18	495	195	b 132	134	b 122	b 131	262	2,060	* 4,970	1,360	399	336
19	478	b 216	b 130	129	b 120	b 129	271	1,870	5,480	1,270	386	341
20	431	b 202	128	124	b 127	b 129	315	1,800	5,420	1,210	* 375	358
21	387	b 212	130	122	127	131	375	1,690	4,510	1,140	364	369
22	380	b 175	b 132	124	127	131	399	1,570	3,790	1,100	352	460
23	361	b 184	137	104	129	129	439	1,500	3,350	992	352	475
24	343	b 181	139	141	131	129	490	1,440	3,170	916	369	475
25	325	b 173	132	122	141	124	545	1,440	3,080	868	352	490
26	302	b 170	137	118	163	120	624	1,520	3,170	820	347	513
27	297	b 167	137	109	141	118	700	1,550	3,170	787	330	490
28	319	b 161	132	111	136	118	* 820	1,710	2,860	765	325	498
29	297	b 161	130	118	-----	-----	115	1,966	2,120	732	315	482
30	281	b 164	130	118	-----	* 115	-----	1,170	2,180	721	300	498
31	276	-----	b 132	113	-----	115	-----	3,120	-----	691	290	-----
TOTAL	13,186	6,396	4,520	3,983.5	3,492	3,919	10,068	48,866	102,990	46,322	14,345	10,833
MEAN	425	213	146	128	125	126	336	1,576	3,433	1,494	463	361
MAX	537	281	181	180	163	139	1170	3,120	5,480	2,280	682	513
MIN	276	161	128	95.5	109	115	118	868	2,180	691	290	262
CFSM	1.79	0.89	0.61	0.54	0.53	0.53	1.41	6.64	14.41	6.26	1.95	1.52
IN	2.06	1.00	0.71	0.62	0.55	0.61	1.57	7.64	16.09	7.24	2.24	1.69
AC-FT	26,150	12,690	8,970	7,900	6,930	7,770	19,970	96,920	204,300	91,880	28,450	21,490

CALENDAR YEAR 1964:

MAX 22,700

MIN 64.8

MEAN 815

CFSM 3.42

IN 46.61

AC-FT 591,400

WATER YEAR 1964-65:

MAX 5,480

MIN 95.5

MEAN 737

CFSM 3.10

IN 42.02

AC-FT 533,400

\* Discharge measurement made on this day.

b Stage-discharge relation affected by ice.

5-0135. St. Mary Lake near St. Mary, Mont.

Location.--Lat 48°44'10", long 113°25'50", in NE $\frac{1}{4}$  sec. 4, T.34 N., R.14 W. (unsurveyed), on downstream side of boat dock on right bank at site of former St. Mary Chalet in Glacier National Park, half a mile upstream from outlet and 1 mile southwest of St. Mary.

Drainage area.--130 sq mi.

Records available.--May 1929 to October 1961, incomplete (discontinued).

Gage.--Water-stage recorder. Altitude of gage is 4,470 ft (from topographic map). Prior to May 29, 1936, staff gage at same site and datum.

Extremes.--Maximum and minimum gage heights in feet, for October 1960 to October 1961 are contained in the following table:

Water year	Maximum		Minimum	
	Date	Gage Height	Date	Gage Height
1961	May 27, 1961.....	6.59	Sept. 26, 1961.....	a 1.78
1962	Oct. 17, 1961.....	8.00	Oct. 5, 1961.....	1.72

a Minimum recorded.

1929-61: Maximum gage height, 7.08 ft June 14, 1953; minimum observed, 0.02 ft Dec. 16, 29, 30, 1929, Jan. 1, 1930.

Remarks.--No diversion.

MEAN GAGE HEIGHT, IN FEET, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

MEAN GAGE HEIGHT, IN FEET, WATER YEAR OCTOBER 1900 TO SEPTEMBER 1902												
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	1.75						-	2.10	6.13	4.58	2.95	2.53
2	1.73						-	2.16	6.06	4.21	2.90	2.37
3	1.70						-	2.21	6.05	4.11	2.87	2.38
4	1.67						-	2.31	6.08	4.06	2.85	2.26
5	1.63						-	2.43	6.19	4.06	2.85	2.24
6	1.59						-	2.52	6.34	4.12	2.86	2.23
7	1.58						-	2.54	6.47	4.14	2.82	2.20
8	1.61						-	2.56	6.42	4.15	2.78	2.20
9	1.57						-	2.59	6.19	4.09	2.76	2.12
10	1.57						-	2.72	5.91	4.02	2.75	2.11
11	1.58						-	2.91	5.71	3.97	2.69	2.12
12	1.59						-	3.06	5.67	3.88	2.63	2.10
13	1.58						-	3.17	5.66	3.80	2.58	2.06
14	1.56						-	3.25	5.58	3.76	2.54	2.02
15	1.55						-	3.33	5.55	3.77	2.51	1.98
16	1.46						-	3.46	5.62	3.83	2.50	1.95
17	1.45						2.16	3.61	5.73	3.82	2.48	1.94
18	1.45						2.19	3.65	5.83	3.76	2.44	1.91
19	1.46						2.22	3.69	5.88	3.66	2.43	1.93
20	-						2.22	3.61	5.87	3.58	2.43	1.89
21	-						2.19	4.07	5.79	3.51	2.42	1.89
22	-						2.17	4.46	5.60	3.46	2.40	1.89
23	-						2.21	4.98	5.39	3.46	2.40	1.88
24	-						2.19	5.45	5.23	3.44	2.31	1.91
25	-						2.20	5.82	5.16	3.38	2.41	1.80
26	-						2.16	6.16	5.15	3.33	2.43	1.80
27	-						2.15	6.46	5.09	3.24	2.39	1.81
28	-						2.14	6.51	4.94	-	-	1.81
29	-				-----		2.11	6.33	4.79	3.14	-	1.84
30	-				-----		2.11	6.26	4.65	3.07	-	1.87
31	-	-----			-----		-----	6.22	-----	3.01	2.33	-----
MAX	-	-	-	-	-	-	-	6.51	6.47	4.38	2.95	2.58
MIN	-	-	-	-	-	-	-	2.10	4.65	3.01	2.33	1.80

MEAN GAGE HEIGHT, IN FEET, 1961

[illegible]

Location.--Lat 48°44'10", long 113°25'50", in NE<sup>1</sup>/<sub>4</sub> sec.4, T.34 N., R.14 W. (unsurveyed), on downstream side of boat dock on right bank, half a mile upstream from lake outlet and 1 mile southwest of St. Mary.

Extremes.--Maximum and minimum discharges for October 1960 to October 1961 are contained in the following table:

Water year	Maximum			Minimum		
	Date	Discharge (cfs)	Gage height (feet)	Date	Discharge (cfs)	Gage height (feet)
1961	May 27, 1961	3,050	6.59	Sept. 26, 1961	122	1.78
1962	Oct. 17, 1961	490	3.00	Oct. 5, 1961	119	1.72

Remarks.--Records good. No regulation or diversion.

MONTHLY INCOME AND EXPENDITURE STATEMENT FOR OCTOBER 1968 TO SEPTEMBER 1969												
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	154						-	209	2,580	1,170	483	261
2	130						-	224	2,510	1,070	466	270
3	125						-	237	2,500	1,010	455	273
4	120						-	264	2,530	976	448	237
5	114						-	299	2,640	976	448	232
6	108						-	326	2,790	1,010	452	226
7	106						-	332	2,920	1,020	441	219
8	111						-	338	2,870	1,030	427	216
9	104						-	347	2,640	994	420	197
10	104						-	392	2,370	952	418	192
11	106						-	458	2,190	925	396	195
12	108						-	514	2,150	880	374	187
13	106						-	558	2,140	840	357	178
14	103						-	580	2,070	820	347	173
15	102						-	622	2,040	825	358	159
16	89						-	674	2,110	855	335	151
17	88						224	745	2,210	855	326	149
18	88						232	785	2,300	825	314	141
19	89						239	780	2,340	775	308	145
20	-						239	845	2,330	735	308	136
21	-	232					232	982	2,260	700	302	138
22	-	-					226	1,220	2,080	678	296	138
23	-	-					237	1,580	1,900	678	293	138
24	-	-					232	1,960	1,770	674	293	143
25	-	-					234	2,290	1,720	650	293	125
26	-	-					224	2,610	1,710	630	299	125
27	-	-					222	2,910	1,680	594	284	129
28	-	-					219	2,960	1,550	570	278	129
29	-	-			----		212	2,780	1,440	554	272	136
30	-	-			----		212	2,710	1,340	526	266	141
31	-	-----			----		-----	2,670	-----	506	261	-----
TOTAL	-	-	-	-	-	-	-	34,191	65,670	25,303	10,996	5,273
MEAN	-	-	-	-	-	-	-	1,103	2,189	816	355	176
MAX	-	-	-	-	-	-	-	2,960	2,920	1,170	483	273
MIN	-	-	-	-	-	-	-	209	1,340	506	261	125
CFSM	-	-	-	-	-	-	-	8.48	16.8	6.28	2.73	1.35
IN	-	-	-	-	-	-	-	9.78	18.79	7.24	3.15	1.51
AC-FT	-	-	-	-	-	-	-	67,820	130,300	50,190	21,810	10,460

[illegible]

## SASKATCHEWAN RIVER BASIN

5-0139. Grinnell Creek at Grinnell Glacier, near Many Glacier, Mont.

Location.--Lat 48°45'30", long 113°43'30", in SW $\frac{1}{4}$  sec.25, T.35 N., R.17 W. (unsurveyed), on left bank a quarter of a mile downstream from Grinnell Glacier, a quarter of a mile upstream from Grinnell Falls, 4 miles southwest of Many Glacier, and 15 miles southwest of Babb.

Drainage area.--1.1 sq mi, approximately.

Records available.--July 1959 to September 1965 (no winter records).

Gage.--Water-stage recorder. Datum of gage is 6,322 ft above mean sea level (planetable bench mark).

Extremes.--Maximum and minimum discharges for the water years 1961-65 are contained in the following table:

Water year	Maximum recorded			Minimum		
	Date	Discharge (cfs)	Gage height (feet)	Date	Discharge (cfs)	Gage height (feet)
1961	July 15, 1961	79	a 5.32	Nov. 29, 30, 1960	0	-
1962	Oct. 13, 1961	90	b 5.49	Nov. 18-30, 1961	0	-
1963	July 5, 1963	66	c 3.14	Jan. 6-8, 1963	0	-
1964	-	-	-	Dec. 5, 1963	d .40	-
1965	July 12, 1965	63	5.05	-	-	-

a Maximum gage height exceeded 9 ft probably during ice jam in June.

b Maximum gage height for year, 3.56 ft Oct. 1, 1961, backwater from ice.

c Maximum gage height for year, 4.54 ft Nov. 20, 1962, backwater from ice.

d Minimum recorded.

1959-65: Maximum discharge recorded, 100 cfs Aug. 3, 1960 (gage height, 3.65 ft); maximum gage height exceeded 9 ft probably during June 1961 (backwater from snow and ice jam); no flow at times; probably no flow for most of each winter.

Remarks.--Records good except those for winter periods, which are poor. No regulation or diversion.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	7.9	5.0								35	58	34
2	7.9	4.5								35	39	22
3	7.6	3.5								37	41	19
4	7.2	3.0								38	42	26
5	9.0	2.5								45	44	27
6	9.0	2.0								55	51	21
7	11	2.3								52	44	16
8	10	2.2								45	38	17
9	5.5	1.7								42	35	16
10	4.0	1.8								40	29	12
11	3.0	3.0								38	31	9.0
12	4.5	2.8								37	32	6.7
13	3.5	2.0								39	34	5.7
14	2.5	2.5								47	34	5.0
15	2.0	2.3								54	37	5.4
16	2.0	2.0								56	38	7.2
17	3.0	1.6								46	32	10
18	3.0	2.2								41	31	12
19	2.0	2.2								42	36	7.2
20	2.0	1.8								40	34	6.4
21	2.6	1.5								45	40	5.7
22	11	.70								46	39	5.0
23	10	.50								44	39	4.6
24	9.7	.50								47	40	4.2
25	9.0	1.5								35	42	4.0
26	5.5	1.6								34	39	4.2
27	6.0	.60								35	33	4.0
28	5.5	.20								36	30	3.5
29	4.5	0			-----					36	31	6.0
30	3.5	0			-----					36	32	10
31	3.0	-----			-----		-----		-----	37	34	-----
TOTAL	176.9	58.00	-	-	-	-	-	-	-	1,298	1,139	335.8
MEAN	5.71	1.93	-	-	-	-	-	-	-	41.9	36.7	11.2
MAX	11	5.0	-	-	-	-	-	-	-	56	51	34
MIN	2.0	0	-	-	-	-	-	-	-	34	29	3.5
CFSM	5.19	1.75	-	-	-	-	-	-	-	38.1	33.4	10.2
IN.	5.98	1.96	-	-	-	-	-	-	-	43.88	38.51	11.35
AC-FT	351	115	-	-	-	-	-	-	-	2,570	2,260	666

## 5-0139. Grinnell Creek at Grinnell Glacier, near Many Glacier, Mont.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	15	4.5								40	38	20
2	20	4.0								35	39	15
3	25	3.5								27	37	9.0
4	35	3.0								23	34	9.0
5	40	2.0								24	46	15
6	35	1.4								25	48	19
7	29	1.3								25	40	15
8	15	.80								26	34	8.1
9	15	.50								28	33	6.7
10	25	1.0								31	35	9.6
11												
12	20	1.0								35	34	15
13	18	.80								32	35	8.7
14	75	.70								33	35	6.4
15	75	.50								36	31	7.8
16	50	.40								36	29	9.9
17												
18	24	.30								32	31	9.3
19	15	.10								30	33	12
20	10	0								29	28	13
21	6.4	0								27	23	12
22	5.0	0								29	31	12
23	5.0	0								36	30	12
24	4.5	0								40	23	17
25	4.5	0								43	21	15
26	4.0	0								42	27	13
27	4.5	0								40	28	12
28	4.5	0								40	24	13
29	4.0	0								42	17	14
30	4.0	0								48	17	16
31	3.5	0								45	15	14
32	4.0	0								45	15	9.0
33	4.0	0								37	15	
34	4.0	0								36	19	
TOTAL	598.9	25.6	-	-	-	-	-	-	-	1,052	928	367.5
MEAN	19.3	.85	-	-	-	-	-	-	-	33.9	29.9	12.2
MAX	75	4.5	-	-	-	-	-	-	-	48	48	20
MIN	3.5	0	-	-	-	-	-	-	-	23	15	6.4
CFSM	17.5	.775	-	-	-	-	-	-	-	30.8	27.2	11.1
IN.	20.25	.87	-	-	-	-	-	-	-	35.57	31.37	12.42
AC-FT	1,130	51	-	-	-	-	-	-	-	2,080	1,840	729

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	8.7	6.4	4.5	.30						27	32	22
2	10	5.7	4.0	1.0						28	29	31
3	9.6	5.7	3.0	.50						35	30	33
4	8.4	5.0	2.5	.20						49	31	32
5	6.7	7.2	3.5	.10						54	33	50
6												
7	5.7	7.0	3.0	0						59	36	29
8	5.0	6.0	3.0	0						58	39	31
9	5.4	4.5	2.5	0						57	38	30
10	5.7	5.2	2.0	-						50	39	29
11	5.2	7.0	2.0	-						40	44	31
12												
13	4.0	7.0	1.5	-						40	44	30
14	7.5	6.0	1.5	-						43	40	28
15	16	5.5	1.8	-						38	42	32
16	10	4.5	1.9	-						36	44	33
17	7.8	3.0	2.4	-						34	40	20
18												
19	7.0	2.5	4.2	-						30	33	17
20	7.0	2.5	3.3	-						31	30	14
21	7.0	2.5	2.4	-						37	28	12
22	6.5	4.0	1.9	-						40	33	10
23	15	10	1.7	-						37	27	10
24												
25	24	9.0	1.2	-						39	21	11
26	19	6.5	.80	-						40	19	18
27	9.6	4.5	.50	-						36	18	23
28	6.4	3.5	.40	-						32	24	22
29	5.0	5.0	.20	-						28	27	18
30												
31	4.8	8.0	.20	-						26	21	17
32	5.0	7.0	.20	-						29	18	17
33	7.8	5.5	.20	-						28	18	16
34	11	4.5	.20	-						28	19	18
35	10	5.0	.30	-						28	21	19
36	7.8		.30	-						28	22	
TOTAL	286.6	165.7	57.10	-	-	-	-	-	-	1,165	940	683
MEAN	8.60	5.52	1.84	-	-	-	-	-	-	37.6	30.3	22.8
MAX	24	10	4.5	-	-	-	-	-	-	59	44	33
MIN	4.0	2.5	.20	-	-	-	-	-	-	26	18	10
CFSM	7.82	5.02	1.67	-	-	-	-	-	-	34.2	27.5	20.7
IN.	9.01	5.60	1.93	-	-	-	-	-	-	39.39	31.78	23.09
AC-FT	529	329	113	-	-	-	-	-	-	2,510	1,860	1,350

## 5-0139. Grinnell Creek at Grinnell Glacier, near Many Glacier, Mont.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	21	2.5	.90								28	9.0
2	16	3.2	.80								26	24
3	14	3.0	.60								25	22
4	12	2.8	.40							50	29	16
5	13	2.8	.40								34	13
6		11	2.8								28	7.8
7	8.4	3.7	-								28	6.2
8	7.0	3.0	-							60	30	5.9
9	6.5	3.0	-								29	5.2
10	6.5	2.5	-								27	4.4
11		7.5	2.5	-							27	3.8
12	9.0	2.0	-								29	3.7
13	10	2.0	-							55	28	4.4
14	11	2.5	-								24	5.0
15	12	9.0	-								24	8.1
16	10	10	-							42	26	12
17	8.4	8.0	-							38	29	15
18	7.0	6.0	-							32	45	14
19	5.0	4.0	-							42	26	8.7
20	4.5	2.5	-							38	26	9.0
21		5.2	3.0	-						38	28	6.9
22	12	3.0	-							37	27	6.7
23	17	3.0	-							32	21	6.2
24	11	3.5	-							29	16	17
25	10	3.5	-							31	17	22
26		8.0	3.5	-						34	30	14
27		6.0	4.6	-						35	22	9.3
28		5.0	2.8	-						35	21	6.4
29		4.5	1.8	-						35	19	5.9
30		4.0	1.1	-	-----		-----			37	14	11
31		3.5	-	-	-----				-----	37	9.6	-----
TOTAL	286.0	107.4	-	-	-	-	-	-	-	1,408	780.6	302.6
MEAN	9.23	3.58	-	-	-	-	-	-	-	45.4	28.2	10.1
MAX	21	10	-	-	-	-	-	-	-	-	34	24
MIN	3.5	1.1	-	-	-	-	-	-	-	29	9.6	3.7
CFSM	8.38	3.25	-	-	-	-	-	-	-	41.3	22.9	9.18
IN.	9.67	3.63	-	-	-	-	-	-	-	47.60	26.39	10.23
AC-FT	667	213	-	-	-	-	-	-	-	2,790	1,550	600

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	12	4.8	2.5							17	39	18
2	16	7.2	2.0							27	40	17
3	17	15	1.5							36	44	14
4	10	10	1.5							40	47	9.0
5	8.1	6.9	1.2							50	43	6.5
6	10	8.0	.90							57	36	5.4
7	9.6	6.0	.60							52	35	5.0
8	9.0	5.0	.60							48	35	7.5
9		3.8	.80							49	37	9.0
10	20	2.8	.80							49	42	6.2
11		13	3.2	.70						43	42	5.0
12	13	3.0	-							39	43	4.4
13	12	3.2	-							35	38	4.4
14	11	2.8	-							38	34	5.9
15	10	2.3	-							39	32	6.5
16		9.0	1.9	-						41	31	7.0
17		8.5	1.7	-						41	29	5.2
18		8.0	1.6	-						41	29	4.5
19		7.5	1.4	-						39	31	5.9
20		7.5	1.3	-						38	31	5.7
21		5.9	1.2	-						37	29	8.7
22		5.0	1.0	-						38	35	6.9
23		4.0	1.2	-						35	32	5.0
24		3.5	2.0	-						35	38	4.8
25		3.2	3.0	-						34	31	6.4
26		3.0	3.5	-						36	34	6.0
27		3.5	2.0	-						40	30	5.0
28		5.2	1.0	-						41	24	4.0
29		9.9	1.5	-	-----					40	15	3.5
30		9.6	2.5	-	-----				15	39	11	3.5
31		6.7	-	-	-----				-----	39	12	-----
TOTAL	292.7	110.8	-	-	-	-	-	-	-	1,233	1,027	207.9
MEAN	9.44	3.69	-	-	-	-	-	-	-	39.8	33.1	6.93
MAX	22	15	-	-	-	-	-	-	-	57	47	18
MIN	3.0	1.0	-	-	-	-	-	-	-	17	11	3.5
CFSM	8.58	3.35	-	-	-	-	-	-	-	36.2	30.1	6.30
IN.	9.90	3.75	-	-	-	-	-	-	-	41.69	34.72	7.03
AC-FT	581	220	-	-	-	-	-	-	-	2,450	2,040	412



5-0140. Grinnell Creek near Many Glacier, Mont.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

CALENDAR YEAR 1961:	MAX 153	MIN 0.5	MEAN 27.6	CFSM 7.95	IN 107.85	AC-FT 19.960
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CHICKEN YEAR 1961:	MAX 135	MIN 0.3	MEAN 27.8	CFSM 7.95	IN 107.85	AC-FT 19,900
WATER YEAR 1961-62:	MAX 140	MIN 0.2	MEAN 23.0	CFSM 6.63	IN 89.88	AC-FT 16,630

Note.--Backwater from beaver dams Oct. 19 to Nov. 29, Apr. 12 to May 29 and Aug. 17 to Sept. 30.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963

CALENDAR YEAR 1962:	MAX 90	MIN 0.2	MEAN 21.7	CFSM 6.25	IN 84.88	AC-PT 15.710
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WATER YEAR 1962-63:	MAX 116	MIN 0.7	MEAN 24.8	CFSM 7.15	IN 97.11	AC-PT 17,980
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## 5-0140. Grinnell Creek near Many Glacier, Mont.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	22	3.4	4.8	.60	.80	.50	1.5	17	74	70	45	18
2	20	3.8	4.3	.60	.80	.40	1.5	24	80	81	44	42
3	17	3.8	3.8	.70	.90	.40	2.0	24	103	87	38	61
4	16	3.4	3.4	.60	.90	.30	2.0	22	117	78	38	45
5	16	3.8	3.2	.70	1.0	.40	2.5	18	115	94	47	34
6	16	3.8	4.8	.60	1.1	.60	2.5	16	113	94	41	25
7	13	4.3	4.1	.60	1.2	.60	2.0	14	119	91	39	20
8	8.7	3.4	3.5	.60	1.2	.90	2.0	12	342	91	38	17
9	7.6	3.4	3.0	.70	1.5	1.0	2.5	15	334	97	38	16
10	6.9	3.2	2.5	.60	1.6	1.0	2.5	26	196	95	37	14
11	7.2	2.5	1.5	.50	1.9	1.5	3.0	24	162	86	34	11
12	8.3	2.4	1.0	.50	2.5	1.5	3.0	24	192	85	34	9.6
13	9.2	2.5	.80	.50	2.5	1.5	3.0	28	157	86	34	9.2
14	11	3.4	1.0	.50	2.0	.90	2.5	27	121	89	31	8.7
15	12	11	1.0	.50	1.5	.90	3.0	24	108	96	29	10
16	12	12	1.0	.50	1.5	1.0	4.0	27	95	84	29	13
17	10	9.2	1.0	.50	1.0	.90	4.0	39	96	65	30	17
18	7.6	7.9	1.5	.40	1.0	1.5	4.0	47	90	70	34	24
19	6.9	6.5	1.5	.40	1.0	1.5	3.0	55	85	69	33	20
20	4.8	4.0	1.3	.40	1.5	1.5	3.5	72	94	63	29	20
21	4.3	5.5	1.3	.40	1.5	2.0	3.0	79	90	60	29	20
22	8.4	5.5	1.0	.60	2.0	2.5	3.0	59	86	58	29	20
23	26	5.5	.60	.70	2.0	2.0	4.0	37	98	53	28	18
24	20	5.9	.50	1.1	1.5	1.5	3.0	26	115	47	23	20
25	18	5.9	.50	.90	1.5	1.5	3.0	22	107	45	20	30
26	12	6.3	.60	.80	1.0	2.0	3.5	21	93	47	30	29
27	8.3	16	.60	.80	1.0	2.0	3.5	27	83	49	31	22
28	6.6	12	.60	.70	.90	1.5	4.2	71	71	48	26	18
29	5.9	7.6	.50	.80	.80	1.5	3.8	65	64	47	26	16
30	5.1	5.9	.50	.60	-----	1.0	7.0	61	66	48	24	27
31	4.3	-----	.50	.80	-----	1.5	-----	62	-----	54	21	-----
TOTAL	351.1	173.8	56.20	19.20	39.60	37.80	91.3	1,056	3,666	2,227	1,009	654.5
MEAN	11.3	5.79	1.81	.62	1.37	1.22	3.04	34.1	122	71.8	32.5	21.8
MAX	26	16	4.8	1.1	2.5	2.5	7.0	79	342	97	47	61
MIN	4.3	2.4	.50	.40	.80	.30	1.5	12	64	45	20	8.7
CFSM	3.26	1.67	.52	.18	.39	.35	.88	9.82	35.2	20.7	9.38	6.29
IN.	3.76	1.86	.60	.21	.42	.41	.98	11.32	39.29	23.87	10.81	7.01
AC-FT	696	345	111	38	79	75	181	2,090	7,270	4,420	2,000	1,300

CALENDAR YEAR 1963: MAX 116 MIN 0.5 MEAN 23.5 CFSM 6.77 IN 91.91 AC-FT 17,010

WATER YEAR 1963-64: MAX 342 MIN 0.3 MEAN 25.6 CFSM 7.38 IN 100.54 AC-FT 18,600

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	42	7.9	3.5	2.5	2.0	2.0	1.5	39	59	46	53	22
2	33	12			2.5		1.5	29	63	61	54	24
3	30	12			2.5		2.0	23	98	77	55	26
4	24	8.3			2.0		2.2	20	103	87	59	22
5	20	7.9			2.0		2.4	19	85	91	55	18
6	20	6.9	3.5	2.0	1.5	2.0	2.5	17	89	108	47	15
7	26	5.9			1.5		2.7	14	74	102	44	13
8	26	5.3			1.5		2.9	13	63	92	44	13
9	38	5.3			1.5		3.2	17	70	92	46	17
10	54	5.3			1.5		3.6	26	87	90	48	16
11	40	5.1	3.0	2.5	1.5	1.0	3.8	39	103	79	47	14
12	32	4.8			1.5		3.8	55	122	64	51	12
13	28	4.8			1.5		4.1	62	121	61	53	11
14	26	4.8			1.5		4.6	57	92	65	45	15
15	27	4.6			2.0		4.8	57	75	68	40	22
16	24	4.6	3.0	2.5	1.0	.50	4.8	58	91	70	38	18
17	18	4.3					4.8	51	103	70	36	16
18	14	4.3					4.6	37	230	70	35	13
19	11	4.3					4.3	32	253	66	35	11
20	11	4.1					10	37	166	56	37	12
21	11	4.1	3.5	2.0	1.5	.50	16	33	118	55	34	17
22	11	4.1					17	28	103	55	37	24
23	8.7	3.8					16	26	96	47	38	20
24	7.2	4.6					16	24	106	47	41	17
25	6.3	5.1					16	26	96	46	38	20
26	6.3	4.5	3.0	2.5	1.0	.50	18	29	90	48	38	20
27	5.9	4.0					21	34	95	52	37	16
28	6.6	3.5					27	66	71	55	34	13
29	6.6	4.0					32	98	54	54	29	11
30	7.6	4.5					38	103	43	53	24	9.6
31	8.7	-----	-----	-----	-----	-----	.90	75	-----	53	20	-----
TOTAL	629.9	164.7	100.5	77.5	72.0	41.10	291.1	1,244	3,019	2,080	1,292	497.6
MEAN	20.3	5.49	3.24	2.50	2.57	1.33	9.70	40.1	101	67.1	41.7	16.6
MAX	54	12	-	-	-	-	38	103	253	108	59	26
MIN	5.9	3.5	-	-	-	-	1.5	13	43	46	20	9.6
CFSM	5.86	1.58	.93	.72	.74	.38	2.80	11.6	29.0	19.3	12.0	4.78
IN.	6.75	1.77	1.08	.83	.77	.44	3.12	13.33	32.36	22.29	13.85	5.33
AC-FT	1,250	327	199	154	143	82	577	2,470	5,990	4,130	2,560	987

CALENDAR YEAR 1964: MAX 342 MIN 0.3 MEAN 26.5 CFSM 7.64 IN 103.92 AC-FT 19,230

WATER YEAR 1964-65: MAX 253 MIN - MEAN 26.1 CFSM 7.52 IN 101.92 AC-FT 18,870

5-0145. Swiftcurrent Creek at Many Glacier, Mont.

(Hydrologic bench-mark station and international gaging station)

Location.--Lat 48°48'10", long 113°39'20". In SE $\frac{1}{4}$  sec.11, T.35 N., R.16 W. (unsurveyed), on right bank 100 ft upstream from outlet of Swiftcurrent Lake at Many Glacier, Glacier National Park, and 11 miles southwest of Babb.

Drainage area.--31.4 sq mi.

Records available.--June 1912 to September 1965 (records incomplete most years prior to 1959). Published as "at McDermott Lake" 1912-14. Monthly discharge only for some periods, published in WSP 1308.

Gage.--Water-stage recorder. Altitude of gage is 4,860 ft (from topographic map). Prior to May 23, 1916, staff gage on left bank of lake opposite present gage at same datum. May 23, 1916, to June 15, 1918, staff gage at present site and datum.

Average discharge.--9 years (1917-19, 1958-65), 148 cfs (107,100 acre-ft per year).

Extremes.--Maximums and minimums (discharge in cubic feet per second, gage height in feet).

Annual maximum discharge (\*) and peak discharges above base (680 cfs), water years 1961-65

Date	Time	Discharge	Gage height	Date	Time	Discharge	Gage height	Date	Time	Discharge	Gage height
May 27, 1961	1400	* 1,010	4.62	June 10, 1963	1900	* 825	4.19	May 30, 1965	1030	787	4.10
June 7, 1961	0800	926	4.43	June 30, 1963	0500	779	4.08	June 4, 1965	0500	741	3.99
June 17, 1961	0630	737	3.98	May 21, 1964	0230	808	4.15	June 13, 1965	0200	753	4.02
June 10, 1962	0500	* 603	3.62	June 8, 1964	1600	* 6,700	10.00	June 19, 1965	0600	* 1,390	5.52

Annual minimum discharge, water years 1961-65

Water year	Date	Discharge	Gage height	Water year	Date	Discharge	Gage height
1961	Jan. 14, 1961	12.5	1.47	1964	Mar. 2, 1964	8.3	1.38
1962	Jan. 26, 1962	11	1.42	1965	Mar. 25-27, 1965	a 15	-
1963	Jan. 31, 1963	a 14	-				

a Minimum daily.

1912-65: Maximum discharge, 6,700 cfs June 8, 1964 (gage height, 10.00 ft, from floodmarks), from rating curve extended above 1,100 cfs on basis of computation of peak flow over dam; minimum, 8.3 cfs Mar. 2, 1964 (gage height, 1.38 ft).

Remarks.--Records good. No regulation or diversion. Records of chemical analyses for the water years 1964-65 are published in reports of the Geological Survey.

Cooperation.--This is one of a number of stations which are maintained jointly by the United States and Canada.

Revisions (water years).--WSP 1508: 1918(M), 1943.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	33.5	54	39.2	16.4	26.8	36.6	41.8	84	728	213	106	95
2	34.6	54	37.9	16.4	23.2	36.6	66	130	703	192	104	121
3	33.5	48.4	36.6	16.4	22.0	36.6	138	145	707	198	104	99
4	37.0	40.5	35.3	16.4	20.4	34.0	213	160	737	207	108	83
5	26.2	36.6	31.6	15.6	18.0	30.4	172	177	837	225	112	81
6	29.2	35.3	28.0	17.2	18.0	29.2	* 130	166	900	283	117	83
7	31.3	32.8	30.4	18.8	20.4	28.0	* 106	142	913	276	124	79
8	38.2	32.8	30.4	19.6	20.4	26.8	83	130	773	273	117	72
9	37.0	29.2	28.0	25.6	23.2	25.6	84	158	603	250	117	64
10	34.6	29.2	26.8	14.8	36.6	24.4	76	283	526	234	110	64
11	35.8	34.0	24.4	14.8	48.4	22.0	70	320	515	222	91	64
12	38.2	31.6	22.0	14.8	45.7	20.4	73	290	607	213	83	57
13	34.6	30.4	22.0	14.0	39.2	18.0	84	276	632	193	81	54
14	33.5	31.6	24.4	13.5	39.2	22.0	79	257	611	183	83	50
15	33.5	29.2	22.0	20.4	39.2	28.0	70	276	661	225	83	47.0
16	28.2	26.8	21.2	30.4	39.2	30.4	64	331	707	257	84	44.4
17	28.2	* 25.6	21.2	30.4	34.0	31.6	83	307	724	234	84	44.4
18	29.2	30.4	24.4	* 29.2	30.4	31.6	110	263	711	195	83	* 44.4
19	30.2	32.8	28.0	24.4	25.6	30.4	114	273	648	169	79	49.8
20	29.2	30.4	24.4	23.2	26.8	31.6	99	374	632	158	79	51
21	* 31.3	58	24.4	23.2	44.4	* 29.2	90	526	586	150	78	53
22	30.2	64	25.6	24.4	70	29.2	84	720	484	160	79	53
23	42.0	34.0	23.2	23.2	68	30.4	81	825	406	166	81	54
24	55	35.3	21.2	22.0	61	34.0	74	896	399	166	83	57
25	70	64	22.0	22.0	67	36.6	74	896	406	155	86	44.4
26	63	66	20.4	20.4	61	39.2	73	909	435	135	88	51
27	76	57	18.8	19.6	49.8	44.4	70	985	406	119	86	53
28	65	53	17.2	18.8	44.4	39.2	67	837	342	114	79	53
29	57	43.1	15.6	19.6	-----	36.6	64	716	290	119	72	61
30	54	41.8	15.6	21.2	-----	35.3	67	779	253	112	72	60
31	44	-----	16.4	25.6	-----	37.9	-----	766	-----	108	78	-----
TOTAL	1,243.9	1,211.8	778.6	622.3	1,062.3	966.2	2,709.8	13,397	17,879	5,894	2,831	1,890.4
MEAN	40.1	40.4	25.1	20.1	37.9	31.2	90.3	432	596	190	91.3	63.0
MAX	76	66	39.2	30.4	70	44.4	213	985	913	283	124	121
MIN	26.2	25.6	15.6	13.5	18.0	18.0	41.8	84	253	108	72	44.4
CFSM	1.28	1.29	.80	.64	1.21	.99	2.88	13.8	19.0	6.50	2.91	2.01
IN	1.47	1.44	.92	.74	1.26	1.14	3.21	15.87	21.18	6.98	3.35	2.24
AC-PT	2,470	2,400	1,540	1,230	2,100	1,920	5,370	26,570	35,460	11,690	5,620	3,750
CALENDAR YEAR 1960:	MAX 863	MIN 12	MEAN 126	CFSM 4.01	IN 54.60	AC-PT 91,430						
WATER YEAR 1960-61:	MAX 985	MIN 13.5	MEAN 138	CFSM 4.39	IN 59.80	AC-PT 100,100						

\* Discharge measurement made on this day.

## 5-0145. Swiftcurrent Creek at Many Glacier, Mont.--Continued

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	57	* 66	34	22	15	12	18	145	410	320	135	54
2	53	64	29	20	12	12	21	* 126	388	293	135	55
3	54	60	32	23	34	12	23	142	395	231	133	57
4	62	58	27	28	42	12	28	146	370	180	130	53
5	81	53	20	24	43	12	40	172	293	158	163	50
6	99	47	22	22	42	12	51	155	238	158	231	48
7	119	46	22	23	39	13	67	140	213	150	210	50
8	112	44	22	24	37	15	66	121	234	152	172	50
9	92	55	22	24	35	15	57	133	465	* 149	148	50
10	99	42	22	20	37	15	51	189	570	183	138	51
11	124	47	22	18	34	14	48	241	476	192	128	83
12	121	48	22	19	30	14	44	263	454	201	121	97
13	126	43	22	19	27	14	44	280	* 442	186	114	90
14	180	42	* 22	18	* 29	13	62	260	484	186	110	84
15	241	40	23	18	29	12	99	257	461	180	106	83
16	260	37	23	16	27	12	135	283	450	169	99	79
17	273	35	24	15	24	12	140	328	552	158	78	78
18	213	33	23	14	22	12	155	366	558	145	91	74
19	166	33	23	14	21	12	* 201	439	518	133	88	73
20	* 140	33	23	13	20	12	293	534	511	121	78	68
21	119	29	22	13	20	13	328	465	465	121	78	66
22	108	32	16	12	17	14	293	420	435	133	81	66
23	99	34	16	12	18	* 14	270	450	402	145	78	62
24	93	33	23	12	17	12	356	454	392	152	68	60
25	84	32	24	12	16	14	461	454	413	160	64	58
26	90	29	23	13	15	18	370	413	410	158	66	57
27	91	28	23	14	14	20	270	395	388	166	70	57
28	83	28	24	12	13	20	234	457	303	180	66	55
29	72	27	25	12	-----	20	180	526	280	195	* 64	76
30	66	30	26	12	-----	18	155	* 518	290	170	60	72
31	67	-----	24	13	-----	17	-----	461	142	55	-----	-----
TOTAL	3,667	1,214	724	531	737	637	4,560	9,773	12,230	5,389	3,375	1,954
MEAN	118	40.5	23.4	17.1	26.3	14.1	152	315	408	174	109	65.1
MAX	273	66	33	28	43	20	461	534	570	320	231	97
MIN	53	27	16	12	13	12	18	121	213	121	55	48
CFSM	3.75	1.29	.74	.55	.84	.45	4.84	10.0	13.0	5.54	3.47	2.07
IN	4.32	1.44	.86	.63	.87	.52	5.40	11.58	14.49	6.38	4.00	2.31
AC-FT	7,230	2,410	1,440	1,050	1,460	867	9,080	19,380	24,260	10,690	6,090	3,880
CALENDAR YEAR 1961:	MAX 985 MIN 14 MEAN 145 CFSM 4.62 IN 62.59 AC-FT 104,800											
WATER YEAR 1961-62:	MAX 570 MIN 12 MEAN 122 CFSM 3.89 IN 52.80 AC-FT 88,400											

\* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Dec. 6-10, 26, 27, 30, Jan. 17-22, Feb. 26 to Mar. 7 (no gage-height record Dec. 11-13, 28, 29).

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	66	91	98	42	b 18	28	44	* 306	621	594	114	52
2	66	83	93	45	b 18	26	38	* 252	555	488	112	52
3	68	76	87	52	27	24	35	195	563	437	102	55
4	* 60	73	76	54	38	24	33	158	598	451	102	58
5	58	74	66	45	89	26	33	136	605	440	102	61
6	57	74	71	39	126	24	42	163	674	473	107	60
7	58	* 68	64	35	155	23	49	343	605	447	112	58
8	58	68	58	31	153	23	51	394	574	426	116	61
9	58	73	54	29	133	23	48	312	578	374	119	61
10	57	81	51	27	* 112	22	44	236	761	312	119	61
11	55	78	45	27	93	22	42	209	* 733	283	128	70
12	79	79	43	26	78	21	42	190	720	316	128	68
13	179	73	40	22	68	19	44	198	737	296	121	66
14	257	* 66	42	23	60	18	58	221	682	270	121	91
15	210	57	51	b 23	55	20	91	283	613	255	114	93
16	166	60	119	b 23	51	18	* 107	299	552	224	107	89
17	135	55	140	b 23	48	19	102	319	552	198	98	* 82
18	110	55	121	b 22	45	18	91	343	540	187	89	71
19	108	62	102	b 20	40	19	76	316	525	192	80	64
20	102	138	87	17	39	* 19	71	319	488	192	80	60
21	124	181	80	16	38	20	62	353	419	187	76	57
22	207	150	71	b 18	34	21	57	402	430	192	70	55
23	231	124	60	b 18	32	27	54	426	384	179	64	60
24	195	93	52	b 18	* 30	31	51	465	306	166	60	61
25	158	116	a 44	b 18	29	30	52	502	309	145	60	61
26	138	195	a 38	b 18	30	29	60	571	* 346	133	64	60
27	114	198	a 39	b 16	30	29	82	* 514	332	121	57	58
28	104	160	a 40	b 16	29	42	128	480	334	114	55	57
29	126	156	b 41	b 16	-----	48	158	499	594	114	54	54
30	99	107	42	b 15	-----	54	239	598	* 751	112	51	58
31	95	-----	44	b 15	-----	49	-----	649	-----	* 107	52	-----
TOTAL	3,571	2,934	2,059	808	1,698	816	2,084	10,651	16,481	8,425	2,834	1,915
MEAN	115	97.8	66.4	26.1	60.6	26.3	69.5	344	549	272	91.4	63.8
MAX	257	198	140	54	155	54	239	649	761	594	128	93
MIN	55	55	38	14	18	18	33	136	306	107	51	52
CFSM	3.67	3.11	2.12	.83	1.93	.84	2.21	10.9	17.5	8.66	2.91	2.03
IN	4.23	3.48	2.44	.96	2.01	.97	2.47	12.61	19.52	9.98	3.36	2.27
AC-FT	7,080	5,820	4,080	1,600	3,370	1,620	4,130	21,130	32,690	16,710	5,620	3,800
CALENDAR YEAR 1962:	MAX 570 MIN 12 MEAN 130 CFSM 4.14 IN 56.33 AC-FT 94,300											
WATER YEAR 1962-63:	MAX 761 MIN 14 MEAN 149 CFSM 4.75 IN 64.30 AC-FT 107,600											

\* Discharge measurement made on this day.

a No gage-height record.

b Stage-discharge relation affected by ice.

## SASKATCHEWAN RIVER BASIN

5-0145. Swiftcurrent Creek at Many Glacier, Mont.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	52	43	58	24	12	9.5	18	126	514	* 336	163	93
2	48	43	51	28	12	8.7	* 11	173	* 571	c 374	166	114
3	48	39	45	23	12	8.7	23	181	686	c 430	140	206
4	47	36	42	23	12	9.1	22	166	808	c 394	136	212
5	48	38	39	22	13	9.0	23	150	779	c 380	158	179
6	49	38	47	22	14	9.0	24	131	783	c 348	150	150
7	48	43	43	24	14	b 11	23	114	820	c 366	136	128
8	43	38	38	24	15	b 12	23	112	* 4,130	c 374	128	116
9	38	35	b 35	22	22	13	24	140	c 2,480	394	131	107
10	36	32	b 30	23	26	13	26	221	c 970	394	133	100
11	35	29	b 26	b 20	28	12	28	230	c 682	343	126	91
12	34	28	b 25	b 20	24	14	28	218	c 720	326	* 114	82
13	35	28	b 26	22	21	14	27	* 280	c 766	329	* 109	75
14	31	30	b 27	21	* 20	14	27	290	c 728	332	109	73
15	33	52	b 27	20	18	12	36	252	c 633	353	100	73
16	* 33	66	b 27	20	16	12	38	252	c 567	* 332	93	66
17	33	64	29	14	14	11	38	349	* 525	* 277	93	* 75
18	33	62	* 28	15	14	13	34	495	* 458	209	100	100
19	30	54	27	16	16	15	32	548	c 447	263	116	116
20	33	* b 34	26	15	18	15	31	678	c 444	258	100	109
21	42	40	26	b 15	19	18	32	753	c 440	233	93	119
22	24	40	23	b 20	20	19	33	548	c 426	221	87	112
23	66	40	16	b 30	18	b 17	34	377	c 458	209	109	109
24	91	43	18	35	b 15	b 15	44	270	c 567	181	80	107
25	98	42	23	33	b 13	b 14	32	221	c 546	166	71	124
26	78	52	23	28	b 13	17	35	206	c 517	155	78	148
27	66	100	23	24	14	16	39	233	c 458	158	98	136
28	60	95	22	22	13	16	40	336	c 412	158	95	124
29	58	78	21	14	13	14	47	514	c 356	158	98	126
30	48	66	19	12	-----	-----	* 73	499	326	153	98	179
31	45	-----	18	12	-----	13	-----	476	-----	184	98	-----
TOTAL	1,463	1,428	928	663	479	408.0	945	9,539	23,083	8,916	3,465	3,549
MEAN	47.2	47.6	29.9	21.4	16.5	13.2	31.5	308	769	288	112	118
MAX	98	100	58	35	28	19	75	436	4,130	630	166	212
MIN	24	28	16	12	12	8.7	18	112	326	153	71	66
CFSM	1.50	1.52	.95	.68	.53	.42	1.00	9.80	24.5	9.16	3.56	3.77
IN-	1.73	1.69	1.10	.79	.57	.48	1.12	11.30	27.34	10.56	4.10	4.20
AC-FT	2,900	2,830	1,840	1,320	950	809	1,870	18,920	45,780	17,680	6,870	7,040

CALENDAR YEAR 1963:

MAX 761

MIN 14

MEAN 136

CFSM 4.33

IN 58.67

AC-FT 98,240

WATER YEAR 1963-64:

MAX 4,130

MIN 8.7

MEAN 150

CFSM 4.78

IN 64.98

AC-FT 108,800

\* Discharge measurement made on this day.

b Stage-discharge relation affected by ice.

c Stage-discharge relation affected by backwater from debris.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	329	76	b 42	23	b 27	34	19	391	426	228	176	70
2	286	73	b 40	21	b 26	33	20	304	405	264	168	67
3	258	82	b 38	21	b 24	31	22	237	* 598	327	166	76
4	209	82	b 38	b 23	b 24	29	22	197	703	380	171	80
5	176	75	35	b 23	b 23	27	23	175	567	374	171	74
6	163	70	32	b 23	b 24	27	24	150	571	433	158	67
7	168	62	30	b 23	b 22	26	25	130	499	447	137	62
8	179	61	b 30	b 23	b 18	27	27	114	398	419	130	58
9	187	62	33	b 23	b 18	27	28	125	405	412	130	70
10	236	62	34	21	b 20	28	33	168	506	394	132	74
11	227	62	35	21	b 19	27	36	258	613	350	132	76
12	190	55	33	22	* b 16	27	37	377	728	295	139	74
13	176	58	30	24	b 16	24	41	* 480	703	258	164	70
14	176	54	29	24	b 16	26	53	455	536	249	142	74
15	176	48	b 32	28	b 16	24	63	437	426	267	128	91
16	168	47	b 31	30	b 17	24	67	455	476	282	121	93
17	140	* 45	b 27	29	b 18	23	58	430	641	289	110	87
18	121	43	b 23	26	22	b 21	52	350	977	292	106	80
19	107	42	b 24	24	31	b 19	50	282	c 1,340	286	100	74
20	100	39	b 24	24	47	b 17	83	289	1,020	246	102	76
21	95	38	b 24	24	52	b 17	137	273	711	220	102	89
22	91	35	b 27	24	49	b 17	161	246	613	214	97	112
23	87	36	b 27	24	43	b 17	151	225	544	192	104	114
24	82	43	b 24	b 24	39	b 16	149	214	552	176	108	110
25	75	b 42	b 26	b 24	35	b 15	156	240	521	174	106	114
26	75	b 39	b 24	b 23	30	b 15	171	267	480	171	102	114
27	68	b 36	b 24	20	35	b 15	184	279	495	176	102	106
28	91	b 34	b 24	20	35	b 16	243	405	391	184	104	97
29	66	b 33	b 24	b 23	-----	b 16	* 320	649	* 298	186	95	85
30	66	b 38	b 24	b 26	-----	b 18	377	766	243	184	89	83
31	68	-----	b 24	b 28	-----	-----	-----	-----	-----	181	* 76	-----
TOTAL	4,636	1,572	912	735	762	701	2,832	9,942	17,386	8,550	3,868	2,517
MEAN	150	52.4	29.4	23.7	27.2	22.6	94.4	321	580	276	125	83.9
MAX	329	82	42	30	52	34	377	766	1,340	447	176	114
MIN	56	33	23	20	16	15	19	114	243	171	76	58
CFSM	4.76	1.67	.94	.76	.87	.72	3.01	10.2	18.5	8.78	3.97	2.67
IN-	5.49	1.86	1.08	.87	.90	.83	3.35	11.78	20.59	10.13	4.58	2.98
AC-FT	9,200	3,120	1,810	1,460	1,510	1,390	5,620	19,720	34,480	16,960	7,670	4,990

CALENDAR YEAR 1964:

MAX 4,130

MIN 8.7

MEAN 159

CFSM 5.06

IN 68.89

AC-FT 115,400

WATER YEAR 1964-65:

MAX 1,340

MIN 15

MEAN 149

CFSM 4.75

IN 66.44

AC-FT 107,900

\* Discharge measurement made on this day.

b Stage-discharge relation affected by ice.

c Stage-discharge relation affected by backwater from debris.

5-0155. Lake Sherburne at Sherburne, Mont.

(International gaging station)

Location.--Lat 48°49'50", long 113°31'10", in S<sup>1</sup> sec.35, T.36 N., R.15 W., in gatehouse at Lake Sherburne on Swiftcurrent Creek, 4½ miles southwest of Babb.

Drainage area.--63.7 sq mi.

Records available.--May 1915 to September 1923 (fragmentary), May 1924 to September 1925, November 1925 to June 1926, September 1926 to March 1936 (no winter records some years), May 1936 to May 1937, July 1937 to September 1965. Month-end contents for some periods, published in WSP 1308. Published as Sherburne Lake Reservoir at Sherburne 1915, 1917-28, 1931-52, and as Sherburne Lake Reservoir near Babb 1929-30.

Gage.--Water-stage recorder. Datum of gage is at mean sea level (levels by Bureau of Reclamation). Prior to May 7, 1931, staff gage at same site and datum.

Extremes.--Maximums and minimums (contents in acre-feet, elevation in feet) for the water years 1961-65 are contained in the following table:

Water year	Maximum			Minimum		
	Date	Contents	Elevation	Date	Contents	Elevation
1961	June 30, 1961	66,370	4,788.1	Sept. 26, 1961	2,150	4,730.85
1962	July 4, 1962	41,640	4,772.26	Oct. 5, 1961	2,150	4,730.86
1963	July 15, 1963	66,130	4,787.96	Sept. 24, 1963	2,190	4,730.92
1964	July 15, 1964	66,510	4,788.18	Apr. 28, 1964	a 2,280	4,731.00
1965	July 20, 1965	66,540	4,788.20	Nov. 5, 1964	a 4,830	4,735.10

a Minimum observed.

1915-65: Maximum contents, 66,540 acre-ft July 20, 1965 (elevation, 4,788.20 ft); no usable contents at times.

Remarks.--Reservoir is formed on natural lake by earthfill dam completed in 1921. Prior to 1919. Flashboards on a temporary dam provided limited storage. Storage behind main dam began in 1919. Capacity, 66,200 acre-ft (corrected) between elevations 4,726 (6 ft above lowest outlet gate sill) and 4,788 ft (spillway crest). Stream bed above gates prevents withdrawal of storage to sill elevation. Dead storage negligible. Figures given herein represent usable contents. Water is used for irrigation on Milk River project of Bureau of Reclamation.

Cooperation.--This is one of a number of stations which are maintained jointly by the United States and Canada.

Revisions.--WSP 1338: Drainage area.

MONTH-END ELEVATION AND CONTENTS, WATER YEARS OCTOBER 1960 TO SEPTEMBER 1965

Date	Elevation (feet)†	Contents (acre-feet)	Change in contents (acre-feet)	Date	Elevation (feet)†	Contents (acre-feet)	Change in contents (acre-feet)
Oct. 31, 1960.....	4,738.96	7,560	+3,610	Oct. 31, 1963.....	4,737.36	6,400	+3,190
Nov. 30.....	4,743.84	11,370	+3,810	Nov. 30.....	4,743.28	10,920	+4,520
Dec. 31.....	4,746.50	13,600	+2,230	Dec. 31.....	4,746.53	13,620	+2,700
Calendar year 1960	-	-	+250	Calendar year 1963	-	-	-14,290
Jan. 31, 1961.....	4,748.90	15,710	+2,110	Jan. 31, 1964.....	4,748.57	15,410	+1,790
Feb. 28.....	4,752.79	19,410	+3,700	Feb. 29.....	4,750.32	17,090	+1,680
Mar. 31.....	4,755.48	22,080	+2,670	Mar. 31.....	4,751.89	18,590	+1,500
Apr. 30.....	4,751.47	2,510	-19,570	Apr. 30.....	4,751.44	2,490	-16,100
May 31.....	4,763.02	30,320	+27,810	May 31.....	4,749.89	16,690	+14,200
June 30.....	4,787.29	64,990	+34,670	June 30.....	4,780.44	53,660	+36,970
July 31.....	4,779.56	52,300	-12,690	July 31.....	4,784.60	60,420	+6,760
Aug. 31.....	4,753.24	19,840	-32,460	Aug. 31.....	4,785.98	33,680	-26,740
Sept. 30.....	4,751.25	2,380	-17,460	Sept. 30.....	4,744.40	11,820	-21,860
Water year 1961...	-	-	-1,570	Water year 1964...	-	-	+8,610
Oct. 31.....	4,758.63	7,320	+4,940	Oct. 31.....	4,737.68	6,630	-5,190
Nov. 30.....	4,743.57	11,160	+3,840	Nov. 30.....	4,740.08	8,400	+1,770
Dec. 31.....	4,748.53	13,620	+2,460	Dec. 31.....	4,743.96	11,470	+3,070
Calendar year 1961	-	-	+20	Calendar year 1964	-	-	-2,150
Jan. 31, 1962.....	4,748.51	15,360	+1,740	Jan. 31, 1965.....	4,746.81	13,850	+2,380
Feb. 28.....	4,751.42	19,120	+2,760	Feb. 28.....	4,749.48	16,280	+2,430
Mar. 31.....	4,753.24	19,940	+1,820	Mar. 31.....	4,752.10	18,790	+2,510
Apr. 30.....	4,739.79	8,180	-11,760	Apr. 30.....	4,761.96	29,060	+10,270
May 31.....	4,746.73	13,780	+5,600	May 31.....	4,767.52	35,580	+6,520
June 30.....	4,772.03	41,340	+27,560	June 30.....	4,779.93	52,990	+17,310
July 31.....	4,759.44	26,280	-15,060	July 31.....	4,786.06	62,810	+9,920
Aug. 31.....	4,733.10	3,500	-22,780	Aug. 31.....	4,769.32	36,580	-26,230
Sept. 30.....	4,736.63	5,880	+2,380	Sept. 30.....	4,744.87	12,200	-24,380
Water year 1962...	-	-	+3,500	Water year 1965...	-	-	+380
Oct. 31.....	4,748.67	15,500	+9,820	† Elevations at 2400 hours.			
Nov. 30.....	4,755.03	21,630	+6,130	g From graph based on once-weekly staff-gage readings. Readings obtained within two days of each month end.			
Dec. 31.....	4,760.92	27,910	+6,280				
Calendar year 1962	-	-	+14,290				
Jan. 31, 1963.....	4,762.99	30,290	+2,390				
Feb. 28.....	4,768.06	36,270	+5,980				
Mar. 31.....	4,769.82	38,470	+2,200				
Apr. 30.....	4,739.68	8,100	-30,370				
May 31.....	4,748.42	15,280	+7,180				
June 30.....	4,784.16	59,670	+44,390				
July 31.....	4,782.20	56,420	-3,250				
Aug. 31.....	4,755.45	22,060	-34,370				
Sept. 30.....	4,732.63	3,210	-18,840				
Water year 1963...	-	-	-2,670				

5-0160. Swiftcurrent Creek at Sherburne, Mont.

(International gaging station)

Location.--Lat 48°50'00", long 113°30'50", in SW<sup>1</sup> sec.36, T.36 N., R.15 W., on left bank 1,000 ft downstream from outlet of Lake Sherburne Dam at Sherburne and 4½ miles southwest of Babb.

Drainage area.--64.3 sq mi.

Records available.--July 1912 to November 1915 (no winter records), March 1916 to October 1923, May 1924 to September 1965 (no winter records). Monthly discharge only for some periods, published in WSP 1308 and 1728. Published as "at Sherburne Lake" 1912-14.

Gage.--Water-stage recorder. Datum of gage is 4,720.81 ft above mean sea level (Bureau of Reclamation bench-mark). Prior to Aug. 10, 1920, staff gages at two sites within 1,000 ft of present site at different datums. Aug. 10, 1920, to May 17, 1921, staff gage at present site and datum.

Average discharge.--7 years (1916-23), 199 cfs (144,100 acre-ft per year), unadjusted.

Extremes.--Maximum and minimum discharges for the water years 1961-65 are contained in the following table:

Water year	Maximum			Minimum		
	Date	Discharge (cfs)	Gage height (feet)	Date	Discharge (cfs)	Gage height (feet)
1961	June 30, 1961	1,190	6.47	Many days	0	-
1962	Apr. 9, 1962	688	5.20	do.	a .10	-
1963	Apr. 5, 1963	904	5.71	do.	0	-
1964	June 11, 1964	2,360	8.37	Nov. 6, 1963	.20	1.05
1965	May 16, 1965	1,560	6.54	(b)	a .40	-

a Minimum daily.

b Sept. 25, 26, 29, 30, 1965.

1912-65: Maximum discharge, 2,360 cfs June 11, 1964 (gage height, 8.37 ft); no flow at times when gates in dam were closed.

Remarks.--Records good. No diversion. Flow regulated by Lake Sherburne (see station 5-0155).

Cooperation.--This is one of a number of stations which are maintained jointly by the United States and Canada.

Revisions (water years).--WSP 1388: Drainage area. WSP 1508: 1935.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	0.2					a 0	192	112	1.9	628	603	650
2	.2					a 0	382	147	1.6	196	617	639
3	.2					a 0	511	183	1.4	41.4	613	624
4	.2					a 0	643	217	1.1	.4	654	650
5	.2					a 0	665	253	1.0	207	684	665
6	.2					a 0	* 758	265	.9	350	680	650
7	.2					a 0	796	253	.8	424	706	636
8	.2					a 0	781	244	.8	461	710	639
9	.1					a .1	755	244	.8	458	706	658
10	.1					a .1	710	294	.6	458	702	632
11	.1					a .1	654	365	.5	458	695	606
12	.1					a .1	624	379	.4	476	687	585
13	.1					a .2	610	387	* 304	* 507	684	* 581
14	.1					a .2	588	390	* 336	516	* 676	578
15	.1					b .2	567	390	.6	516	665	617
16	.1					a .3	546	406	.5	516	661	482
17	.1					a .3	526	303	.4	536	654	257
18	.1					.3	* 507	* 230	420	564	647	* 156
19	.1					a .3	491	238	758	581	636	125
20	.1					a .4	473	247	672	606	628	94
21	** 0					** .4	440	263	546	603	621	88
22	0					** .4	395	257	546	603	636	85
23	0					a .4	314	176	248	603	658	83
24	0					a .4	206	37.3	292	599	672	104
25	0					.4	* 166	* 3.6	322	574	661	80
26	0					a .3	141	3.6	* 241	560	647	69
27	0					a .3	127	3.0	210	556	636	73
28	0					a .3	118	2.4	296	553	672	* 80
29	0					b 135	111	2.2	438	550	684	85
30	0					89	109	2.4	872	567	676	107
31	0					a 3.1	-----	2.3	-----	581	661	-----
TOTAL	2.8	-	-	-	-	232.6	13,906	6,299.8	6,514.3	14,848.8	20,532	11,378
MEAN	0.09	-	-	-	-	7.50	464	203	217	479	662	379
MAX	0.2	-	-	-	-	135	796	406	872	623	710	665
MIN	0	-	-	-	-	0	109	2.2	.40	.40	603	69
AC-FT	5.6	-	-	-	-	461	27,500	12,500	12,920	29,450	40,720	22,570
(†)	+3,610	-	-	-	-	+2,670	-19,570	+27,810	+34,670	-12,690	-32,460	-17,460

Adjusted for change in contents in Lake Sherburne

	MEAN	CFSM	IN	AC-FT								
	58.8	0.914	1.05	3,620	-	-	-	-	50.9	135	656	800
					-	-	-	-	0.792	2.10	10.2	12.4
					-	-	-	-	0.91	2.34	11.75	13.88
					-	-	-	-	3,130	8,010	40,310	47,390
					-	-	-	-				16,760
					-	-	-	-				8,260
					-	-	-	-				5,110

\* Discharge measurement or observation of no flow made on this day.

† Change in contents, in acre-feet, in Lake Sherburne.

\*\* Field estimate made on this day.

a No gage-height record.

b Stage-discharge relation affected by ice.

## 5-0160. Swiftcurrent Creek at Sherburne, Mont.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962												
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	102	** 0.1					8 0.6	406	74	318	612	247
2	91						107 .6	406	27	318	608	165
3	88						107	446	27	267	601	131
4	83						159	437	28	239	594	131
5	96						143	424	28	239	587	64
6	97						402	415	28	239	580	1.2
7	125					0.2	556	469	28	251	576	1.8
8	177						542	531	29	261	573	1.6
9	197						594	500	30	353	566	1.2
10	148						673	453	30	431	559	1.2
11	154						651	418	118	500	548	* 1.1
12	186						* 629	401	235	590	542	.9
13	201					** .3	608	392	237	* 584	534	.8
14	183				** 0.2		590	401	81	580	570	.5
15	230						573	* 401	.5	576	580	.4
16	290						556	428	.4	573	566	.4
17	330						538	443	.3	570	* 556	.3
18	334					a .3	524	456	.3	566	580	.4
19	184						556	483	.3	562	598	.4
20	* 2.2						580	424	.3	559	580	.4
21	2.0						573	406	.3	556	559	.4
22	1.3						566	421	.3	552	542	.3
23	1.2					** .3	556	365	.2	548	520	.3
24	.7					.1	552	307	.3	570	479	181
25	.6					0.1	469	259	.2	580	428	289
26	.9					0.1	390	191	.2	576	365	279
27	.3					0.2	390	195	** 93	615	330	269
28	.1					0.2	387	200	318	637	392	122
29	.1					0.3	387	204	318	633	387	.8
30	.1					0.4	418	210	318	626	* 325	.6
31	.1					.5	-----	* 148	-----	619	316	-----
TOTAL	3,305.6	-	-	-	-	7.6	13,670.2	11,640	2,050.6	15,088	16,153	1,893.0
MEAN	107	-	-	-	-	0.25	456	375	68.4	487	521	63.1
MAX	334	-	-	-	-	.5	673	531	318	637	612	289
MIN	.1	-	-	-	-	.1	0.6	148	.2	239	316	.3
AC-FT	6,560	-	-	-	-	15	27,110	23,090	4,070	29,930	32,040	3,750
(+)	+5,010	-	-	-	-	+1,820	-11,670	+5,740	+27,900	-14,690	-22,570	+2,450
Adjusted for change in contents in Lake Sherburne												
MEAN	188	-	-	-	-	29.8	260	469	537	248	154	104
CFSM	2.92	-	-	-	-	0.463	4.04	7.29	8.35	3.86	2.40	1.62
IN	3.37	-	-	-	-	0.54	4.50	8.41	9.32	4.44	2.76	1.81
AC-FT	11,570	-	-	-	-	1,840	15,450	28,820	31,960	15,240	9,470	6,200

\* Discharge measurement made on this day.

† Change in contents, in acre-feet, in Lake Sherburne, adjusted for evaporation.

\*\* Field estimate made on this day.

a No gage-height record.

## 5-0160. Swiftcurrent Creek at Sherburne, Mont.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963												
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	0.5	89					a 1	673	.6	158	615	673
2	.5	152					1.0	651	.6	324	615	669
3	.4	152					410	633	.8	370	669	698
4	* .4	152					644	605	.8	370	687	716
5	.4	152					747	563	1.3	370	687	702
6	.4	58					750	503	1.4	372	687	724
7	.3	** .2					691	484	1.1	375	680	724
8	.3	137				a 0.2	720	519	1.0	375	677	705
9	.3	142					769	285	1.0	322	673	684
10	.3	.6			** 0.5		757	247	2.3	242	669	659
11	.3	.3					750	317	1.6	183	666	633
12	.3	.3					724	317	1.2	183	659	605
13	.2	.2					695	450	1.1	220	680	566
14	.3	.2					687	563		249	687	535
15	.2	.1					669	510	* .8	293	684	475
16	.2	-				.3	709	* 469	.7	411	709	397
17	** .1	-					* 739	457	.6	472	724	* 354
18	.1	-				a .2	720	460	.5	472	* 713	364
19	.1	-					709	469	.5	469	705	303
20	.1	-				** .2	716	408	.4	469	698	* 188
21	0	-				a .3	713	364	.5	469	691	137
22	.1	-				a .3	691	344	.8	469	702	113
23	.1	-				.3	687	312	.6	469	705	108
24	.1	-				a .3	691	329	.5	469	691	95
25	.1	-				a .3	673	349	.4	526	684	38
26	0	-				a .3	655	367	.4	556	673	70
27	0	-			** .5	* .3	633	* 204	* 118	549	666	69
28	0	-				a .3	619	1.0	* 276	549	655	67
29	0	-				158	648	.8	121	546	648	66
30	0	-				273	687	.7	.8	542	637	66
31	.1	-----				-----	a 1	-----	-----	590	655	-----
TOTAL	6.2	-	-	-	-	438.5	19,305	11,855.1	538.1	12,454	20,991	12,163
MEAN	0.20	-	-	-	-	14.1	644	382	17.9	402	677	405
MAX	0.5	-	-	-	-	273	769	673	276	500	724	724
MIN	0	-	-	-	-	0.2	.1	.6	.4	158	615	38
AC-FT	12	-	-	-	-	870	38,290	23,510	1,070	24,700	41,640	24,120
(†)	+9,672	-	-	-	-	+2,194	-30,289	+7,335	+44,703	-2,732	-34,015	-18,732
Adjusted for change in contents in Lake Sherburne												
MEAN	157	-	-	-	-	49.8	134	502	769	357	124	90.6
CFSM	2.44	-	-	-	-	0.774	2.08	7.81	12.0	5.55	1.93	1.41
IN	2.82	-	-	-	-	0.80	2.33	9.00	13.35	6.41	2.22	1.57
AC-FT	9,680	-	-	-	-	3,060	8,000	30,850	45,770	21,970	7,620	5,390

\* Discharge measurement made on this day.

† Change in contents, in acre-feet, in Lake Sherburne, adjusted for evaporation.

\*\* Field estimate made on this day.

a No gage-height record.

## 5-0160. Swiftcurrent Creek at Sherburne, Mont.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	* 60	a 0.5					87	163	123	* 16	* 762	671
2		a .4					95	240	172	17	246	663
3		a .3					* 82	327	202	16	17	659
4		a .3					194	201	81	16	205	652
5	a 65	a .2					88	346	245	17	363	671
6		** .2					8 2	249	* 243	16	363	682
7		-					8 2	254	544	15	363	675
8	a 25	-					187	469	77	12	471	687
9		-					464	488	29	12	564	686
10		-					497	475	448	12	558	706
11	a 3	-					519	450	1,820	12	554	694
12		-					510	426	2,340	12	582	682
13		-					497	429	2,340	152	607	671
14		-					522	* 438	1,970	312	600	656
15		-			** 0.5		573	447	1,660	* 435	597	* 633
16	** 2.5	-					605	457	* 1,540	516	593	604
17	2.3	-					576	466	1,380	* 447	589	544
18	2.3	-					556	491	* 1,060	432	633	474
19	2.3	-					539	529	700	427	659	554
20	2.3	-	** 0.5				513	497	761	427	656	644
21	1.9	** .3					488	447	713	404	644	503
22	1.2	-					457	300	351	368	641	316
23	1.1	-					423	188	180	459	637	285
24	.9	-					370	131	17	506	630	185
25	a .9	-					228	102	16	506	626	168
26	a .8	-					151	105	17	503	615	* 173
27	a .8	-					118	107	16	500	671	169
28	a .7	-					* 102	110	16	500	702	187
29	a .6	-					105	115	16	500	698	187
30	a .6	-					127	118	16	500	686	181
31	a .5	-				† 0.7	119			493	678	
TOTAL	523.7						9,657	9,095.5	18,071.2	8,560	17,210	15,242
MEAN	16.9						322	293	602	276	555	508
MAX	66						605	529	2,340	516	762	706
MIN	.5						2	2.9	2.3	12	17	168
AC-FT	1,040						19,150	18,040	35,840	16,980	34,140	30,230
(±)	+3,240						-16,100	+14,360	+37,340	+7,360	-26,330	-21,760
Adjusted for change in contents in Lake Sherburne												
MEAN	69.6						51.4	527	1,230	396	127	142
CFSM	1.08						0.799	8.20	19.1	6.16	1.98	2.21
IN	1.25						0.89	9.45	21.34	7.10	2.28	2.47
AC-FT	4,260						3,060	32,400	73,180	24,340	7,810	8,480

\* Discharge measurement made on this day.

† Result of discharge measurement.

‡ Change in contents, in acre-feet, in Lake Sherburne, adjusted for evaporation.

\*\* Field estimate made on this day.

a No gage-height record.

## 5-0160. Swiftcurrent Creek at Sherburne, Mont.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965											
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	SEPT.
1	317	384				-	a 1.6	4.1	421	177	544
2	278	360				-	1.6	3.4	304	177	540
3	267	368				-	a 1.6	2.5	** 713	177	540
4	274	263				-	a 1.7	1.8	840	177	540
5	339	29				-	1.8	1.7	878	178	537
6	368	* 1.2				-	a 1.9	1.7	840	178	537
7	322	-				-	2.0	1.7	823	75	533
8	* 292	-				-	a 2.1	1.8	741	.8	533
9	253	-				-	2.2	2.0	597	.8	506
10	247	-				-	a 2.1	2.0	409	1.0	487
11	249	-				-	a 1.9	2.5	261	.8	487
12	285	-			** 0.5	-	1.8	2.5	228	.8	547
13	297	-				-	a 2.0	12.0	232	.8	582
14	283	-				-	2.1	994	* 254	.7	667
15	271	-				-	a 1.9	1,180	236	* .7	702
16	262	-				-	1.7	1,320	252	.9	* 698
17	222	-				-	a 1.7	1,040	* 1,040	182	637
18	196	* .5				-	a 1.8	1,020	980	320	607
19	168	-				-	1.8	1,010	1,100	297	600
20	160	-				-	a 3.6	998	1,220	307	597
21	150	-				-	5.4	861	860	325	648
22	146	-				-	a 5.2	786	564	377	675
23	160	-				-	5.0	671	506	346	664
24	150	-				-	a 5.0	520	506	323	654
25	131	-				-	a 5.1	471	509	320	650
26	268	-				-	5.2	432	509	320	652
27	407	-				-	a 5.2	403	509	444	644
28	390	-				-	5.2	406	314	513	644
29	368	-				-	a 5.2	409	* 177	579	637
30	543	-				-	* 1.5	415	177	589	633
31	558	-				-	a 1.5	418	547	547	626
TOTAL	8,621	-	-	-	-	-	90.6	13,393.7	16,980	6,923.3	18,558
MEAN	278	-	-	-	-	-	3.02	432	566	223	599
MAX	558	-	-	-	-	-	5.4	1,320	1,220	589	702
MIN	131	-	-	-	-	-	1.6	1.7	177	.70	487
AC-FT	17,100	-	-	-	-	-	180	26,570	33,680	13,730	36,610
(+)	-5,110	-	-	-	-	-	+10,280	+6,760	+17,610	+10,530	-25,840
Adjusted for change in contents in Lake Sherburne											
MEAN	195	-	-	-	-	-	176	542	862	395	178
CFSM	3.03	-	-	-	-	-	2.74	8.43	13.4	6.14	2.77
IN	3.50	-	-	-	-	-	3.05	9.72	14.96	7.08	3.20
AC-FT	11,990	-	-	-	-	-	5,270	16,800	25,860	12,230	5,530

\* Discharge measurement made on this day.

† Change in contents, in acre-feet, in Lake Sherburne, adjusted for evaporation.

‡ Result of discharge measurement.

\*\* Discharge measurement made on this day.

a No gage-height record.

5-0175. St. Mary River near Babb, Mont.

Location.--Lat 48°50'00", long 113°25'00", in SE $\frac{1}{4}$  sec.34, T.36 N., R.14 W., on right bank half a mile upstream from outlet of Lower St. Mary Lake and 2 miles southeast of Babb.

Drainage area.--278 sq mi.

Records available.--July 1901 to October 1902, May 1910 to September 1925, October 1950 to September 1955. Monthly discharge only for some periods, published in WSP 1308. Published as "at Main" 1901-2 and as "below Swiftcurrent Creek, at Babb" 1910-15. April 1902 to September 1915, May 1929 to September 1950 at sites about  $\frac{1}{2}$  miles downstream; records not equivalent because flow of Swiftcurrent Creek not included 1905-15 and diversion by St. Mary Canal not included 1929-50.

Gage.--Digital water-stage recorder. Datum of gage is 4,468.13 ft above mean sea level, datum of 1929. Prior to Oct. 1, 1915, graphic water-stage recorder or staff gages at several sites about  $\frac{3}{4}$  miles downstream at different datums. Oct. 1, 1915, to Sept. 30, 1925, graphic water-stage recorder or staff gages at several sites within  $\frac{1}{2}$  miles downstream at different datums. Oct. 1, 1950, to Oct. 10, 1964, graphic water-stage recorder at present site and datum.

Average discharge.--31 years (1901-2, 1910-25, 1950-65), 792 cfs (573,400 acre-ft per year), unadjusted.

Extremes.--Maximum and minimum discharges for the water years 1961-65 are contained in the following table:

Water year	Maximum			Minimum		
	Date	Discharge (cfs)	Gage height (feet)	Date	Discharge (cfs)	Gage height (feet)
1961	May 28, 1961	3,500	5.41	Jan. 9, 1961	60	0.77
1962	June 20, 1962	2,080	4.10	Feb. 1, 1962	73	.86
1963	June 7, 1963	2,770	4.76	Jan. 23, 1963	77	.89
1964	June 9, 1964	16,500	12.96	Jan. 16, 1964	34	.51
1965	June 20, 1965	5,070	6.82	Mar. 12, 1965	63	.78

1901-2, 1910-25, 1950-65: Maximum discharge, 16,500 cfs June 9, 1964 (gage height, 12.96 ft, from high watermark in well), from rating curve extended above 6,100 cfs on basis of slope-area measurement of peak flow; minimum, 26 cfs Jan. 5, 1953, Jan. 8, 1958.

Remarks.--Records good. Entire flow of Swiftcurrent Creek below Lake Sherburne is diverted into Lower St. Mary Lake above station. Since 1919, flow of Swiftcurrent Creek regulated by Lake Sherburne (see station 5-0155). Since October 1950, monthly discharge and runoff figures adjusted for change in contents (adjusted for evaporation since October 1961) in Lake Sherburne.

Revisions (water years).--WSP 1308: 1913-14, 1920, 1922-24. WSP 1508: 1902.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961											
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	SEPT.
1	169	142	128	79	74	150	159	383	3,210	2,160	1,130
2	162	142	126	76	74	150	251	387	3,110	1,800	1,110
3	156	142	128	74	74	150	370	405	3,030	1,460	1,110
4	136	142	128	71	74	147	548	437	3,010	1,260	1,090
5	136	142	126	71	74	145	710	500	3,040	1,150	1,110
6	136	139	123	73	76	142	846	570	3,150	1,250	1,120
7	131	136	118	73	76	139	985	618	3,310	1,350	1,120
8	128	134	113	71	76	134	1,030	636	3,350	1,440	1,130
9	123	134	111	68	76	131	1,020	648	3,220	1,490	1,150
10	121	131	106	66	81	128	978	690	2,980	1,490	1,160
11	118	131	104	66	97	123	930	800	2,730	1,490	1,140
12	118	123	95	66	104	118	904	885	2,570	1,460	1,110
13	116	126	89	66	104	116	904	964	2,520	1,440	1,080
14	116	123	87	66	106	111	885	1,030	2,730	1,410	1,060
15	116	118	89	68	109	111	859	1,080	2,520	1,390	1,040
16	113	118	89	68	116	111	833	1,180	2,410	1,430	1,030
17	109	118	89	66	116	111	800	1,260	2,410	1,430	1,010
18	106	123	89	66	116	109	762	1,230	2,480	1,460	992
19	101	126	93	68	116	106	768	1,200	2,830	1,430	985
20	99	128	95	68	113	104	755	1,240	3,150	1,410	971
21	101	128	93	69	121	104	722	1,360	3,150	1,390	964
22	95	126	93	69	136	101	703	1,590	3,030	1,370	950
23	95	126	95	71	139	101	678	1,900	2,790	1,370	950
24	99	123	95	71	142	106	612	2,260	2,440	1,350	957
25	104	139	95	71	150	109	554	2,580	2,330	1,320	964
26	111	139	93	71	153	111	500	2,900	2,240	1,290	964
27	121	136	91	71	150	126	456	3,250	2,130	1,240	957
28	123	136	87	71	150	123	427	3,480	2,030	1,210	937
29	128	136	85	71	-----	126	405	3,440	2,010	1,190	950
30	131	134	83	73	-----	156	392	3,350	2,060	1,170	950
31	136	-----	81	74	-----	159	-----	3,300	-----	1,150	944
TOTAL	3,754	3,946	3,117	2,172	2,993	3,858	20,746	45,553	81,970	43,250	32,135
MEAN	121	132	101	70.1	107	124	692	1,469	2,732	1,395	1,037
MAX	169	142	128	79	153	159	1,030	3,480	3,350	2,160	1,160
MIN	95	118	81	66	74	101	159	383	2,010	1,150	937
AC-FT	7,450	7,830	6,180	4,310	5,960	7,650	41,150	90,360	162,600	85,790	63,740
(+)	+3,610	+3,810	+2,230	+2,110	+3,700	+2,670	-19,570	+27,810	+34,670	-12,690	-32,460
MEAN+	180	196	137	104	174	168	363	1,922	3,315	1,189	909
CFSM+	.65	.70	.49	.37	.63	.60	1.31	6.91	11.9	4.28	1.83
IN+	.75	.79	.57	.43	.65	.70	1.46	7.97	13.31	4.93	2.11
AC-FT+	11,060	11,640	8,410	6,420	9,640	10,320	21,580	118,200	197,300	73,100	31,280

## OBSERVED

CAL YR 1960: TOTAL 231,330	MEAN 632	MAX 3,200	MIN 60	AC-T 458,900
WAT YR 1961: TOTAL 262,839	MEAN 720	MAX 3,480	MIN 66	AC-FT 521,300

## ADJUSTED +

CAL YR 1960: MEAN 632	CFSM 2.27	IN 30.98	AC-FT 459,100
WAT YR 1961: MEAN 718	CFSM 2.58	IN 35.08	AC-FT 519,800

+ Adjusted for change in contents, in acre-feet, in Lake Sherburne.

## SASKATCHEWAN RIVER BASIN

5-0175. St. Mary River near Babb, Mont.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962												
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	290	348	106	111	76	95	89	1,260	1,960	1,740	1,310	618
2	290	331	109	109	77	95	91	1,190	1,860	1,720	1,290	554
3	278	310	126	106	87	90	93	1,160	1,780	1,640	1,250	505
4	282	290	136	106	101	90	99	1,150	1,700	1,510	1,230	451
5	282	278	135	104	104	90	136	1,110	1,610	1,430	1,220	418
6	298	278	135	101	101	90	226	1,080	1,490	1,360	1,190	365
7	331	259	130	101	104	95	392	1,070	1,360	1,290	1,200	315
8	378	251	125	100	106	95	505	1,100	1,260	1,220	1,200	293
9	423	240	120	95	106	95	570	1,130	1,230	1,150	1,190	274
10	442	247	115	95	111	100	672	1,120	1,320	1,190	1,160	255
11	446	229	110	90	113	100	742	1,110	1,460	1,250	1,140	247
12	470	219	110	90	113	95	755	1,110	1,630	1,330	1,110	244
13	500	229	105	90	113	97	774	1,130	1,780	1,380	1,080	247
14	505	212	100	85	121	97	781	1,180	1,950	1,390	1,060	251
15	542	201	100	85	123	93	794	1,210	1,920	1,390	1,050	259
16	618	184	100	85	123	91	807	1,310	1,870	1,380	1,030	263
17	755	175	105	85	123	87	814	1,390	1,880	1,350	1,020	270
18	840	169	105	85	123	83	833	1,450	1,930	1,310	999	270
19	866	166	105	80	123	81	866	1,540	2,000	1,270	1,010	270
20	774	156	105	75	121	79	957	1,660	2,030	1,230	992	270
21	684	150	100	80	118	81	1,080	1,750	2,020	1,190	964	270
22	618	147	105	80	118	81	1,150	1,820	1,990	1,170	944	267
23	559	145	110	79	115	83	1,200	1,860	1,930	1,150	937	259
24	515	145	121	76	110	81	1,270	1,860	1,850	1,150	898	267
25	480	142	123	76	105	79	1,360	1,900	1,810	1,170	846	344
26	460	139	123	77	100	79	1,390	1,860	1,790	1,180	788	409
27	427	128	121	77	100	83	1,390	1,820	1,780	1,210	729	446
28	405	118	118	76	100	89	1,400	1,820	1,850	1,310	696	451
29	392	123	118	76	-----	89	1,370	1,900	1,830	1,350	716	392
30	370	118	116	76	-----	87	1,310	1,980	1,780	1,350	703	340
31	348	-----	113	76	-----	87	-----	2,020	-----	1,330	660	-----
TOTAL	14,868	6,127	3,550	2,727	3,035	2,757	23,916	45,050	52,650	41,090	31,612	10,089
MEAN	480	204	115	88.0	108	88.9	797	1,453	1,755	1,325	1,020	336
MAX	866	348	136	111	123	100	1,400	2,020	2,030	1,740	1,310	618
MIN	278	118	100	75	76	79	89	1,070	1,230	1,150	660	244
AC-FT	29,490	12,150	7,040	5,410	6,020	5,470	47,440	89,360	104,400	81,500	62,700	20,010
(†)	+5,010	+3,840	+2,470	+1,740	+2,760	+1,820	-11,670	+5,740	27,000	-14,600	-22,570	+2,450
MEAN†	561	269	+55	116	158	119	601	1,546	2,224	1,087	653	377
CFSM†	2.02	.47	.56	.42	.57	.43	2.16	5.56	8.00	3.91	2.35	1.36
IN†	2.33	1.08	.64	.48	.59	.49	2.41	6.41	8.92	4.51	2.71	1.51
AC-FT†	34,500	15,990	9,510	7,140	8,780	7,290	35,770	95,090	132,300	66,810	41,130	22,460

## OBSERVED

CAL YR 1961: TOTAL 276,567	MEAN 758	MAX 3,480	MIN 66	AC-FT 548,600
WAT YR 1962: TOTAL 237,471	MEAN 651	MAX 2,030	MIN 75	AC-FT 471,000

## ADJUSTED †

CAL YR 1961: MEAN 760	CFSM 2.73	IN 37.13	AC-FT 550,500
WAT YR 1962: MEAN 657	CFSM 2.36	IN 32.08	AC-FT 475,800

† Adjusted for change in contents, in acre-feet, in Lake Sherburne, adjusted for evaporation.

5-0175. St. Mary River near Babb, Mont.--Continued

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	302	396	323	208	113	172	208	1,030	2,230	1,660	1,100	892
2	278	423	319	195	113	166	195	1,070	2,270	1,750	1,100	904
3	263	446	319	188	123	159	205	1,110	2,310	1,840	1,090	904
4	244	456	331	181	126	156	352	1,120	2,360	1,900	1,100	924
5	229	470	331	162	153	150	490	1,130	2,440	1,950	1,110	924
6	226	456	319	131	169	147	666	1,130	2,670	2,020	1,110	930
7	219	409	294	111	195	139	742	1,120	2,730	2,040	1,100	944
8	215	387	282	95	212	134	774	1,210	2,680	2,070	1,090	944
9	201	409	267	85	233	131	833	1,230	2,570	2,040	1,090	937
10	198	387	247	87	247	131	852	1,120	2,620	1,930	1,090	924
11	195	348	233	99	263	126	859	1,110	2,700	1,760	1,090	918
12	208	319	219	111	278	126	859	1,110	2,700	1,640	1,100	885
13	212	298	212	123	278	121	846	1,110	2,700	1,540	1,100	866
14	247	282	212	134	278	113	833	1,210	2,690	1,500	1,110	846
15	286	263	212	139	278	111	840	1,270	2,680	1,460	1,110	814
16	323	244	208	145	274	106	846	1,290	2,610	1,460	1,110	788
17	348	237	205	145	267	106	878	1,310	2,550	1,470	1,110	736
18	357	233	208	142	255	99	904	1,350	2,490	1,460	1,110	678
19	365	240	215	136	251	97	904	1,410	2,430	1,410	1,100	648
20	365	240	226	111	244	95	911	1,440	2,320	1,360	1,080	592
21	357	237	251	91	233	93	911	1,440	2,230	1,330	1,060	505
22	365	233	270	81	222	93	911	1,480	2,140	1,310	1,030	451
23	392	240	259	79	215	93	904	1,530	1,980	1,290	1,020	414
24	414	251	244	82	205	97	892	1,630	1,780	1,260	1,010	392
25	423	270	229	88	195	97	878	1,770	1,600	1,230	1,010	344
26	437	278	222	93	188	93	872	1,960	1,470	1,230	992	323
27	442	298	215	98	184	93	859	2,110	1,390	1,210	971	310
28	432	310	198	102	178	104	859	2,030	1,460	1,170	944	298
29	423	323	201	106	-----	109	872	1,980	1,640	1,130	930	294
30	409	323	215	107	-----	195	937	1,990	1,670	1,110	904	290
31	400	-----	212	109	-----	226	-----	2,110	-----	1,080	892	-----
TOTAL	9,775	9,706	7,698	3,764	5,970	3,878	22,892	43,910	68,110	47,610	32,763	20,609
MEAN	315	324	248	121	213	125	763	1,416	2,270	1,536	1,057	687
MAX	442	470	331	208	278	226	937	2,110	2,730	2,070	1,110	944
MIN	195	233	198	79	113	93	195	1,030	1,390	1,080	892	290
AC-FT	19,390	19,250	15,270	7,470	11,840	7,690	45,410	87,090	135,100	94,430	64,980	40,880
(+)	+9,670	+6,130	+6,280	+2,380	+5,980	+2,190	-30,290	+7,340	+44,700	-2,730	-34,020	-18,730
MEAN†	473	426	350	160	321	161	254	1,536	3,022	1,491	504	372
CFSM†	1.70	1.53	1.26	.58	1.15	.58	.91	5.53	10.9	5.36	1.81	1.34
III†	1.46	1.71	1.45	.66	1.20	.67	1.02	6.37	12.13	6.18	2.09	1.49
AC-FT†	29,060	29,380	21,550	9,840	17,820	9,890	15,120	94,430	179,800	91,700	30,970	22,140

## OBSERVED

CAL YR 1962: TOTAL 240,105	MEAN 658	MAX 2,030	MIN 75	AC-FT 476,200
WAT YR 1963: TOTAL 276,685	MEAN 756	MAX 2,730	MIN 79	AC-FT 548,800

## ADJUSTED †

CAL YR 1962: MEAN 679	CFSM 2.44	IN 33.15	AC-FT 491,800
WAT YR 1963: MEAN 757	CFSM 2.72	IN 36.93	AC-FT 547,700

† Adjusted for change in contents, in acre-feet, in Lake Sherburne, adjusted for evaporation.

5-0175. St. Mary River near Babb, Mont.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964												
DAY	UCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	286	116	128	59	106	67	62	346	1,840	1,900	1,270	1,050
2	282	109	121	60	106	65	80	456	1,950	1,830	1,250	1,050
3	278	106	118	55	106	64	87	658	2,200	1,870	976	1,050
4	259	104	116	53	106	63	110	790	2,430	1,850	838	1,070
5	263	99	113	51	106	67	144	730	2,680	1,870	885	1,080
6	267	101	118	50	109	65	146	670	2,840	1,870	913	1,110
7	263	99	118	49	106	65	127	670	3,060	1,870	920	1,120
8	263	97	113	48	101	65	122	802	7,700	1,800	934	1,140
9	240	95	110	45	97	64	194	927	15,600	1,840	1,000	1,130
10	219	91	108	43	97	63	292	1,010	11,400	1,830	1,050	1,140
11	198	91	107	40	97	63	395	1,090	9,100	1,790	1,050	1,130
12	188	89	107	40	95	63	478	1,100	7,900	1,710	1,050	1,110
13	178	87	103	40	92	63	528	1,140	7,000	1,680	1,070	1,080
14	166	89	101	39	89	62	555	1,170	6,160	1,800	1,080	1,050
15	156	91	98	38	85	60	610	1,210	5,540	1,900	1,060	1,020
16	147	93	98	39	83	60	670	1,240	5,130	1,990	1,050	983
17	142	95	97	37	80	59	700	1,330	4,850	1,940	1,030	934
18	134	97	97	38	78	60	700	1,480	4,400	1,840	1,040	871
19	128	95	94	38	78	64	694	1,640	3,850	1,750	1,040	838
20	128	93	93	39	76	63	682	1,680	3,460	1,660	1,050	857
21	126	92	94	40	76	61	676	2,180	3,190	1,590	1,050	885
22	126	90	93	40	75	60	652	2,340	2,950	1,500	1,010	802
23	121	100	86	45	73	58	670	2,260	2,610	1,440	997	712
24	123	105	81	60	73	58	622	2,060	2,450	1,430	990	634
25	126	111	77	73	76	57	555	1,830	2,470	1,400	983	582
26	131	121	73	81	75	58	472	1,640	2,500	1,350	955	572
27	126	131	71	87	71	59	410	1,490	2,490	1,310	948	550
28	128	136	69	95	68	60	359	1,460	2,390	1,280	990	528
29	126	142	68	97	68	60	333	1,560	2,220	1,250	1,020	528
30	118	134	61	101	-----	60	329	1,670	2,030	1,230	1,020	533
31	113	-----	61	106	-----	60	-----	1,740	-----	1,240	1,050	-----
TOTAL	5,549	3,099	2,992	1,726	2,548	1,916	12,454	40,569	134,440	51,640	31,569	27,139
MEAN	179	103	96.5	55.7	87.9	61.8	415	1,309	4,481	1,666	1,018	905
MAX	286	142	128	106	109	87	700	2,340	15,600	1,990	1,270	1,140
MIN	113	87	61	37	68	57	62	346	1,840	1,230	838	528
AC-FT	11,010	6,150	5,930	3,420	5,050	3,800	24,700	80,470	266,700	102,400	62,620	53,830
(+)	+3,240	+4,520	+2,700	+1,700	+1,680	+1,500	-16,100	+14,360	+37,340	+7,360	-26,330	-21,760
MEAN†	232	179	140	84.8	117	86.2	145	1,542	5,109	1,785	590	539
CFSM†	.84	.64	.50	.30	.42	.31	.52	5.55	18.4	6.42	2.12	1.94
IN†	.96	.72	.58	.35	.45	.36	.58	6.40	20.50	7.40	2.45	2.16
AC-FT†	14,250	10,670	8,640	5,210	6,730	5,300	8,600	94,830	304,000	109,800	36,290	32,070
OBSERVED												
CAL YR 1963: TOTAL		261,146	MEAN 715		MAX 2,730		MIN 61	AC-FT 518,000				
WAT YR 1964: TOTAL		315,641	MEAN 862		MAX 15,600		MIN 37	AC-FT 626,100				
ADJUSTED †												
CAL YR 1963: MEAN		698	CFSM 2.51		IN 34.07		AC-FT 505,300					
WAT YR 1964: MEAN		877	CFSM 3.15		IN 42.91		AC-FT 636,400					

† Adjusted for change in contents, in acre-feet, in Lake Sherburne, adjusted for evaporation.

Note.--No gage-height record June 8-13.

5-0175. St. Mary River near Babb, Mont.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965												
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	577	790	149	115	98	112	94	927	2,470	1,780	1,320	995
2	652	730	147	113	96	112	92	1,020	2,410	1,640	1,300	966
3	670	700	149	111	96	110	94	1,070	2,490	1,600	1,290	948
4	682	676	149	110	96	110	94	1,050	2,860	1,630	1,280	948
5	700	566	149	110	94	107	92	1,010	3,120	1,680	1,270	941
6	742	451	149	108	98	107	89	941	3,240	1,750	1,270	941
7	754	368	152	108	98	107	92	899	3,290	1,820	1,250	920
8	748	321	152	108	98	105	92	832	3,170	1,810	1,220	899
9	748	292	152	107	103	105	92	790	2,930	1,820	1,190	920
10	742	272	149	110	105	107	98	766	2,750	1,360	1,150	899
11	760	253	147	111	103	100	112	766	2,670	1,870	1,120	899
12	772	238	141	110	100	107	112	320	2,780	1,790	1,110	899
13	796	226	130	111	89	112	115	927	2,940	1,690	1,160	895
14	820	219	130	114	89	117	132	1,300	2,960	1,570	1,170	913
15	826	208	132	112	92	110	144	1,880	2,810	1,470	1,210	976
16	826	194	127	107	83	110	161	2,350	2,760	1,410	1,220	1,120
17	808	184	125	105	87	105	161	2,580	3,330	1,400	1,200	1,200
18	778	178	120	103	92	85	161	2,560	3,810	1,500	1,140	1,240
19	730	178	120	100	94	83	158	2,500	4,370	1,530	1,100	1,240
20	694	174	120	96	100	83	184	2,500	4,990	1,520	1,070	1,240
21	640	171	120	94	103	85	223	2,450	4,830	1,490	1,050	1,220
22	610	168	119	92	107	87	272	2,280	4,250	1,490	1,070	1,210
23	588	164	118	89	107	85	316	2,160	3,740	1,430	1,090	1,140
24	572	161	117	92	105	83	364	1,980	3,400	1,350	1,100	832
25	544	168	116	92	103	83	430	1,870	3,200	1,280	1,090	616
26	533	161	115	89	105	82	500	1,860	3,100	1,220	1,080	500
27	599	155	114	92	107	82	550	1,760	2,940	1,200	1,060	435
28	670	149	113	89	110	82	610	1,750	2,700	1,260	1,070	386
29	688	147	112	92	-----	87	682	1,880	2,320	1,290	1,060	359
30	712	147	110	92	-----	94	778	2,170	2,010	1,340	1,040	346
31	790	-----	112	96	-----	94	-----	2,400	-----	1,340	1,020	-----
TOTAL	21,771	8,809	4,055	3,178	2,758	3,038	7,094	50,048	94,640	47,830	35,770	27,033
MEAN	702	294	131	103	98.5	98.0	236	1,614	3,155	1,543	1,154	901
MAX	826	790	152	115	110	117	778	2,580	4,990	1,870	1,320	1,240
MIN	533	147	110	89	83	82	89	766	2,010	1,200	1,020	346
AC-FT	43,180	17,470	8,040	6,300	5,470	6,030	14,070	99,270	187,700	94,870	70,950	53,620
(+)	-5,110	+1,770	+3,070	+2,380	+2,430	+2,510	+10,280	+6,760	+17,610	+10,530	-25,840	-24,310
MEAN†	619	323	181	141	142	139	409	1,724	3,451	1,714	1,254	493
CFSM†	2.23	1.16	.65	.51	.51	.50	1.47	6.20	12.4	6.17	2.64	1.77
IN†	2.57	1.30	.75	.59	.53	.58	1.64	7.15	13.85	7.11	3.04	1.98
AC-FT†	38,070	19,240	11,110	8,680	7,900	8,540	24,350	106,000	205,300	105,400	45,110	29,310

## OBSERVED

CAL YR 1964: TOTAL 338,636	MEAN 925	MAX 15,600	MIN 37	AC-FT 671,700
WAT YR 1965: TOTAL 306,024	MEAN 838	MAX 4,990	MIN 82	AC-FT 607,000

## ADJUSTED †

CAL YR 1964: MEAN 925	CFSM 3.33	IN 45.27	AC-FT 671,200
WAT YR 1965: MEAN 841	CFSM 3.03	IN 41.09	AC-FT 609,100

† Adjusted for change in contents, in acre-feet, in Lake Sherburne, adjusted for evaporation.

5-0185. St. Mary Canal at St. Mary Crossing, near Babb, Mont.

Location.--Lat 48°56'50", long 113°22'30", in SW<sup>1</sup>/<sub>4</sub> sec.19, T.37 N., R.13 W., on left bank 50 ft upstream from inlet of St. Mary siphon, 7 miles northeast of Babb, and 9 miles downstream from intake.

Records available.--July 1918 to October 1965 (seasonal records only). Monthly discharge only for some periods, published in WSP 1308 and 1728.

Gage.--Water-stage recorder and concrete control. Altitude of gage is 4,440 ft (from topographic map). Prior to June 14, 1951, water-stage recorder at several sites three-quarters of a mile downstream at different datums.

Extremes.--1918-65: Maximum daily discharge, 767 cfs June 19, 28, 1936; no flow at times in each year.

Remarks.--Records excellent. Canal diverts water from left bank of St. Mary River near Babb and discharges into North Fork Milk River. This water flows in the natural channel of Milk River through Canada and then back into Montana, where it is used for irrigation in Milk River Valley east of Havre. Some water may be returned to St. Mary River at Kennedy Creek and St. Mary Crossings.

Cooperation.--This is one of a number of stations which are maintained jointly by the United States and Canada.

DISCHARGE, IN CUBIC FEET PER SECOND, APRIL TO OCTOBER 1961

DAY	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.		
1		0	133	696	679	643	656	94		
2		0	123	689	673	641	660	93		
3		75	* 122	687	664	641	660	93		
4		354	124	687	664	639	658	95		
5		507	126	689	656	639	658	93		
6			553	126	689	658	637	656	83	
7		* 579	124	694	662	643	654	97		
8		608	149	694	668	658	652	97		
9		610	239	689	671	664	652	88		
10		622	252	687	671	664	656	83		
11		647	328	679	673	662	656	83		
12		647	365	673	671	660	652	83		
13		650	372	677	668	656	* 645	83		
14		645	397	689	666	656	645	83		
15		643	457	* 689	666	656	641	83		
16		639	547	685	666	* 664	622	83		
17		637	606	685	668	662	515	* 91		
18		* 626	* 606	685	* 668	658	384	97		
19		612	602	692	666	656	290	83		
20		521	604	696	666	658	283	67		
21		(*) 413	608	698	666	658	* 256	0		
22		408	620	696	662	656	138	0		
23		406	654	692	662	656	108	0		
24		397	683	683	662	656	101	0		
25		* 392	692	679	660	656	97	0		
26			372	702	679	658	656	97	0	
27			209	706	677	654	656	95	0	
28			144	700	677	654	654	* 95	0	
29			140	704	675	650	654	96	0	
30			140	702	677	647	654	95	0	
31			-----	702	-----	645	656	-----	0	
TOTAL		13,196	13,875	20,584	20,566	20,273	13,119	1,763		
MEAN		440	448	686	683	654	437	57.0		
MAX		650	706	698	679	664	660	91		
MIN		0	122	673	645	637	95	0		
AC-FT		26,170	27,520	40,830	40,790	40,210	26,020	3,517		

THE SEASON APRIL TO OCTOBER: MAX - MIN - MEAN - AC-FT AC-FT 205,000

\* Discharge measurement or observation of no flow made on this day.

5-0185. St. Mary Canal at St. Mary Crossing, near Babb, Mont.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, APRIL TO NOVEMBER 1962									
DAY	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.
1		N11	660	696	694	666	135	* N11	N11
2		N11	654	696	694	662	132	"	"
3		5.0	656	694	689	680	150	"	"
4		84.2	656	681	685	660	128	"	"
5		90.5	654	494	681	660	126	"	"
6			114	652	121	675	658	94.3	"
7			217	652	664	671	658	11.6	* N11
8			312	652	683	666	658	6.8	"
9			397	654	679	682	656	5.3	"
10			444	652	683	664	654	4.2	"
11									
12			539	652	689	666	652	.8	"
13			* 555	654	696	671	650	.2	"
14		(*)	571	654	* 702	* 675	647	0.0	"
15			563	656	706	675	645	* 0.0	"
16			610	652	704	675	* 645	0.0	"
17			612	* 660	704	675	645	0.0	"
18			614	660	704	673	643	0.0	"
19			618	662	704	671	639	0.0	"
20			620	664	706	668	639	0.0	"
21			631	668	704	668	639	0.0	"
22			643	673	704	666	637	0.0	"
23		** 0.5	650	685	704	664	637	0.0	"
24			652	689	702	662	635	0.0	"
25			654	689	702	660	633	0.0	"
26			658	692	698	660	626	0.0	"
27			662	692	698	660	618	0.0	"
28			664	689	698	660	610	N11	"
29			666	692	696	666	581	"	"
30			664	694	696	668	521	"	"
31			662	696	696	668	* 351	N11	"
			-----	696	-----	668	228	-----	N11
TOTAL			- 14,191.7	20,713	20,104	20,800	19,113	774.2	N11
MEAN			- 473	668	670	671	617	25.8	N11
MAX			- 666	698	706	671	666	135	N11
MIN			- N11	652	121	660	228	N11	N11
AC-FT			- 28,150	41,080	39,880	41,260	37,910	1,540	N11

THE SEASON APRIL TO OCTOBER: MAX - MIN - MEAN - AC-FT - AC-FT 189,800

\* Discharge measurement or observation of no flow made on this day.

\*\* Field estimate made on this day.

Note.--The expressions "n11" and "0.0" represent "no flow" and "less than 0.05 cfs", respectively.

DISCHARGE, IN CUBIC FEET PER SECOND, APRIL TO NOVEMBER 1963									
DAY	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.
1		N11	633	704	687	675	679	* N11	N11
2		* N11	* 620	706	690	683	679	"	"
3		25.2	590	706	690	686	679	"	"
4		251	592	706	690	686	679	"	"
5		390	590	708	690	696	681	"	"
6		559	600	713	692	696	679	"	* N11
7		614	633	717	692	696	681	"	"
8		657	637	717	690	694	683	"	"
9		660	637	717	690	694	681	"	"
10		666	629	717	692	696	671	"	"
11		679	594	719	690	694	671	"	"
12		679	592	713	685	692	668	"	"
13		(*)	679	590	694	683	684	"	"
14			679	581	732	679	694	666	"
15			685	507	* 717	675	694	666	"
16			683	* 525	713	* 675	* 692	648	"
17			* 685	588	710	675	692	594	"
18			687	588	706	677	692	539	"
19			687	590	706	685	690	* 378	"
20		(*)	685	602	704	685	687	181	"
21			687	652	704	683	687	* 19.6	"
22			687	626	706	681	687	12.3	"
23			687	687	698	679	685	3.7	"
24			685	692	692	679	685	N11	"
25			685	696	687	679	683	"	"
26			683	700	683	677	683	"	"
27		(*)	673	702	681	675	683	"	"
28			668	702	683	675	683	"	"
29			688	702	692	673	679	"	"
30			648	702	690	673	679	N11	"
31			-----	702	-----	671	679	-----	N11
TOTAL			- 17,401.2	19,481	21,141	21,157	21,356	12,504.6	N11
MEAN			- 580	628	706	682	689	417	N11
MAX			- 687	702	732	692	696	683	N11
MIN			- N11	507	681	671	675	N11	N11
AC-FT			- 34,510	38,640	41,930	41,960	42,360	24,800	N11

THE SEASON APRIL TO OCTOBER: MAX - MIN - MEAN - AC-FT - AC-FT 224,200

\* Discharge measurement or observation of no flow made on this day.

Note.--The expressions "n11" and "0.0" represent "no flow" and "less than 0.05 cfs", respectively.

5-0185. St. Mary Canal at St. Mary Crossing, near Babb, Mont.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, APRIL TO NOVEMBER 1964											
DAY			APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	
1			* N11	133	683	304	696	* 704	** 0.1	N11	
2			** "	181	685	322	698	704	0.1	"	
3			"	290	690	353	695	704	0.0	"	
4			"	346	696	320	677	706	N11	* N11	
5			"	503	700	302	679	708	"	"	
6			"	499	700	280	679	710	"	"	
7			N11	523	706	269	683	710	"	"	
8			31.6	598	624	268	683	710	"	"	
9			121	610	103	270	687	708	"	"	
10			227	616	47.3	255	690	710	"	"	
11			310	616	34.1	120	690	710	"	"	
12			334	616	19.2	1.8	692	710	"	"	
13			368	618	15.4	0.3	694	708	"	"	
14			461	* 618	12.3	0.2	694	708	"	"	
15			525	618	10.2	** 0.1	696	* 704	*	"	
16			571	620	3.2	0.4	696	704	"	"	
17			604	624	1.4	87.6	696	696	"	"	
18			620	624	** 1.4	318	698	677	"	"	
19			622	629	95.5	440	696	675	"	"	
20			616	635	499	447	696	684	"	"	
21			616	643	481	471	698	629	"	"	
22			602	654	451	620	698	610	"	"	
23			608	668	461	633	696	519	"	"	
24			586	668	517	633	696	535	"	"	
25			507	662	519	633	700	527	"	"	
26			302	662	471	633	696	* 90.1	-	"	
27			288	675	432	633	698	2.2	"	"	
28			* 255	675	392	641	700	0.4	"	"	
29			167	679	343	668	702	0.2	"	"	
30			* 132	679	316	690	702	0.2	"	"	
31			-----	691	-----	694	704	-----	N11	"	
TOTAL			9,473.6	17,863	10,709.0	11,307.4	21,495	16,443.1	0.2		
MEAN			316	576	357	365	693	548	0.01		
MAX			622	691	706	694	704	710	0.1		
MIN			N11	133	1.4	0.1	677	0.2	N11		
AC-FT			18,790	35,430	21,240	22,450	42,630	32,610	0.4		

THE SEASON APRIL TO OCTOBER: MEAN MEAN - MAX MAX - MIN MIN - AC-FT AC-FT 173,100

\* Discharge measurement or observation of no flow made on this day.

\*\* Field estimate made on this day.

Note.--The expressions "n11" and "0.0" represent "no flow" and "less than 0.05 cfs", respectively.

DISCHARGE, IN CUBIC FEET PER SECOND, APRIL TO OCTOBER 1965											
DAY			APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	
1			N11	N11	* 600	643	658	660	N11		
2			"	"	679	429	656	656	"	(*)	
3			"	"	671	168	658	656	*	"	
4			"	"	681	20.9	660	656	"	"	
5			"	"	675	16.9	658	656	"	"	
6			"	"	679	15.1	664	656	"	"	
7			"	"	608	122	664	654	"	"	
8			"	"	664	508	666	654	"	"	
9			"	"	662	668	671	656	"	"	
10			"	"	654	652	671	654	"	"	
11			"	"	650	648	668	654	"	"	
12			"	"	671	645	668	654	"	"	
13			"	*	677	643	668	654	"	"	
14			"	"	679	633	671	654	"	"	
15			"	"	* 677	602	671	641	"	"	
16			"	"	679	569	673	553	"	"	
17			"	"	683	565	673	340	"	"	
18			"	"	668	569	671	130	"	"	
19			"	"	673	571	668	17.9	"	"	
20			"	"	685	491	668	15.1	*	"	
21			"	"	683	224	666	11.0	"	"	
22			"	"	675	20.3	668	6.8	"	"	
23			"	"	664	37.9	668	6.2	"	"	
24			"	"	658	505	668	5.8	"	"	
25			"	"	658	541	666	4.7	"	"	
26			"	"	658	569	666	4.6	"	"	
27			"	"	654	635	664	4.4	"	"	
28			"	N11	648	641	664	4.4	"	"	
29			"	107	668	652	664	N11	"	"	
30			** N11	535	658	654	664	N11	"	"	
31			-----	561	-----	658	662	-----	N11	"	
TOTAL			N11	1,203	19,939	14,316.1	20,645	10,920.7	N11		
MEAN			N11	38.3	665	462	666	364	N11		
MAX			N11	561	685	668	673	660	N11		
MIN			N11	N11	600	15.1	656	N11	N11		
AC-FT			N11	2,390	39,550	28,400	40,950	21,660	N11		

THE SEASON APRIL TO OCTOBER: MEAN MEAN - MAX MAX - MIN MIN - AC-FT AC-FT 133,000

\* Discharge measurement or observation of no flow made on this day.

\*\* Field estimate made on this day.

Note.--The expression "n11" represents "no flow".

5-0190. St. Mary Canal at Hudson Bay Divide, near Browning, Mont.

(International gaging station)

Location--Lat 48°59', long 113°04', in sec. 5, T.37 N., R.11 W., on right bank 3 miles upstream from canal outlet and 30 miles north of Browning on Blackfeet Indian Reservation.

Records available--March 1917 to October 1965 (seasonal records only). Monthly discharge only for some periods, published in WSP 1308 and 1728.

Gage--Water-stage recorder and concrete control. Altitude of gage is 4,380 ft (from topographic map). Prior to Sept. 9, 1918, staff gage at site 1 mile upstream at different datum. Apr. 23, 1919, to June 28, 1920, water-stage recorder 40 ft upstream at datum 0.40 ft lower. June 29, 1920, to June 9, 1930, water-stage recorder on left bank opposite present site at present datum.

Extremes--1917-65: Maximum daily discharge, 816 cfs June 8, 1964; no flow at times in most years.

Remarks--Records excellent. Canal diverts water from left bank of St. Mary River near Babb and discharges into North Fork Milk River. This water flows in the natural channel of Milk River through Canada then back into Montana, where it is used for irrigation in Milk River Valley east of Havre. Some water may be returned to St. Mary River basin at Kennedy Creek, St. Mary and Hall's Coulee crossings.

Cooperation--This is one of a number of stations which are maintained jointly by the United States and Canada.

## DISCHARGE, IN CUBIC FEET PER SECOND, MARCH TO OCTOBER 1961

DAY		MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.		
1	-	-	1.5	* 136	682	647	617	632	93		
2	-	-	.6	130	674	649	615	637	91		
3	-	-	.8	118	672	612	612	642	90		
4	-	-	102	122	669	617	612	627	92		
5	-	-	390	126	689	624	615	637	90		
6	-	-	495	133	689	629	610	629	88		
7	-	-	535	129	677	634	610	629	87		
8	-	-	581	126	669	637	624	632	93		
9	-	-	586	180	677	639	639	624	90		
10	-	-	591	235	669	642	639	632	86		
11	-	-	615	266	664	647	634	634	87		
12	-	-	629	323	657	647	634	* 629	89		
13	-	-	624	351	649	644	632	624	89		
14	-	-	629	354	659	647	629	617	85		
15	-	-	629	401	669	637	627	615	88		
16	-	-	622	479	669	642	634	612	86		
17	-	-	624	555	664	639	637	555	86		
18	-	-	610	574	* 662	642	632	436	90		
19	-	-	610	* 569	672	639	632	327	90		
20	-	-	* 553	581	674	637	632	272	87		
21	-	-	444	584	672	637	632	* 264	49.4		
22	** .3	-	390	585	672	637	632	221	13.2		
23	.3	-	388	610	672	637	629	161	3.7		
24	.8	* 383	647	667	667	637	627	114	2.1		
25	.5	-	376	664	659	634	629	97	0.9		
26	.4	-	368	674	657	629	629	93	1.0		
27	.5	-	292	693	652	627	629	95	.5		
28	.5	-	176	677	652	622	627	95	.2		
29	.6	-	140	684	654	624	627	92	.1		
30	.3	-	137	687	659	619	* 632	93	.2		
31	.4	-----	-----	684	-----	617	634	-----	** .2		
TOTAL	-	-	12,521.9	13,078	19,982	19,671	19,443	12,967	1,852.5		
MEAN	-	-	417	422	666	635	627	432	59.8		
MAX	-	-	629	693	682	649	639	642	93		
MIN	-	-	.6	118	649	612	610	92	.1		
AC-FT	-	-	24,840	25,940	39,630	39,020	38,560	25,720	3,670		

THE SEASON APRIL TO OCTOBER: MEAN - MAX - MIN - AC-FT AC-FT 197,400

\* Discharge measurement made on this day.

\*\* Field estimate made on this day.

Note.--Flow from local runoff only prior to Apr. 4.

5-0190. St. Mary Canal at Hudson Bay Divide, near Browning, Mont.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, APRIL TO OCTOBER 1962									
DAY		MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.
1				637	679	677	649	189	N11
2				629	677	674	647	137	"
3				629	679	672	644	131	"
4				629	674	669	647	127	"
5				619	615	664	644	126	"
6				624	286	664	637	124	"
7			8.5	627	344	652	639	188.6	"
8			259	622	649	647	644	35.4	"
9			352	632	664	644	637	16.3	"
10			381	627	664	639	637	8.6	"
11			464	629	667	644	634	* 5.9	"
12			512	619	* 672	* 647	632	3.5	"
13			537	624	690	652	629	1.4	"
14			546	629	701	654	* 627	.6	"
15			574	627	690	654	622	* 2	"
16			579	637	690	657	624	.1	"
17			584	637	693	654	624	0.0	"
18			586	* 634	687	652	619	N11	"
19		† 6.8	593	637	687	649	617	"	"
20			595	642	687	644	619	"	"
21			612	644	690	642	615	"	"
22			617	654	690	637	617	"	"
23			624	664	687	637	617	"	"
24			627	667	684	642	615	"	"
25			629	672	679	639	610	"	"
26			632	672	684	637	602	"	"
27			637	672	679	639	595	"	"
28			647	674	677	647	574	"	"
29			637	677	677	647	544	"	"
30			634	669	679	647	434	N11	"
31			-----	679	-----	649	303	-----	N11
TOTAL			12,829.0	19,934	19,621	20,172	18,798	994.5	N11
MEAN			428	643	654	651	606	33.2	N11
MAX			647	679	701	677	649	189	N11
MIN			-	286	637	603	N11	N11	N11
AC-FT			25,450	39,540	38,920	40,010	37,290	1,970	N11

THE SEASON APRIL MEAN MAX MIN AC-FT  
TO OCTOBER: MEAN - MAX - MIN - AC-FT 183,200

\* Discharge measurement made on this day.

\*\* Field estimate made on this day.

† Result of discharge measurement.

a No gage-height record.

Note.--The expressions "nil" and "0.0" represent "no flow" and "less than 0.05 cfs", respectively.

DISCHARGE, IN CUBIC FEET PER SECOND, APRIL TO OCTOBER 1963									
DAY		MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.
1			* 0.0	627	693	677	654	659	0.1
2			0.0	610	693	677	654	662	N11
3			0.0	576	703	677	669	662	"
4			20.5	569	701	677	677	664	"
5			* 309	574	703	679	674	664	"
6			448	572	706	677	674	664	"
7			562	588	709	679	677	664	"
8			597	615	706	679	672	664	"
9			627	617	714	677	674	667	"
10			639	617	719	679	674	662	"
11			654	591	714	682	674	657	"
12			662	572	709	677	672	654	"
13			664	* 569	672	672	674	654	"
14		(*)	664	569	* 716	669	674	652	"
15			669	525	711	667	674	642	"
16			662	479	709	659	* 672	654	"
17			669	526	706	659	674	600	*
18			677	565	701	* 659	674	* 562	"
19			672	567	701	664	677	456	"
20			674	565	693	669	674	297	"
21			677	607	698	667	669	136	"
22		(*)	677	617	716	664	669	46.1	"
23			682	639	696	659	669	22.4	"
24			677	674	690	659	672	11.8	"
25			674	679	682	659	672	4.3	"
26			674	684	672	657	672	1.4	"
27		(*)	669	690	667	659	664	0.4	"
28			659	690	667	657	664	0.2	"
29			657	693	684	654	664	0.2	"
30			659	690	682	652	662	0.1	"
31			-----	693	-----	649	659	-----	N11
TOTAL			16,574.5	18,951	20,933	20,691	20,774	12,682.9	0.1
MEAN			552	608	698	667	670	423	0.035
MAX			682	693	719	682	677	667	0.1
MIN			0.0	479	667	649	654	0.1	N11
AC-FT			32,880	37,390	41,520	41,040	41,200	25,160	0.2

THE SEASON APRIL MEAN MAX MIN AC-FT  
TO OCTOBER: MEAN - MAX - MIN - AC-FT 219,200

\* Discharge measurement or observation of no flow made on this day.

Note.--The expressions "nil" and "0.0" represent "no flow" and "less than 0.05 cfs", respectively.

5-0190. St. Mary Canal at Hudson Bay Divide, near Browning, Mont.--Continued

## DISCHARGE, IN CUBIC FEET PER SECOND, MARCH TO OCTOBER 1964

DAY	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.		
1	-	** 0.8	133	674	303	674	693	0.2		
2	-	0.2	150	682	299	682	696	0.2		
3	-	0.4	260	684	332	677	693	0.1		
4	-	0.4	311	687	327	669	693	N11		
5	-	0.2	418	696	313	664	693	"		
6	-	0.2	486	693	288	659	693	"		
7	-	0.1	484	703	266	669	698	"		
8	-	** 0.1	542	816	259	669	701	"		
9	-	0.1	566	380	261	672	696	"		
10	-	63.5	595	70.8	257	669	698	* "		
11	-	263	607	25.9	227	674	696	"		
12	-	385	* 607	10.8	87.4	679	696	"		
13	-	338	607	5.5	20.8	684	693	"		
14	-	399	602	1.8	9.8	682	693	"		
15	-	458	610	1.9	4.9	682	696	"		
16	-	525	605	3.8	2.6	682	698	"		
17	-	567	622	2.6	1.0	682	680	"		
18	* N11	597	605	0.7	115	687	670	"		
19	-	607	612	0.2	* 338	682	* 659	"		
20	-	605	619	208	412	684	652	"		
21	-	607	629	450	422	684	627	"		
22	-	593	637	434	505	684	600	"		
23	-	597	654	418	597	684	555	"		
24	-	588	659	450	605	684	422	"		
25	-	558	652	484	610	687	291	"		
26	-	394	647	* 480	607	692	185	"		
27	-	291	667	424	607	684	68.4	"		
28	-	278	672	386	607	684	9.6	"		
29	-	* 208	672	343	632	693	2.0	"		
30	0.6	153	672	323	662	687	0.8	"		
31	0.6	-----	674	-----	682	693	-----	N11		
TOTAL			9,057.0	17,298	10,518.7	10,659.3	21,068	16,547.8	0.5	
MEAN			302	558	351	344	680	552	0.02	
MAX			607	674	816	682	693	701	0.2	
MIN			0.1	133	0.2	1.0	659	0.8	N11	
AC-FT			17,960	34,310	20,860	21,140	41,790	32,820	1.0	

THE SEASON APRIL MEAN MAX AC-FT  
TO OCTOBER: MEAN - MAX - MIN - AC-FT 168,900

\* Discharge measurement or observation of no flow made on this day.

\*\* Field estimate made on this day.

Note.--The expression "n11" represents "no flow".

## DISCHARGE, IN CUBIC FEET PER SECOND, MARCH TO OCTOBER 1965

DAY	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.		
1	-	-	2.3	530	642	639	654	0.6		
2	-	-	0.9	619	565	639	* 647	0.1		
3	-	-	1.1	647	324	639	657	0.0		
4	-	-	0.8	657	109	642	649	0.0		
5	-	** 0.3	659	29.2	647	647	647	0.1		
6	-	-	0.1	662	19.1	644	649	0.2		
7	-	-	0.1	632	16.3	647	644	0.0		
8	-	† 20.7	0.2	617	244	649	642	N11		
9	-	-	0.2	642	574	652	644	"		
10	-	-	0.3	637	652	652	642	"		
11	-	** 0.2	634	639	647	639	"	"		
12	-	0.3	644	629	652	637	"	"		
13	-	† 7.8	0.2	659	629	654	639	"		
14	-	-	0.2	667	624	647	637	"		
15	-	-	0.2	667	607	654	639	"		
16	-	-	0.4	677	569	654	a 635	"		
17	-	-	0.4	703	549	654	a 500	"		
18	-	-	0.0	667	546	654	a 300	"		
19	-	-	N11	669	542	652	a 130	"		
20	-	-	0.1	674	542	652	a 50	"		
21	-	-	0.1	669	376	649	a 25	"		
22	-	-	0.1	672	137	649	a 20	"		
23	-	-	0.2	659	5.8	654	a 15	"		
24	-	-	0.4	647	164	657	a 9	"		
25	-	-	0.6	652	490	652	a 8	"		
26	-	-	0.7	669	519	652	a 7	"		
27	-	-	0.3	652	584	652	a 8	"		
28	-	-	0.2	632	615	654	a 5	"		
29	-	3.8	0.1	644	627	652	a 5	"		
30	-	3.4	229	652	637	649	3.5	"		
31	-	-----	499	-----	639	652	-----	N11		
TOTAL			739.0	19,501	13,845.4	20,142	11,384.5	1.0		
MEAN			23.8	650	447	650	379	0.03		
MAX			499	703	852	657	657	0.6		
MIN			N11	530	6.8	639	3.5	N11		
AC-FT			1,470	38,680	27,460	39,950	22,580	2.0		

THE SEASON MAY MEAN MAX MIN AC-FT  
TO OCTOBER: MEAN - MAX - MIN - AC-FT 130,100

\* Discharge measurement or observation of no flow made on this day.

\*\* Field estimate made on this day.

† Result of discharge measurement.

a No gage-height record.

Note.--The expressions "n11" and "0.0" represent "no flow" and "less than 0.05 cfs", respectively.

## 5-0205. St. Mary River at international boundary

(International gaging station)

Location.--Lat 49°00'10", long 113°18'50", in SW 1/4 sec. 5, T. 1, R. 25 W., fourth meridian, in Alberta, on right bank a quarter of a mile north of international boundary, 2 1/2 miles downstream from Boundary Creek, 7 miles southwest of Kimball, Alberta, and 11 miles northeast of Babb, Mont.

Drainage area.--469 sq mi.

Records available.--September 1902 to September 1965. Monthly discharge only for some periods, published in WSP 1308. Published as "near Cardston, Alberta" and "at Cook's Ranch, Alberta" 1902-12 and as "near Kimball, Alberta" 1913-55.

Gage.--Water-stage recorder. Altitude of gage is 4,120 ft (from topographic map). Prior to Jan. 1, 1913, wire-weight gages at two sites within a quarter of a mile of present site at different datums. Jan. 1, 1913, to Oct. 25, 1955, water-stage recorder at several sites about 8 miles downstream from present site at various datums. Oct. 25, 1955, to Mar. 23, 1965, at site 100 ft upstream at datum 2 ft higher.

Average discharge.--14 years (1902-16), prior to operation of St. Mary Canal, 1,003 cfs (726,100 acre-ft per year); 49 years (1916-65), 703 cfs (509,000 acre-ft per year).

Extremes.--Maximum and minimum discharges for the water years 1961-65 are contained in the following table:

Water Year	Maximum			Minimum		
	Date	Discharge (cfs)	Gage height (feet)	Date	Discharge (cfs)	Gage height (feet)
1961	May 30, 1961	3,630	6.60	Jan. 19, 29, 30	a 87	-
1962	June 5, 1962	1,960	b 5.80	Jan. 24, 25, 1962	a 90	-
1963	June 12, 1963	3,200	6.41	Jan. 9, 1963	41	-
1964	June 8, 1964	21,000	12.06	Jan. 21, 1964	30	-
1965	June 20, 1965	5,220	8.59	Dec. 17, 1964	107	-

a Minimum daily.

b Maximum gage height for year, 7.10 ft Mar. 26, 1962, backwater from ice.

1902-65: Maximum discharge, about 40,000 cfs June 5, 1908 (gage height, 12.75 ft, from flood-marks, site and datum then in use), from rating curve extended above 6,000 cfs by logarithmic plotting; minimum daily, 16 cfs Nov. 29, 1936.

Remarks.--Records good except those for winter periods, which are poor. Since 1917, St. Mary Canal has diverted water from river near Babb, Mont. to North Fork Milk River (see station 5-0190). Some regulation by Lake Sherburne on Swiftcurrent Creek (see station 5-0155).

Cooperation.--This is one of a number of stations which are maintained jointly by Canada and the United States.

Revisions (water years).--WSP 1308: 1903-12. WSP 1508: 1902, 1908-9.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961												
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	235	* 191	* 167	115	98	* 191	220	361	3,260	1,650	* 551	* 328
2	230	* 191	* 163	112	104	187	291	366	3,080	1,340	537	366
3	221	182	159	109	109	187	284	392	2,970	1,010	523	360
4	212	187	159	106	112	182	155	* 426	2,910	782	508	328
5	204	182	159	106	112	182	134	487	2,950	678	516	310
6	196	191	159	106	115	178	201	582	3,080	747	523	304
7	197	187	159	109	115	178	304	620	3,190	840	516	285
8	183	182	152	112	112	178	366	628	3,220	911	501	279
9	179	178	148	112	112	174	406	590	3,020	955	559	268
10	176	182	144	112	112	174	399	678	2,710	966	551	279
11	176	178	141	112	118	187	360	678	2,440	977	530	297
12	179	182	134	112	131	182	328	712	2,300	944	501	263
13	172	182	128	106	138	159	310	791	2,220	900	473	* 235
14	164	178	* 122	106	141	159	304	830	2,360	870	460	215
15	164	174	122	106	141	167	279	860	* 2,210	850	439	196
16	164	* 174	122	106	* 115	182	251	922	2,080	900	426	215
17	161	174	122	95	104	167	240	1,020	2,080	* 890	* 406	274
18	* 161	174	122	* 90	109	167	* 229	* 944	2,150	911	386	285
19	157	178	118	87	122	167	240	890	2,420	890	380	291
20	157	182	115	95	138	171	347	944	2,730	860	366	229
21	161	178	115	104	167	* 159	412	1,100	2,730	850	347	224
22	157	178	118	106	171	152	386	1,400	2,620	820	335	263
23	153	178	131	104	174	155	373	1,700	2,380	820	328	322
24	153	174	138	101	182	171	316	2,030	2,040	800	335	316
25	157	178	138	98	187	167	263	2,420	1,910	774	341	304
26	161	196	134	95	191	163	224	2,770	1,800	738	341	285
27	172	196	131	92	191	174	366	3,260	1,660	678	335	268
28	176	187	128	90	191	174	380	3,420	* 1,570	653	322	* 263
29	168	182	125	87	-----	178	347	3,330	1,540	628	328	251
30	176	178	122	87	-----	215	347	3,350	1,550	597	328	263
31	179	-----	118	90	-----	224	-----	* 3,490	-----	574	328	-----
TOTAL	5,495	5,454	4,209	3,168	3,812	5,451	9,062	41,971	73,180	26,803	13,320	8,366
MEAN	177	182	136	102	136	176	302	1,354	2,439	865	430	279
MAX	235	196	167	115	191	224	412	3,490	3,260	1,650	559	366
MIN	153	174	115	87	98	152	134	341	1,540	574	322	196
AC-FT	10,900	10,920	8,350	6,280	7,560	10,810	17,970	83,250	145,200	53,160	26,420	16,590
CALENDAR YEAR 1960: MAX 2,890 MIN 60 MEAN 506 AC-FT 367,600												
WATER YEAR 1960-61: MAX 3,490 MIN 87 MEAN 549 AC-FT 397,300												

\* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 9, 14-17, 19, 20, Nov. 22 to Mar. 8.

5-0205. St. Mary River at international boundary--Continued

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	263	* 432	140	175	200	105	140	* 850	1,640	1,280	* 756	566
2	257	439	140	170	* 220	105	150	782	1,550	1,270	730	508
3	257	386	150	160	210	105	160	756	1,450	1,180	704	466
4	257	366	160	150	190	105	* 180	747	1,430	1,040	670	406
5	251	366	160	140	165	110	245	687	1,590	922	662	380
6	279	322	155	125	145	115	235	662	1,640	840	645	366
7	322	328	150	120	155	120	297	645	977	756	636	386
8	360	316	145	120	170	120	268	670	880	704	628	373
9	419	310	135	120	170	115	246	738	922	670	613	354
10	446	322	130	* 115	170	110	304	721	1,030	712	597	328
11	453	291	130	115	170	115	274	712	1,130	756	566	328
12	460	268	125	110	170	120	* 297	704	1,270	820	530	322
13	501	285	125	110	165	* 120	322	730	* 1,440	* 870	501	322
14	508	263	120	110	165	120	373	810	1,710	890	* 480	* 322
15	537	* 235	* 120	110	* 130	120	439	850	1,660	890	* 480	328
16	628	225	120	105	170	130	419	* 1,030	1,580	870	466	335
17	791	220	120	105	155	130	392	1,060	1,570	850	446	335
18	* 890	224	120	100	155	140	412	1,120	1,640	810	419	341
19	922	210	115	100	160	160	453	1,240	1,680	765	426	335
20	870	195	115	100	145	140	574	1,400	1,680	730	412	328
21	860	190	115	95	140	135	687	1,470	1,660	687	386	328
22	765	190	120	95	135	125	782	1,510	1,640	653	386	316
23	695	185	140	95	130	115	830	1,540	1,570	628	373	316
24	645	* 185	150	90	125	120	922	1,540	1,480	628	341	316
25	597	180	165	90	120	130	1,080	1,580	1,430	636	279	386
26	590	185	150	95	115	140	1,090	1,550	1,410	636	224	453
27	559	180	145	105	110	160	1,060	1,500	* 1,370	670	187	487
28	494	163	150	115	110	140	1,040	1,510	1,380	765	178	516
29	487	167	160	130	-----	130	999	1,620	1,370	810	279	466
30	466	150	170	140	-----	130	933	1,640	1,320	800	* 439	399
31	446	-----	175	195	-----	140	-----	* 1,710	-----	791	523	-----
TOTAL	16,275	7,778	4,315	3,725	4,415	3,870	15,653	34,124	43,099	25,329	14,962	11,412
MEAN	525	259	139	120	158	125	522	1,101	1,437	817	483	380
MAX	922	175	175	195	220	160	1,090	1,710	1,880	1,280	756	566
MIN	251	150	115	90	110	105	140	645	880	628	178	316
AC-FT	32,280	15,430	8,560	7,390	8,760	7,680	31,050	67,680	85,490	50,240	29,680	22,640

CALENDAR YEAR 1961: MAX 3,490 MIN 87 MEAN 585 AC-FT 423,500

WATER YEAR 1961-62: MAX 1,710 MIN 90 MEAN 507 AC-FT 366,900

\* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 15-17, 20-27, Nov. 30 to Apr. 5.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	354	439	b 392	b 274	b 134	* b 201	279	613	1,830	1,370	502	246
2	* 322	466	b 392	b 268	b 159	b 196	257	678	1,850	1,390	480	255
3	304	494	b 386	b 246	b 174	b 191	205	721	1,910	1,440	444	255
4	285	408	b 360	b 220	b 223	b 191	92	730	2,040	1,500	465	265
5	279	523	b 399	b 210	b 285	b 171	122	730	2,190	1,530	465	270
6	268	508	399	b 187	b 322	b 167	104	747	2,480	1,590	458	270
7	257	* 460	366	b 128	b 347	b 167	155	747	2,440	1,590	451	280
8	257	426	354	b 112	b 380	b 159	167	830	2,300	1,590	438	280
9	240	453	335	b 86	b 373	b 155	201	840	2,210	1,560	458	275
10	240	439	335	b 109	b 380	b 155	246	747	2,500	1,420	458	286
11	229	406	* b 310	b 122	b 360	b 148	246	738	2,560	1,260	465	286
12	251	380	b 279	b 155	b 360	b 148	251	738	* 2,540	1,120	458	260
13	257	360	b 263	b 163	* b 347	b 144	246	738	2,420	1,030	451	236
14	279	328	257	b 174	b 335	b 144	246	840	2,380	987	465	226
15	328	* 304	263	b 182	b 328	b 141	* 251	1,010	* 2,320	945	465	204
16	360	291	268	b 196	b 328	b 131	263	* 1,010	2,240	* 924	* 465	222
17	* 380	b 263	257	* b 178	b 316	b 131	279	999	2,150	945	465	* 226
18	399	b 257	257	b 167	b 313	134	310	1,060	2,060	903	465	236
19	399	b 285	268	b 163	b 316	* 131	316	1,120	2,010	842	451	366
20	412	297	285	b 182	b 304	131	322	1,110	1,880	802	431	517
21	406	279	291	b 163	b 291	134	328	1,060	1,800	764	410	572
22	399	b 285	b 322	b 144	b 279	134	328	1,130	1,820	737	378	517
23	426	b 297	b 268	b 125	b 268	138	322	1,110	1,680	709	366	495
24	460	b 341	b 246	b 109	263	138	310	1,220	1,400	683	366	458
25	480	347	b 235	b 112	229	134	297	1,380	1,210	656	366	417
26	501	366	b 224	b 118	183	131	297	1,570	1,060	648	341	378
27	494	366	b 220	b 122	229	138	316	1,710	977	622	329	360
28	494	b 373	b 215	b 118	* 220	163	328	* 1,650	1,370	589	302	353
29	487	b 419	b 235	b 122	-----	159	* 360	1,580	1,350	556	286	347
30	466	b 426	b 268	b 131	-----	235	480	1,640	1,520	525	* 265	335
31	453	-----	b 274	b 141	-----	310	-----	1,760	-----	* 495	250	-----
TOTAL	11,166	11,386	9,223	4,927	8,046	4,950	7,924	32,556	58,157	31,722	12,859	9,693
MEAN	360	360	298	159	287	160	244	1,050	1,939	1,023	615	323
MAX	501	523	399	274	380	310	480	1,760	2,560	1,590	502	572
MIN	229	257	215	86	134	131	92	613	977	495	250	204
AC-FT	22,150	22,580	18,290	9,770	15,960	9,820	15,720	64,570	115,400	62,920	25,510	19,230

CALENDAR YEAR 1962: MAX 1,710 MIN 90 MEAN 516 AC-FT 373,600

WATER YEAR 1962-63: MAX 2,560 MIN 86 MEAN 555 AC-FT 401,900

\* Discharge measurement made on this day.

b Stage-discharge relation affected by ice.

## 5-0205. St. Mary River at international boundary--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964											
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	SEPT.
1	* 329	163	159	95	144	112	155	372	* 1,290	* 2,150	620 * 399
2	329	163	163	95	128	112	128	639	1,760	2,020	656 399
3	318	159	159	86	118	100	* 131	1,160	2,110	2,040	439 387
4	302	155	155	81	125	95	138	1,150	2,480	2,040	283 403
5	307	148	159	78	128	* 106	107	783	2,710	2,090	293 415
6	307	* 148	163	69	125	106	195	589	2,920	2,070	319 439
7	302	144	155	72	131	98	178	525	3,320	2,060	331 455
8	297	141	144	65	125	83	152	572	12,700	2,020	331 480
9	270	138	125	60	118	78	117	746	* 17,000	1,980	371 467
10	255	134	125	55	125	86	103	842	14,300	1,950	411 480
11	236	134	138	52	118	92	118	872	11,600	2,010	435 463
12	226	128	122	48	106	89	155	882	* 10,100	2,050	431 459
13	217	131	134	50	100	89	171	945	8,960	2,010	443 491
14	200	128	128	55	103	78	125	* 966	8,190	2,120	* 447 411
15	195	134	122	52	* 98	89	* 118	956	* 7,250	* 2,220	439 * 387
16	* 186	131	122	52	98	86	112	987	6,610	2,290	423 343
17	182	131	112	55	95	93	112	1,170	8,190	2,080	403 319
18	174	128	110	52	103	100	103	1,350	* 5,720	1,760	391 279
19	167	122	105	45	92	82	106	1,560	4,840	1,550	399 234
20	171	109	105	40	86	83	112	1,880	4,000	1,440	407 271
21	163	* 106	* 100	* 33	83	89	112	2,260	3,580	1,280	395 363
22	178	103	120	38	92	74	112	2,280	3,340	1,030	375 323
23	167	118	106	53	83	62	100	2,400	* 2,920	960	351 319
24	171	122	115	55	89	69	103	1,820	2,750	943	351 411
25	171	138	112	72	95	74	140	1,540	2,730	915	331 480
26	174	138	103	92	98	74	302	1,300	2,800	859	331 605
27	175	105	95	104	98	69	231	1,330	2,720	810	311 650
28	178	174	92	144	103	72	222	1,130	2,650	754	331 615
29	178	178	92	155	106	76	291	1,320	2,530	686	371 610
30	171	174	106	148	-----	98	* 353	1,420	2,310	626	367 620
31	167	-----	100	144	-----	144	-----	1,490	-----	* 615	387 -----
TOTAL	6,862	4,175	3,826	2,494	2,773	4,662	36,746	162,680	49,412	12,163	12,917
MEAN	221	139	123	74.0	107	89.5	155	1,185	5,423	1,594	431
MAX	329	178	163	155	144	144	353	2,820	17,000	2,290	656
MIN	163	103	92	33	83	62	100	372	1,590	615	283
AC-FT	13,610	8,290	7,590	4,550	6,170	5,500	9,250	72,880	32,700	98,010	24,120

CALENDAR YEAR 1963: MAX 2,560 MIN 86 MEAN 509 AC-FT 368,400

WATER YEAR 1963-64: MAX 17,000 MIN 33 MEAN 824 AC-FT 598,300

\* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 12, Nov. 18 to Dec. 5, Dec. 7-17, Dec. 21 to Apr. 9, Apr. 23. Stage-discharge relation indefinite June 15-21.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965											
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	SEPT.
1	* 680	845	a 190	a 130	a 135	a 190	b 161	1,440	* 2,290	* 1,650	850 * 430
2	754	706	a 190	a 130	b 129	b 188	b 188	1,460	2,170	1,740	829 394
3	782	* 733	a 180	a 125	b 115	b 182	b 167	1,500	2,340	1,900	801 398
4	775	728	a 175	a 125	b 129	b 199	b 230	a 1,480	2,750	2,020	808 407
5	789	602	a 175	a 125	b 151	a 195	b 331	a 1,400	2,940	2,030	794 407
6	817	555	a 180	a 125	a 140	b 206	b 348	a 1,250	3,120	2,080	787 407
7	845	443	a 190	a 120	b 135	a 190	b 344	a 1,200	3,280	1,970	748 380
8	845	391	a 195	a 120	b 133	a 185	* 327	a 1,150	3,100	1,610	708 358
9	845	359	b 193	a 120	a 140	b 179	307	a 1,100	2,840	1,540	670 416
10	838	335	b 190	a 125	b 145	b 182	307	a 1,100	2,760	1,610	638 389
11	852	315	b 176	a 125	a 140	* b 182	255	a 1,100	2,720	1,600	596 376
12	866	295	b 166	a 130	b 137	a 180	283	a 1,200	2,830	1,500	578 376
13	894	275	b 163	a 140	b 129	b 182	344	* 1,340	2,920	1,380	614 366
14	* 915	260	b 154	* b 145	a 130	a 185	407	1,640	2,860	1,270	626 389
15	929	248	b 127	a 160	a 130	b 188	362	2,170	* 2,700	* 1,190	663 460
16	929	241	* b 117	a 160	b 129	a 185	331	2,630	2,920	2,160	670 737
17	908	237	a 107	b 149	b 151	b 173	340	2,960	3,840	1,130	* 650 * 1,050
18	866	* 230	a 125	b 147	a 200	b 141	331	2,940	* 4,070	1,190	602 1,260
19	817	226	a 140	a 135	a 300	b 135	323	2,860	4,540	1,220	560 1,340
20	761	226	a 140	a 135	b 234	b 133	402	2,830	5,160	1,290	519 1,380
21	710	216	a 130	a 130	a 190	a 135	542	2,800	4,900	1,490	502 1,390
22	668	220	a 135	b 126	a 180	a 135	608	2,590	4,220	1,640	514 1,410
23	658	212	a 135	a 110	a 185	a 130	670	2,490	3,700	1,500	548 1,350
24	620	206	a 130	b 115	b 199	b 120	754	2,380	3,380	1,060	566 1,100
25	590	202	a 140	a 115	* b 212	b 116	878	2,490	3,290	990	536 871
26	570	193	a 140	b 122	b 206	b 118	997	2,520	3,620	877	519 734
27	620	b 179	a 135	b 115	a 195	b 114	1,050	2,260	3,260	767	497 644
28	692	b 179	a 125	a 110	a 190	b 118	1,190	2,200	2,750	801	508 596
29	722	b 171	b 124	b 117	-----	b 124	1,280	2,200	2,240	829	497 572
30	728	b 182	a 120	a 125	-----	b 132	* 1,350	2,240	1,880	* 885	475 554
31	831	-----	a 125	a 135	-----	* b 148	-----	2,350	-----	877	455 -----
TOTAL	24,096	10,210	4,712	3,991	4,589	4,970	15,407	61,270	95,390	42,784	19,328
MEAN	777	340	152	129	164	160	514	1,976	3,180	1,380	623
MAX	929	845	195	160	300	206	1,350	2,960	5,160	2,080	850
MIN	570	171	107	110	115	114	161	1,100	1,880	767	455
AC-FT	47,790	20,250	9,350	7,920	9,100	9,860	30,560	121,500	189,200	84,860	38,340

CALENDAR YEAR 1964: MAX 17,000 MIN 33 MEAN 890 AC-FT 646,200

WATER YEAR 1964-65: MAX 5,160 MIN 107 MEAN 843 AC-FT 610,300

\* Discharge measurement made on this day.

a No gage-height record.

b Stage-discharge relation affected by ice.

5-0300. Otter Tail River near Detroit Lakes, Minn.

Location.--Lat 46°50', long 95°42', in sec.23, T.139 N., R.40 W., on right bank 10 f' upstream from highway bridge, 5 miles downstream from Height of Land Lake, and 7½ miles east of city of Detroit Lakes.

Drainage area.--270 sq mi.

Records available.--March 1937 to September 1965.

Gage.--Water-stage recorder and concrete control. Datum of gage is 1,409.49 ft above mean sea level, datum of 1929.

Average discharge.--28 years, 52.6 cfs (38,080 acre-ft per year).

Extremes.--Maximum and minimum discharges for the water years 1961-65 are contained in the following table:

Water year	Maximum			Minimum		
	Date	Discharge (cfs)	Gage height (feet)	Date	Discharge (cfs)	Gage height (feet)
1961	May 15, 1961	151	4.12	Nov. 29, 1960	3.3	2.75
1962	June 8, 1962	316	4.65	Nov. 8, 1961	1.6	2.67
1963	June 9-10, 1963	157	a 4.07	Feb. 20-22, 1963	b 10	c 2.77
1964	May 19, 1964	164	4.10	Nov. 18, 1963	5.8	2.85
1965	June 13, 1965	264	4.45	Sept. 10, 11, 1965	16	d 3.10

a Maximum gage height for year, 5.36 ft Jan. 27, 1963, backwater from ice.

b Minimum daily.

c Occurred Mar. 5, 1963.

d Occurred Dec. 11, 1964.

1937-65: Maximum discharge, 371 cfs June 26, 1943 (gage height, 4.78 ft, from graph based on partial record); maximum gage height, 6.96 ft Jan. 27, 1950 (backwater from ice); minimum daily discharge, 0.10 cfs Mar. 23, 1940.

Remarks.--Records good except those for periods of no gage-height record and those for winter periods, which are fair.

Revisions (water years).--WSP 1308: 1944(M).

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	61	26	12	35	43	34	26	77	137	39	21	8.1
2	58	26	18	35	44	33	26	79	137	46	18	7.3
3	56	26	16	36	44	32	26	80	128	46	15	6.2
4	53	25	17	36	44	31	28	80	124	47	14	5.3
5	50	25	17	36	44	29	31	83	120	50	10	5.9
6	47	25	18	36	44	28	30	88	117	44	7.7	5.9
7	45	24	18	37	44	27	29	89	111	40	5.9	5.3
8	41	23	19	37	44	26	28	88	108	28	4.5	12
9	39	23	20	37	44	25	28	88	105	16	4.0	18
10	38	24	20	37	44	24	28	94	105	18	3.8	21
11	37	23	21	37	43	23	28	92	108	20	3.5	19
12	35	23	21	37	43	23	28	94	105	20	3.8	18
13	34	23	21	37	43	22	28	103	100	21	4.2	21
14	32	23	22	37	42	21	31	115	97	26	4.2	19
15	30	23	23	37	42	21	33	142	90	25	4.2	16
16	27	23	23	37	42	21	31	137	94	24	4.2	14
17	27	23	24	38	41	20	31	133	100	22	6.4	12
18	21	22	25	38	41	20	32	133	77	21	19	12
19	19	21	25	38	41	20	32	133	62	19	20	10
20	19	21	26	39	40	20	35	133	64	19	20	10
21	19	21	27	40	40	20	39	139	64	21	20	11
22	19	21	28	40	39	20	45	139	66	21	18	10
23	19	21	29	41	39	20	53	139	70	23	17	10
24	19	21	30	41	38	21	65	139	66	39	15	9.2
25	19	21	31	41	37	23	66	142	64	57	14	8.8
26	19	20	31	41	37	23	66	142	61	76	13	8.4
27	19	20	32	42	36	25	69	139	58	77	13	9.6
28	19	16	33	42	35	25	73	139	56	51	12	8.8
29	20	8.1	34	43	-----	26	74	139	53	35	11	9.6
30	26	9.4	36	43	-----	26	76	137	49	34	10	9.2
31	26	-----	35	43	-----	26	-----	137	-----	28	8.8	-----
TOTAL	993	650.5	747	1,194	1,158	755	1,215	3,592	2,696	1,053	345.2	340.6
MEAN	32.0	21.7	24.1	38.5	41.4	24.4	40.5	116	89.9	34.0	11.1	11.4
MAX	61	26	35	43	44	34	76	142	137	77	21	21
MIN	19	8.1	12	35	35	20	26	77	49	16	3.5	5.3
AC-FT	1,970	1,290	1,480	2,370	2,300	1,500	2,410	7,120	5,350	2,090	685	676

CAL YR 1960: TOTAL 22,169.5 MEAN 60.6 MAX 203 MIN 8.1 AC-FT 43,970

WAT YR 1961: TOTAL 14,739.3 MEAN 40.4 MAX 142 MIN 3.5 AC-FT 29,230

Note.--No gage-height record Jan. 19 to Feb. 17, Feb. 19 to Mar. 23.

## RED RIVER OF THE NORTH BASIN

5-0300. Otter Tail River near Detroit Lakes, Minn.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962											
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	SEPT.
1	8.2	6.8	7.8	10	14	18	29	67	258	176	86
2	7.2	6.8	7.8	10	14	18	30	68	253	179	84
3	6.4	7.2	7.8	10	14	18	30	68	258	176	81
4	6.5	7.2	7.2	10	15	19	35	70	258	179	78
5	5.9	7.2	7.0	11	15	19	36	68	261	169	76
6	5.6	7.2	7.0	11	15	20	36	71	261	166	74
7	5.6	6.5	7.2	11	15	20	38	76	261	166	71
8	5.6	6.5	7.2	11	15	21	48	76	296	159	68
9	5.6	7.2	7.3	11	15	22	50	79	302	151	67
10	5.9	7.2	7.5	11	15	23	50	81	296	141	65
11	6.8	7.2	7.7	11	16	23	50	84	280	131	73
12	6.5	7.2	7.8	11	16	24	51	84	267	109	76
13	6.5	7.2	7.9	11	16	24	52	100	261	125	73
14	6.5	6.8	8.0	11	16	25	52	107	261	129	68
15	6.5	6.8	8.1	12	16	25	52	119	252	129	62
16	6.8	7.2	8.2	12	16	26	54	141	258	137	60
17	6.8	7.2	8.4	12	16	26	56	147	267	151	51
18	6.8	6.8	8.4	12	16	27	57	141	267	137	48
19	6.8	7.2	8.5	12	16	27	57	143	252	135	47
20	6.8	6.8	8.7	12	16	27	60	143	243	129	47
21	6.5	6.8	8.9	12	17	28	62	143	240	127	46
22	6.5	6.5	9.0	13	17	28	64	169	237	127	43
23	5.9	6.8	9.0	13	17	28	65	195	231	123	42
24	5.6	6.8	9.1	13	17	28	67	198	220	117	39
25	6.8	6.8	9.1	13	17	28	64	216	213	113	37
26	6.8	6.8	9.2	13	17	28	62	222	207	109	34
27	7.5	6.8	9.2	13	17	28	67	219	198	104	32
28	7.5	6.8	9.2	13	17	29	60	222	190	100	29
29	7.5	6.8	9.3	14	-----	29	60	240	184	98	27
30	6.8	7.5	9.5	14	-----	29	65	249	179	93	26
31	6.8	-----	9.7	14	-----	29	-----	255	-----	86	24
TOTAL	203.9	208.6	256.7	367	443	764	1,559	4,261	7,406	4,171	679
MEAN	6.58	6.95	8.28	11.8	15.8	24.6	52.0	137	247	135	22.6
MAX	8.2	7.5	9.7	16	17	29	67	255	302	179	86
MIN	5.6	6.5	7.0	10	14	18	29	67	179	86	24
AC-FT	404	414	509	728	879	1,520	3,090	8,450	14,690	8,270	1,350

CAL YR 1961: TOTAL 13,018.0 MEAN 35.7 MAX 142 MIN 3.5 AC-FT 25,820  
 WAT YR 1962: TOTAL 22,053.2 MEAN 60.4 MAX 302 MIN 5.6 AC-FT 43,740

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963											
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	SEPT.
1	17	16	19	18	14	11	39	54	96	102	27
2	17	16	20	18	14	11	44	54	92	98	35
3	17	16	20	18	13	11	52	55	90	94	31
4	17	17	20	18	13	11	52	57	98	90	28
5	17	16	19	18	13	11	52	57	83	85	24
6	17	16	19	18	13	11	51	57	106	87	24
7	17	17	20	18	13	11	51	56	126	89	24
8	19	17	20	18	13	11	45	54	131	87	26
9	19	17	20	18	13	11	31	54	138	83	25
10	18	17	20	18	13	11	25	54	154	79	24
11	18	17	22	18	13	11	19	50	147	76	28
12	18	17	24	17	13	11	15	50	142	73	52
13	17	17	22	17	13	11	20	47	140	70	52
14	17	17	20	17	12	12	23	47	135	67	45
15	17	17	20	17	12	12	25	47	135	64	40
16	15	17	20	17	12	20	29	47	131	54	37
17	15	17	20	17	12	25	35	46	128	51	35
18	14	18	20	16	12	25	42	45	126	49	33
19	14	18	20	16	11	25	45	45	124	47	28
20	14	18	20	16	10	22	46	46	122	41	21
21	15	17	20	16	10	20	46	47	119	39	22
22	17	18	20	15	10	20	48	47	115	37	29
23	17	18	19	15	11	30	47	47	111	34	33
24	16	19	19	15	11	35	48	46	106	29	31
25	16	19	19	15	11	32	50	46	98	29	30
26	16	19	19	15	11	32	50	46	90	26	30
27	16	19	19	15	11	34	52	55	86	25	25
28	16	20	19	14	11	39	54	68	102	28	36
29	16	19	19	14	-----	37	57	70	100	27	39
30	16	19	18	14	-----	37	56	67	100	27	38
31	16	-----	18	14	-----	37	-----	73	-----	26	35
TOTAL	511	525	614	510	338	637	1,249	1,634	3,481	1,813	987
MEAN	16.5	17.5	19.8	16.5	12.1	20.5	41.6	52.7	116	58.5	31.8
MAX	19	20	24	18	14	39	57	73	154	102	52
MIN	14	16	18	14	10	11	15	45	83	25	21
AC-FT	1,010	1,040	1,220	1,010	670	1,260	2,480	3,240	6,900	3,600	2,010

CAL YR 1962: TOTAL 23,034 MEAN 63.1 MAX 302 MIN 10 AC-FT 45,690  
 WAT YR 1963: TOTAL 13,314 MEAN 36.5 MAX 154 MIN 10 AC-FT 26,410

## 5-0300. Otter Tail River near Detroit Lakes, Minn.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	29	10	8.3	15	16	15	30	113	124	89	47	25
2	28	10	7.9	15	15	15	115	117	117	87	45	24
3	28	9.6	8.3	15	15	15	34	124	115	85	43	21
4	27	9.2	8.3	14	15	15	33	133	111	85	41	17
5	25	9.2	8.3	13	15	15	35	142	104	87	37	17
6	24	8.8	8.3	13	15	15	40	150	102	92	35	19
7	24	8.3	8.2	13	15	15	42	152	104	98	32	24
8	23	8.3	8.5	13	14	15	42	152	115	100	29	23
9	23	8.3	8.5	13	14	16	43	152	115	104	28	24
10	24	8.3	8.5	14	14	16	45	154	111	104	20	27
11	23	7.9	8.6	14	14	16	47	152	104	104	13	23
12	22	7.2	8.8	14	15	16	49	152	98	109	14	20
13	20	7.2	9.0	14	14	17	70	147	94	104	15	19
14	19	6.8	9.2	14	14	16	90	142	92	98	15	19
15	18	6.8	9.5	14	14	16	94	142	90	90	15	18
16	17	7.2	10	14	14	15	100	142	85	87	15	20
17	17	6.8	10	15	14	15	109	142	87	83	15	19
18	16	6.1	11	15	14	15	113	145	94	79	14	18
19	16	6.1	12	15	14	16	122	162	96	74	13	18
20	15	6.1	12	15	14	17	131	152	96	72	14	18
21	16	6.1	13	15	14	18	147	145	94	68	20	18
22	16	6.2	15	15	14	18	135	140	94	64	21	19
23	16	7.0	15	13	14	18	126	140	100	60	20	29
24	15	7.5	15	15	14	19	115	138	100	60	19	31
25	15	8.0	15	16	14	20	109	140	100	57	18	29
26	13	8.8	15	16	14	21	106	140	98	55	16	30
27	13	8.8	14	16	15	25	113	142	96	52	16	28
28	12	8.3	13	16	15	26	119	142	94	51	16	26
29	11	8.3	13	16	15	27	111	138	90	50	18	25
30	11	7.9	13	16	-----	28	111	133	90	46	23	25
31	10	-----	14	16	-----	29	-----	128	-----	44	23	-----
TOTAL	586	235.1	338.2	452	418	560	2,494	4,391	3,010	2,438	710	673
MEAN	18.9	7.84	10.7	14.6	14.4	18.1	83.1	142	100	78.6	22.9	22.4
MAX	29	10	15	16	16	29	147	162	124	109	67	11
MIN	10	6.1	7.9	13	14	15	30	113	85	44	13	17
AC-FT	1,160	466	671	897	829	1,110	4,950	8,710	5,970	4,840	1,410	1,330

CAL YR 1963: TOTAL 12,823.3 MEAN 35.1 MAX 154 MIN 6.1 AC-FT 25,430  
 MAY YR 1964: TOTAL 16,305.3 MEAN 44.6 MAX 162 MIN 6.1 AC-FT 32,340

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	25	22	23	29	25	26	34	180	182	180	90	28
2	24	22	24	26	25	26	35	182	182	180	87	26
3	23	22	25	28	25	26	42	182	187	167	81	24
4	24	22	25	27	26	27	51	182	193	164	76	23
5	24	23	25	27	26	27	56	190	196	154	76	21
6	25	23	24	26	27	28	170	196	233	150	85	21
7	24	22	24	26	28	30	150	193	236	145	81	20
8	24	22	23	25	29	31	140	193	239	135	76	19
9	24	23	23	25	29	31	105	196	242	135	73	19
10	24	23	22	25	28	31	115	196	251	126	70	17
11	24	28	22	24	27	32	154	193	254	122	67	17
12	24	28	22	24	26	32	113	190	258	119	61	23
13	24	28	21	24	26	33	109	190	261	128	59	24
14	24	28	21	24	26	35	119	190	261	119	54	28
15	24	28	22	23	26	36	131	196	258	115	50	30
16	24	25	22	24	26	36	133	198	258	111	48	29
17	23	24	23	24	26	36	135	196	254	104	45	31
18	23	23	24	24	27	36	145	187	251	102	33	31
19	23	22	25	24	27	35	154	187	245	100	24	30
20	23	21	28	25	27	34	164	185	239	98	25	29
21	23	21	29	25	26	33	177	185	233	96	26	30
22	22	20	30	26	26	33	182	182	230	92	26	30
23	22	20	30	26	25	32	187	180	221	92	24	32
24	22	20	30	26	24	32	190	182	212	89	27	35
25	22	20	31	26	24	32	196	182	207	85	29	38
26	22	20	31	26	24	32	198	182	201	83	28	40
27	21	20	30	26	24	32	187	187	201	79	28	39
28	21	21	30	26	25	32	172	193	193	85	32	37
29	21	22	30	25	-----	32	177	187	185	87	36	40
30	21	22	30	25	-----	33	180	182	177	89	34	49
31	22	-----	30	25	-----	33	-----	182	-----	94	30	-----
TOTAL	716	685	799	788	730	984	4,101	5,826	6,740	3,625	1,581	860
MEAN	23.1	22.8	25.8	25.4	26.1	31.7	137	188	225	117	51.0	28.7
MAX	25	28	31	29	29	36	198	198	261	180	90	49
MIN	21	20	21	23	24	26	34	180	177	79	24	17
AC-FT	1,420	1,360	1,580	1,560	1,450	1,950	8,130	11,560	13,370	7,190	3,140	1,710

CAL YR 1964: TOTAL 17,346 MEAN 47.4 MAX 162 MIN 13 AC-FT 34,410  
 MAY YR 1965: TOTAL 27,435 MEAN 75.2 MAX 261 MIN 17 AC-FT 54,420

Note.--No gage-height record Jan. 14 to Mar.



5-0405. Pelican River near Fergus Falls, Minn.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	11	12	12	5.0	1.0	1.0	30	149	275	241	177	117
2	11	13	12	4.9	1.0	1.0	70	145	270	261	171	115
3	11	13	12	4.9	1.0	1.0	135	137	266	261	165	119
4	10	13	11	4.8	1.0	1.0	170	129	261	277	161	120
5	10	12	11	4.7	1.0	1.0	190	128	257	275	153	119
6	10	12	10	4.7	1.0	1.1	210	124	250	289	153	113
7	11	13	10	4.5	.90	1.2	190	122	248	294	155	112
8	11	14	9.9	4.1	.90	1.3	160	122	300	280	155	117
9	13	14	10	3.8	.90	1.4	150	122	322	270	153	135
10	14	15	10	3.5	.90	1.5	142	124	336	266	151	161
11	14	19	9.6	3.3	.90	1.5	138	124	336	257	195	165
12	14	21	9.3	3.3	.90	1.6	136	126	322	248	195	165
13	14	22	8.8	3.2	.90	1.6	135	126	305	239	189	159
14	14	20	8.4	3.1	.90	1.6	139	126	294	233	185	155
15	15	14	8.1	2.8	1.0	1.7	128	137	294	226	189	153
16	15	19	7.7	2.6	1.0	1.8	128	197	307	224	177	155
17	16	21	7.4	2.5	1.0	1.9	137	211	348	217	175	149
18	16	12	7.2	2.4	1.0	2.0	149	215	361	213	171	141
19	14	13	7.0	2.2	1.0	2.1	149	228	329	257	165	135
20	14	14	6.7	2.0	1.0	2.3	141	226	322	246	157	129
21	14	11	6.4	1.8	1.0	4.0	135	219	317	233	151	124
22	15	10	6.1	1.7	1.0	7.2	129	270	305	224	147	120
23	14	12	5.9	1.5	1.0	8.4	126	322	298	217	145	122
24	14	13	5.7	1.4	1.0	9.5	122	348	291	211	141	126
25	14	13	5.4	1.3	1.0	11	120	351	284	244	137	124
26	14	13	5.4	1.3	1.0	12	115	339	270	202	131	126
27	14	13	5.4	1.2	1.0	13	137	322	259	187	126	120
28	14	12	5.3	1.2	1.0	14	143	310	250	191	119	119
29	14	12	5.2	1.1	-----	16	147	294	241	189	120	117
30	13	12	5.1	1.1	-----	18	151	291	235	193	119	122
31	13	-----	5.0	1.0	-----	21	-----	282	-----	187	-----	-----
TOTAL	411	427	249.0	86.9	27.20	163.7	4,152	6,366	8,733	7,322	4,847	3,954
MEAN	13.3	14.2	8.03	2.80	.97	5.28	138	205	291	226	156	132
MAX	16	22	12	5.0	1.0	21	210	351	348	294	195	165
MIN	10	10	5.0	1.0	.90	1.0	30	122	235	187	119	112
AC-FT	815	847	494	172	54	325	8,240	12,630	17,320	14,570	9,610	7,840

CAL YR 1961: TOTAL 12,418.6 MEAN 34.0 MAX 129 MIN 5.0 AC-FT 24,630

WAT YR 1962: TOTAL 36,738.80 MEAN 101 MAX 351 MIN .90 AC-FT 72,870

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	124	90	76	46	28	36	180	121	177	108	64	62
2	124	92	76	46	28	36	175	120	195	105	66	63
3	122	90	76	46	28	40	170	116	200	103	68	88
4	122	92	75	46	26	40	165	116	184	100	63	74
5	122	90	72	45	26	40	160	116	182	95	58	64
6	124	90	70	45	26	40	155	116	200	92	58	63
7	128	93	68	45	26	42	150	113	200	92	58	62
8	126	85	65	45	26	42	145	118	182	91	54	62
9	124	88	62	45	26	42	141	114	200	89	54	61
10	120	88	62	44	28	42	138	114	191	82	54	50
11	119	98	58	42	28	42	137	114	191	68	55	50
12	119	95	58	42	28	44	140	118	182	66	55	50
13	117	95	58	42	28	46	138	118	182	66	53	50
14	117	93	56	40	28	47	136	114	178	64	52	52
15	115	92	56	40	28	48	137	113	166	61	51	54
16	112	92	56	40	28	52	159	120	159	67	52	49
17	110	90	54	40	30	52	144	120	148	62	51	50
18	110	82	54	40	30	52	148	120	146	66	53	53
19	109	85	54	40	30	52	146	118	139	64	53	55
20	104	80	54	38	30	56	150	114	128	62	52	55
21	99	80	52	38	30	62	146	114	125	60	50	48
22	99	85	52	38	30	65	150	105	121	57	53	54
23	99	85	52	36	30	70	132	100	120	60	54	56
24	95	85	50	36	32	75	121	98	118	62	53	56
25	98	85	50	36	32	90	123	89	118	60	53	56
26	96	85	48	34	33	110	133	89	111	81	53	54
27	96	90	48	34	34	140	126	120	109	85	54	52
28	95	79	46	32	34	170	135	139	108	82	55	52
29	92	78	46	32	-----	200	135	137	106	64	55	50
30	93	78	46	30	-----	200	137	120	111	68	57	45
31	90	-----	46	30	-----	190	-----	137	-----	54	60	-----
TOTAL	3,423	2,630	1,796	1,233	811	2,263	4,352	3,581	4,677	2,337	1,721	1,687
MEAN	110	87.7	57.9	39.8	29.0	73.0	145	116	156	75.4	55.5	56.2
MAX	128	98	76	46	34	200	180	139	200	108	68	88
MIN	90	78	46	30	26	36	121	89	106	56	50	45
AC-FT	6,790	5,220	3,560	2,450	1,610	4,490	8,630	7,100	9,280	4,640	3,610	3,350

CAL YR 1962: TOTAL 43,500.80

MEAN 119

MAX 351

MIN 26

AC-FT 86,280

WAT YR 1963: TOTAL 30,511

MEAN 83.6

MAX 200

MIN 26

AC-FT 60,520

## RED RIVER OF THE NORTH BASIN

5-0405. Pelican River near Fergus Falls, Minn.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964												
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	A'G.	SEPT.
1	44	27	23	15	23	30	70	227	182	86	37	33
2	43	26	22	15	24	30	85	224	180	32	37	32
3	41	26	23	15	24	30	90	219	175	78	37	31
4	40	25	22	15	24	30	100	227	168	73	36	30
5	39	24	22	15	24	30	110	232	163	72	34	29
6	39	24	22	16	24	30	130	240	156	73	34	30
7	39	24	22	16	24	32	140	251	153	70	33	33
8	39	24	20	16	24	32	150	265	146	68	33	30
9	38	24	18	15	25	32	160	265	146	65	35	30
10	37	24	18	15	25	32	170	254	144	65	35	30
11	36	24	17	16	25	32	180	249	142	64	32	30
12	35	24	16	16	25	32	170	240	137	61	31	30
13	34	20	16	16	25	34	185	230	130	61	33	30
14	33	26	15	16	25	34	156	230	126	61	33	30
15	33	25	14	16	26	34	227	227	119	60	33	31
16	32	23	14	16	26	34	235	227	113	57	33	31
17	31	23	14	17	26	34	235	227	113	53	33	32
18	31	22	13	17	26	34	222	227	149	50	31	31
19	31	22	13	18	26	34	205	227	149	46	31	33
20	31	22	13	19	26	36	192	224	153	44	31	32
21	32	22	12	19	26	36	208	222	153	41	34	32
22	33	25	12	19	27	37	214	222	153	40	34	33
23	33	22	13	19	27	38	222	219	149	39	34	35
24	33	24	13	19	27	40	219	216	137	39	34	37
25	32	25	13	21	28	40	211	214	133	38	33	37
26	31	25	14	20	28	40	222	205	124	37	32	39
27	30	25	14	21	28	45	227	195	115	36	33	30
28	29	24	14	22	28	50	230	192	104	37	33	37
29	29	24	14	22	28	55	227	188	96	36	33	37
30	28	23	14	23	-----	60	230	185	90	35	33	36
31	27	-----	14	23	-----	60	-----	180	-----	34	33	-----
TOTAL	1,063	718	504	548	744	1,147	5,422	6,950	4,198	1,701	1,038	980
MEAN	34.3	23.9	16.3	17.7	25.7	37.0	181	224	140	54.9	33.5	32.7
MAX	44	27	23	23	28	60	235	265	182	86	37	39
MIN	27	20	12	15	23	30	70	180	90	34	31	29
AC-FT	2,110	1,420	1,000	1,090	1,480	2,280	10,750	13,790	8,330	3,370	2,060	1,940
CAL YR 1963: TOTAL 24,947      MEAN 68.3      MAX 200      MIN 12      AC-FT 49,480												
WAT YR 1964: TOTAL 25,013      MEAN 68.3      MAX 265      MIN 12      AC-FT 49,610												

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965												
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	A'G.	SEPT.
1	35	22	22	25	29	37	58	205	254	192	113	77
2	33	24	22	26	29	37	62	208	265	185	110	75
3	33	24	22	26	29	36	79	211	276	175	106	70
4	32	24	23	26	30	36	110	216	282	168	102	70
5	32	24	23	27	31	37	230	222	290	163	102	68
6	32	24	24	28	32	38	470	232	325	161	106	67
7	31	25	25	28	34	39	450	235	334	158	108	65
8	29	26	26	29	35	40	480	238	361	188	104	63
9	27	26	26	28	36	42	535	240	361	175	100	61
10	27	26	26	28	36	44	510	240	355	165	96	60
11	27	29	27	27	36	46	485	240	337	163	94	60
12	27	31	27	27	35	49	455	240	316	158	92	75
13	26	32	27	27	35	54	430	243	302	158	90	72
14	25	32	26	27	35	55	406	246	293	151	88	77
15	24	33	25	27	35	56	358	260	285	146	84	84
16	24	33	25	27	36	56	313	265	276	142	80	94
17	24	33	25	27	38	55	276	262	265	140	78	104
18	24	32	24	27	39	54	254	268	260	138	80	104
19	24	30	24	28	40	53	240	260	249	135	78	104
20	24	28	24	29	41	53	232	257	243	130	78	100
21	24	25	24	30	41	53	232	260	235	128	75	104
22	22	24	23	30	42	52	230	257	230	125	73	106
23	22	23	23	30	41	52	227	268	222	122	70	108
24	22	23	23	31	40	52	224	276	211	122	70	102
25	22	22	23	31	39	52	222	279	203	122	72	100
26	21	22	23	30	38	51	216	276	203	121	73	98
27	21	22	24	30	38	51	211	274	211	121	75	96
28	21	22	24	30	37	51	205	268	205	119	75	92
29	21	22	24	29	-----	52	208	260	200	119	75	98
30	22	22	24	29	-----	53	205	251	192	117	77	113
31	22	-----	25	29	-----	54	-----	251	-----	115	77	-----
TOTAL	800	785	753	873	1,007	1,490	8,613	7,708	8,041	4,522	2,701	2,567
MEAN	25.8	26.2	24.3	28.2	36.0	48.1	287	249	268	146	87.1	85.6
MAX	35	33	27	31	42	56	535	279	361	192	113	113
MIN	21	22	22	25	29	36	58	205	192	115	70	60
AC-FT	1,590	1,560	1,490	1,730	2,000	2,960	17,080	15,290	15,950	8,970	5,360	5,090
CAL YR 1964: TOTAL	25,066			MEAN	68.5	MAX	265	MIN	15	AC-FT	49,720	
WAT YR 1965: TOTAL	39,860			MEAN	109	MAX	535	MIN	21	AC-FT	79,060	

## 5-0459.5. Orwell Reservoir near Fergus Falls, Minn.

Location.--Lat 46°12'55", long 96°10'40", in SW $\frac{1}{4}$  sec.26, T.132 N., R.44 W., at dam on Otter Tail River at outlet of Orwell Reservoir, 7 miles southwest of Fergus Falls, Minn.

Drainage area.--1,830 sq mi. approximately.

Records available.--March 1953 to September 1965.

Gage.--Water-stage recorder. Datum of gage is 1,000.00 ft above mean sea level, adjustment of 1912. Gage readings reduced to elevations above mean sea level.

Extremes.--Maximums and minimums (contents in acre-feet, elevation in feet) for the water years 1961-65 are contained in the following table:

Water year	Maximum			Minimum		
	Date	Contents	Elevation	Date	Contents	Elevation
1961	Nov. 8, 1960	12,350	1,068.35	June 19, 1961	4,480	1,057.75
1962	June 17, 1962	16,920	1,072.38	Mar. 25, 1962	1,060	1,048.28
1963	(a)	14,100	1,070.00	May 26, 1963	1,040	1,048.22
1964	Sept. 30, 1964	15,690	1,071.37	July 8, 1964	1,000	1,048.00
1965	Oct. 3, 1964	15,650	1,071.33	Mar. 29, 1965	910	1,047.89

a Oct. 30, 1962, Sept. 18, 1963.

1953-65: Maximum contents, 16,920 acre-ft June 17, 1962 (elevation, 1,072.38 ft; minimum (after initial filling), 844 acre-ft Aug. 26, 27, 1953 (elevation, 1,046.96 ft).

Remarks.--Reservoir is formed by earth dam with concrete spillway with one taintor gate; storage began in March 1953. Capacity at elevation 1,070 ft, revised (maximum operating stage) is 14,100 acre-ft of which 13,100 acre-ft is controlled storage above elevation 1,048 ft (minimum operating stage). Dead storage, 210 acre-ft. Figures given herein represent total contents. Reservoir is used for flood control and to increase low flow for water supply and pollution abatement.

Cooperation.--Records furnished by Corps of Engineers.

## MONTH-END ELEVATION AND CONTENTS, WATER YEARS OCTOBER 1960 TO SEPTEMBER 1965

Date	Elevation (feet)†	Contents (acre-feet)	Change in contents (acre-feet)	Date	Elevation (feet)†	Contents (acre-feet)	Change in contents (acre-feet)
Oct. 31, 1960.....	1,068.20	12,200	+2,300	Oct. 31, 1963.....	1,070.65	14,850	+1,070
Nov. 30.....	1,068.12	12,120	-80	Nov. 30.....	1,068.48	12,480	-2,370
Dec. 31.....	1,067.00	11,100	-1,020	Dec. 31.....	1,061.86	7,000	-5,480
Calendar year 1960	-	-	+80	Calendar year 1963	-	-	-2,740
Jan. 31, 1961.....	1,065.94	10,150	-950	Jan. 31, 1964.....	1,058.04	4,620	-2,380
Feb. 28.....	1,063.45	8,160	-1,990	Feb. 29.....	1,058.71	4,990	+370
Mar. 31.....	1,060.00	5,750	-2,410	Mar. 31.....	1,060.88	6,320	+1,330
Apr. 30.....	1,060.07	5,800	+50	Apr. 30.....	1,061.19	6,530	+210
May 31.....	1,058.90	5,100	-700	May 31.....	1,057.55	4,380	-2,170
June 30.....	1,058.30	4,760	-340	June 30.....	1,048.44	1,090	-3,270
July 31.....	1,059.70	5,570	+810	July 31.....	1,049.03	1,210	+120
Aug. 31.....	1,064.20	8,760	+3,190	Aug. 31.....	1,065.60	9,880	+8,670
Sept. 30.....	1,065.90	10,120	+1,360	Sept. 30.....	1,071.30	15,610	+5,730
Water year 1961...	-	-	+220	Water year 1964...	-	-	+1,830
Oct. 31.....	1,064.03	8,620	-1,500	Oct. 31.....	1,070.00	14,100	-1,510
Nov. 30.....	1,059.48	5,440	-3,180	Nov. 30.....	1,068.80	12,800	-1,300
Dec. 31.....	1,055.30	5,340	-2,100	Dec. 31.....	1,063.12	7,900	-4,900
Calendar year 1961	-	-	-7,760	Calendar year 1964	-	-	+900
Jan. 31, 1962.....	1,051.70	1,960	-1,380	Jan. 31, 1965.....	1,058.68	4,970	-2,930
Feb. 28.....	1,054.83	3,130	+1,170	Feb. 28.....	1,055.15	3,270	-1,700
Mar. 31.....	1,050.68	1,650	-1,480	Mar. 31.....	1,049.56	1,340	-1,950
Apr. 30.....	1,051.45	1,980	+330	Apr. 30.....	1,064.49	8,990	+7,650
May 31.....	1,069.50	13,550	+11,670	May 31.....	1,063.42	8,140	-850
June 30.....	1,068.85	12,850	-700	June 30.....	1,060.90	6,340	-1,800
July 31.....	1,067.00	11,100	-1,750	July 31.....	1,063.61	8,290	+1,950
Aug. 31.....	1,064.00	2,800	-8,300	Aug. 31.....	1,067.22	11,300	+3,010
Sept. 30.....	1,064.22	8,780	+5,980	Sept. 30.....	1,070.28	14,420	+3,120
Water year 1962...	-	-	-1,340	Water year 1965...	-	-	-1,190
Oct. 31.....	1,069.92	14,010	+5,230	† Elevation at 2400 hours.			
Nov. 30.....	1,069.66	13,750	-260				
Dec. 31.....	1,065.43	9,740	-4,010				
Calendar year 1962	-	-	+6,400				
Jan. 31, 1963.....	1,055.93	3,620	-6,120				
Feb. 28.....	1,052.82	2,340	-1,280				
Mar. 31.....	1,051.11	1,780	-560				
Apr. 30.....	1,049.48	1,320	-460				
May 31.....	1,049.35	1,290	-30				
June 30.....	1,054.64	3,060	+1,770				
July 31.....	1,053.44	2,580	-480				
Aug. 31.....	1,064.39	8,910	+6,330				
Sept. 30.....	1,069.71	13,780	+4,870				
Water year 1963...	-	-	+5,000				

5-0460. Otter Tail River below Orwell Dam, near Fergus Falls, Minn.

Location.--Lat 46°12'35", long 96°11'05", in NE¼ sec. 34, T.132 N., R.44 W., on left bank 0.7 mile downstream from Orwell Dam, 6.1 miles downstream from Dayton Hollow Dam, 8 miles southwest of Fergus Falls, and 11.1 miles downstream from Pelican River.

Drainage area.--1,830 sq mi, approximately.

Records available.--October 1930 to September 1965. Prior to October 1952, published as Otter Tail River below Pelican River, near Fergus Falls. Monthly discharge only for some periods, published in WSP 1308.

Gage.--Water-stage recorder. Datum of gage is 1,029.65 ft above mean sea level, adjustment of 1912 (levels by Corps of Engineers). Oct. 11, 1930, to Nov. 17, 1933, at same site at datum 2.00 ft higher; Nov. 18, 1933, to Mar. 21, 1953, at site 6.1 miles upstream at datum 40.30 ft higher.

Average discharge.--35 years, 263 cfs (190,400 acre-ft per year).

Extremes.--Maximum and minimum discharges for the water years 1961-65 are contained in the following table:

Water year	Maximum			Minimum		
	Date	Discharge (cfs)	Gage height (feet)	Date	Discharge (cfs)	Gage height (feet)
1961	May 23, 1961	654	3.44	Sept. 6, 1961	45	2.06
1962	June 26, 1962	1,260	4.40	Jan. 4, 1962	50	1.96
1963	June 17-18, 1963	745	3.65	July 19, 1963	62	2.04
1964	May 11, 1964	861	3.73	Aug. 26, 1964	10	1.82
1965	June 14, 1965	1,350	4.74	Oct. 14, 1964	30	2.00

1930-65: Maximum discharge, 1,710 cfs June 17, 1953 (gage height, 5.60 ft, backwater from aquatic vegetation); minimum, 1.0 cfs May 2, 1934, Sept. 30, 1935; minimum daily, 1.6 cfs Feb. 7, 1937.

Remarks.--Records good except those for periods of no gage-height record and those for winter periods, which are fair. Flow regulated by Orwell Reservoir beginning Mar. 21, 1953 (see station 5-0459.5), and powerplants upstream. Records of chemical analyses for the water years 1961-63 and 1965 are published in reports of the Geological Survey.

Revisions (water years).--WSP 785: 1934(M). WSP 1208: 1947(M). WSP 1308: 1931(M).

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961												
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	87	133	136	137	172	199	269	352	402	169	149	53
2	87	129	136	137	172	198	269	347	468	203	153	55
3	90	133	136	137	172	195	243	342	503	226	153	56
4	90	129	134	137	171	195	249	342	491	226	153	56
5	90	129	132	137	170	195	245	342	479	221	153	56
6	90	129	133	138	168	198	245	338	474	221	149	55
7	90	126	134	139	160	215	245	334	468	221	149	46
8	85	129	134	139	155	250	245	316	468	226	137	46
9	85	129	130	140	152	243	249	307	468	221	119	46
10	85	129	132	153	150	240	257	307	462	221	112	49
11	82	129	133	170	149	238	273	307	468	212	115	49
12	82	129	132	176	149	236	273	307	462	203	119	49
13	85	129	131	174	149	235	265	307	456	203	119	49
14	85	129	135	170	150	234	265	307	446	203	105	72
15	85	129	136	169	152	233	265	307	402	199	90	112
16	85	133	137	168	154	233	257	307	381	182	87	105
17	85	133	138	167	154	233	261	316	386	169	79	105
18	85	133	138	168	152	235	269	338	381	169	69	98
19	85	133	139	170	151	233	269	342	350	169	69	98
20	105	133	140	170	150	232	273	342	248	169	65	102
21	129	133	142	172	160	231	282	342	248	169	60	105
22	129	133	144	174	200	228	277	356	295	169	55	105
23	133	133	143	175	200	245	286	387	360	173	55	105
24	129	133	141	175	200	256	307	382	381	178	55	105
25	129	129	138	175	200	262	320	387	365	178	56	105
26	133	129	136	174	200	263	352	392	305	165	55	105
27	129	129	136	174	200	263	356	392	234	149	53	109
28	133	132	136	173	200	265	356	397	182	149	51	109
29	133	135	136	173	-----	269	356	397	165	149	53	105
30	133	135	137	173	-----	269	352	397	165	149	53	109
31	133	-----	137	172	-----	269	-----	397	-----	149	55	-----
TOTAL	3,186	3,926	4,222	5,006	4,712	7,290	8,440	10,733	11,363	5,810	2,945	2,419
MEAN	103	131	136	161	168	235	281	346	379	187	95.0	80.6
MAX	133	144	146	176	200	269	356	397	503	226	153	112
MIN	82	126	130	137	149	195	245	307	165	149	51	46
AC-FT	6,320	7,790	8,370	9,930	9,350	14,460	16,740	21,290	22,540	11,520	5,840	4,800

CAL YR 1960: TOTAL 115,225 MEAN 315 MAX 804 MIN 82 AC-FT 228,500

WAT YR 1961: TOTAL 70,052 MEAN 192 MAX 503 MIN 46 AC-FT 138,900

Note.--No gage-height record Jan. 13 to Feb. 15, Feb. 17 to Mar. 28.

5-0460. Otter Tail River below Orwell Dam, near Fergus Falls, Minn.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962												
DAY	UCT.	NUV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	109	98	92	72	85	118	392	449	943	1,140	1,020	408
2	109	98	90	70	82	130	382	481	943	931	997	413
3	105	105	90	66	82	124	377	492	943	883	979	413
4	105	109	90	64	80	128	387	481	937	1,120	961	418
5	105	109	90	70	90	145	397	476	937	1,110	943	418
6	105	115	90	69	90	174	408	470	931	1,120	925	387
7	105	122	90	69	90	170	428	465	937	1,100	943	372
8	105	119	90	70	90	170	449	460	590	1,110	1,040	377
9	105	119	90	72	93	187	449	413	532	1,100	1,040	382
10	102	115	90	70	88	214	449	377	850	1,090	860	387
11	102	112	90	80	88	218	444	377	800	1,080	1,020	392
12	98	112	90	80	88	214	444	382	866	1,070	1,010	397
13	98	112	90	80	94	210	439	387	883	1,060	997	428
14	102	115	90	80	95	210	439	423	895	1,040	1,010	470
15	98	115	90	79	96	206	439	492	919	1,030	986	476
16	98	115	90	79	96	210	428	572	967	1,020	967	486
17	98	115	90	90	96	210	428	609	1,140	1,000	860	492
18	102	115	90	95	96	215	423	026	1,250	997	750	492
19	98	115	90	95	96	226	423	412	1,240	826	669	497
20	95	115	90	92	96	274	418	231	1,240	399	653	497
21	95	112	90	90	96	283	418	247	1,240	326	599	497
22	95	112	90	90	96	297	418	205	1,240	321	481	502
23	95	112	90	95	96	270	418	274	1,240	551	512	476
24	95	112	90	95	96	252	405	283	1,240	880	534	465
25	95	112	90	92	100	252	508	288	1,240	967	518	465
26	95	112	90	92	102	283	492	423	1,240	961	524	465
27	92	105	90	92	106	341	476	096	1,240	955	508	465
28	95	90	80	80	112	372	406	055	1,220	940	481	455
29	92	95	81	82	-----	378	449	901	1,190	943	470	444
30	92	95	78	86	-----	382	449	949	1,170	991	428	444
31	92	-----	76	87	-----	392	-----	943	-----	1,040	397	-----
TOTAL	3,070	3,312	2,750	2,539	2,621	7,255	12,991	15,150	31,063	29,119	24,092	13,280
MEAN	99.0	110	98.7	81.9	93.6	236	433	499	943	939	777	443
MAX	109	122	92	95	112	392	508	949	1,250	1,140	1,040	502
MIN	92	95	76	64	82	118	377	231	532	321	397	372
AC-FT	0,900	6,570	5,450	5,040	5,200	14,390	25,770	30,050	61,610	57,760	47,790	26,340
CAL YR 1961: TOTAL 67,850				MEAN 186		MAX 503		MIN 46		AC-FT 134,600		
WAT YR 1962: TOTAL 147,242				MEAN 403		MAX 1,250		MIN 64		AC-FT 292,100		

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963												
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	449	428	316	356	183	206	555	476	508	604	218	75
2	444	423	316	356	179	222	572	492	513	577	210	78
3	449	418	316	351	179	226	502	492	465	561	183	78
4	460	418	316	346	176	226	460	486	307	545	195	78
5	455	418	316	346	176	226	444	455	336	518	195	78
6	455	418	316	346	179	231	444	439	545	465	191	80
7	460	418	316	341	183	243	444	434	663	402	191	80
8	455	418	316	341	187	252	439	434	663	413	191	80
9	455	418	316	341	187	256	439	434	663	408	161	80
10	460	418	316	341	187	256	439	428	291	402	146	80
11	460	418	316	336	191	243	439	434	90	402	146	83
12	455	418	312	336	218	231	423	439	92	397	146	83
13	460	397	312	331	218	231	423	434	267	392	146	120
14	460	372	312	331	218	235	377	444	513	392	150	146
15	465	372	312	326	214	235	382	460	658	382	154	150
16	361	377	312	321	214	260	387	465	685	372	154	164
17	292	377	312	297	210	278	397	455	701	336	154	198
18	292	351	312	278	210	265	408	444	740	302	157	231
19	302	316	312	270	206	260	481	428	728	205	157	243
20	307	297	312	260	206	256	492	423	718	243	126	247
21	307	297	312	260	206	252	481	423	701	252	100	247
22	312	297	312	252	202	256	476	423	690	265	103	247
23	312	297	312	252	202	260	476	423	680	274	106	247
24	312	302	307	218	198	288	428	428	663	243	106	247
25	351	316	307	198	198	321	444	428	653	226	106	247
26	387	316	307	198	198	341	449	408	636	239	92	226
27	387	316	302	198	198	316	455	413	626	243	75	198
28	387	316	326	191	198	439	455	418	620	252	75	187
29	387	316	356	187	-----	449	455	423	626	276	75	187
30	408	316	455	187	-----	457	465	423	620	297	75	187
31	444	-----	351	183	-----	513	-----	492	-----	260	75	-----
TOTAL	12,390	10,979	9,832	8,875	5,521	8,829	13,515	13,740	16,661	11,147	4,359	4,672
MEAN	400	366	317	286	197	285	451	443	555	360	141	152
MAX	465	428	356	356	218	512	572	740	604	577	218	247
MIN	292	297	302	183	176	206	377	408	90	205	75	75
AC-FT	24,580	21,780	19,500	17,600	10,950	17,510	26,810	27,250	33,050	22,110	8,650	9,270
CAL YR 1962: TOTAL 171,311				MEAN 469		MAX 1,250		MIN 64		AC-FT 339,800		
CAL YR 1963: TOTAL 120,520				MEAN 330		MAX 740		MIN 75		AC-FT 239,000		

5-0460. Otter Tail River below Orwell Dam, near Fergus Falls, Minn.--Continued

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	187	205	173	160	178	64	191	790	743	334	210	64
2	191	201	173	160	178	64	219	784	743	322	214	64
3	210	201	173	160	178	69	278	726	743	356	182	64
4	219	201	173	160	178	69	278	703	726	372	100	64
5	219	201	173	160	178	69	278	709	714	367	92	64
6	214	201	169	165	178	71	294	709	691	328	66	64
7	230	205	165	170	182	73	311	761	669	322	51	64
8	235	205	169	170	191	71	317	796	651	372	53	67
9	230	205	165	170	191	73	355	796	633	378	58	71
10	235	205	161	170	182	73	380	790	633	350	55	110
11	235	210	169	170	182	76	380	819	680	367	64	153
12	235	191	191	170	182	76	380	855	680	356	73	153
13	235	165	191	170	182	67	380	849	622	367	66	153
14	235	165	191	170	182	116	435	855	570	339	66	153
15	235	165	191	170	182	120	530	849	519	256	66	153
16	235	165	191	172	178	123	576	849	412	230	66	153
17	235	165	191	175	178	157	576	849	272	283	66	157
18	235	165	175	175	178	182	576	849	372	296	66	161
19	235	165	187	175	153	201	576	843	616	278	66	161
20	235	165	187	175	130	240	564	837	772	251	66	161
21	235	165	186	175	126	300	559	825	651	246	66	161
22	224	169	170	175	126	300	559	825	651	246	66	161
23	210	169	170	175	126	267	564	825	418	278	64	161
24	187	165	160	178	126	251	564	819	513	278	62	161
25	187	157	160	180	126	246	570	814	524	272	62	161
26	187	157	160	180	126	246	576	814	446	251	55	161
27	196	173	160	180	92	210	674	802	378	240	66	161
28	205	173	160	180	62	187	732	796	362	240	62	161
29	201	173	160	180	62	191	767	785	350	210	60	161
30	201	173	160	178	-----	191	790	770	334	205	62	165
31	201	-----	160	178	-----	187	-----	755	-----	210	64	-----
TOTAL	6,754	5,425	5,396	5,326	4,508	4,660	14,234	24,848	16,932	9,203	2,435	3,868
MEAN	218	181	174	172	155	150	474	802	564	297	78.5	129
MAX	235	210	191	180	191	300	790	855	772	378	214	165
MIN	187	157	160	160	62	64	191	703	272	205	51	64
AC-FT	13,400	10,760	10,700	10,560	8,940	9,240	28,230	49,290	33,580	18,250	4,830	7,670

CAL YR 1963: TOTAL 104,894

MEAN 287

MAX 740

MIN 75

AC-FT 208,100

WAT YR 1964: TOTAL 103,589

MEAN 283

MAX 855

MIN 51

AC-FT 205,500

Note.--No gage-height record Dec. 20 to Jan. 29.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	165	201	230	235	196	224	260	822	1,100	1,040	550	307
2	237	201	230	235	196	230	260	816	1,110	931	524	312
3	362	201	230	235	191	218	270	844	1,120	816	481	312
4	356	201	230	230	187	201	274	866	1,140	811	486	316
5	328	201	235	230	182	196	288	866	1,180	816	486	316
6	223	196	230	230	178	191	418	860	1,230	811	492	316
7	235	196	224	230	178	191	545	850	1,160	816	492	316
8	226	196	224	230	173	196	593	855	1,080	833	492	292
9	188	196	224	230	173	196	336	850	1,040	844	486	283
10	256	196	224	230	173	191	172	850	1,040	850	434	270
11	256	191	224	230	173	191	176	855	1,120	855	418	256
12	256	210	230	224	173	191	172	850	1,260	855	428	260
13	210	224	230	224	173	191	172	850	1,280	850	428	274
14	157	224	230	224	173	191	360	901	1,280	855	428	346
15	172	224	230	219	174	201	740	1,030	1,280	855	428	428
16	194	224	230	214	176	240	740	1,060	1,230	680	408	481
17	246	224	235	214	178	256	734	1,060	1,220	620	372	481
18	246	224	240	214	178	261	734	1,060	1,190	674	372	497
19	155	224	230	210	178	246	762	1,050	1,180	680	372	513
20	192	224	230	210	176	246	806	1,040	1,180	653	372	534
21	251	224	235	210	174	230	806	1,030	1,180	631	366	545
22	251	224	205	205	171	800	800	1,030	1,170	642	366	492
23	256	224	235	205	168	219	789	1,030	1,160	653	377	476
24	235	224	235	205	165	219	800	1,030	1,150	663	377	508
25	214	230	235	201	161	214	794	1,030	1,140	663	366	524
26	205	230	235	201	161	214	816	1,040	1,120	669	372	497
27	196	235	235	201	161	210	850	1,050	1,110	588	377	449
28	201	235	235	201	201	208	844	1,060	1,100	455	377	439
29	201	230	230	196	-----	205	833	1,080	1,080	460	377	439
30	201	230	230	201	-----	208	822	1,090	1,060	518	377	470
31	201	-----	235	201	-----	222	-----	1,090	-----	561	326	-----
TOTAL	7,072	6,464	7,165	6,725	4,941	6,621	16,966	29,795	34,690	22,648	13,007	11,949
MEAN	228	215	231	217	176	214	566	961	1,156	731	420	398
MAX	362	235	240	235	201	261	850	1,090	1,280	1,040	550	545
MIN	155	191	224	196	161	191	172	816	1,040	455	326	256
AC-FT	14,030	12,820	14,210	13,340	9,800	13,130	33,650	59,100	68,810	44,920	25,800	23,700

CAL YR 1964: TOTAL 106,715

MEAN 292

MAX 855

MIN 51

AC-FT 211,700

WAT YR 1965: TOTAL 168,043

MEAN 460

MAX 1,280

MIN 155

AC-FT 333,300

5-0500. Bois de Sioux River near White Rock, S. Dak.

Location.--Lat 45°51'45", long 96°34'25", in SW1SW1 sec.27, T.128 N., R.47 W., on left bank just downstream from Big Slough Outlet, 300 ft downstream from White Rock Dam, 4 miles south of White Rock, and 5 miles northwest of Wheaton, Minn.

Drainage area.--1,160 sq mi, approximately.

Records available.--October 1941 to September 1965.

Gage.--Water-stage recorder. Datum of gage is 960.00 ft above mean sea level, adjustment of 1912 (levels by Corps of Engineers). Prior to Jan. 14, 1943, staff gage at same site at datum 0.11 ft lower. Jan. 16, 1943, to Sept. 30, 1963, water-stage recorder at present site at datum 0.11 ft lower.

Average discharge.--24 years, 83.8 cfs (60,670 acre-ft per year).

Extremes.--Maximum and minimum discharges for the water years 1961-65 are contained in the following in the following table:

Water year	Maximum			Minimum		
	Date	Discharge (cfs)	Gage height (feet)	Date	Discharge (cfs)	Gage height (feet)
1961	Sept. 14, 1961	125	a 5.05	Many days	0	-
1962	Aug. 6, 1962	1,620	a 11.41	do.	0	-
1963	June 18, 1963	945	a 8.54	Aug. 16, 1963	0.90	-
1964	Apr. 22, 1964	209	b 5.44	Many days	0	-
1965	June 9, 1965	1,320	11.05	do.	0	-

a Present datum.

b Maximum gage height for year, 6.34 ft Mar. 3, backwater from ice.

1941-65: Maximum discharge, 1,620 cfs Aug. 6, 1962 (gage height, 11.41 ft, present datum); no flow at times in most years.

Remarks.--Records good except those for periods of shifting control and those for winter periods, which are fair. Flow regulated by Lake Traverse-Bois de Sioux Flood Control and Water Conservation project (available capacity for flood control, 137,000 acre-ft). Records of chemical analyses for the water years 1964-65 are published in reports of the Geological Survey.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961												
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1							5.2	1.5	1.5	0	0	0
2	.10	0	0	0	0	0	8.3	1.7	1.0	0	0	0
3	0	0	0	0	0	0	6.4	1.9	1.5	0	0	0
4	0	0	0	0	0	0	9.5	2.4	1.4	0	0	0
5	0	0	0	0	0	0	4.6	2.9	1.5	0	0	0
6	0	0	0	0	0	0	2.6	5.6	2.1	0	0	0
7	.20	0	0	0	0	0	7.2	8.6	1.5	0	0	0
8	0	0	0	0	0	0	9.2	5.6	1.2	0	0	0
9	0	0	0	0	0	0	6.8	5.2	.80	0	0	0
10	0	0	0	0	0	0	5.6	6.2	.50	0	0	0
11	0	0	0	0	0	0	.60	6.6	.60	0	0	0
12	0	0	0	0	0	0	3.7	4.2	.50	0	0	3.3
13	.20	0	0	0	0	0	11	8.6	.60	0	0	1.5
14	.40	0	0	0	0	0	3.5	12	1.2	0	0	16
15	.20	0	0	0	0	0	2.6	14	3.7	0	0	9.5
16	.10	0	0	0	0	0	4.4	12	2.3	0	0	7.0
17	0	0	0	0	0	0	2.1	8.3	1.5	0	0	4.4
18	0	0	0	0	0	0	6.2	10	.70	0	0	3.3
19	0	0	0	0	0	0	18	10	.50	0	0	2.4
20	0	0	0	0	0	.20	7.7	9.5	.30	0	0	2.6
21	0	0	0	0	0	1.0	7.2	7.9	.10	0	.10	1.4
22	0	0	0	0	0	2.5	3.3	7.5	.10	0	.60	1.4
23	0	0	0	0	0	3.5	1.0	7.7	0	0	.20	.70
24	.10	0	0	0	0	4.6	2.3	6.6	0	0	.50	.70
25	0	0	0	0	0	4.8	4.8	3.7	0	0	0	.50
26	0	0	0	0	0	4.7	4.6	4.0	0	0	0	.10
27	0	0	0	0	0	4.4	4.4	5.4	0	0	0	.10
28	0	0	0	0	0	4.2	2.3	4.8	0	0	0	.40
29	0	0	0	0	-----	4.3	3.8	3.3	0	0	0	.40
30	0	0	0	0	-----	4.5	2.1	6.2	0	0	0	0
31	0	-----	0	0	-----	4.7	-----	3.3	-----	0	0	-----
TOTAL	1.30	0	0	0	0	43.40	161.00	197.7	25.10	0	1.40	55.70
MEAN	.042	0	0	0	0	1.40	5.37	6.38	.84	0	.045	1.86
MAX	.40	0	0	0	0	4.8	18	14	3.7	0	.60	16
MIN	0	0	0	0	0	0	.60	1.5	0	0	0	0
AC-FT	2.6	0	0	0	0	86	319	392	50	0	2.8	110

CAL YR 1960: TOTAL 5,556.00 MEAN 15.2 MAX 123 MIN 0 AC-FT 11,020  
 WAT YR 1961: TOTAL 485.60 MEAN 1.33 MAX 18 MIN 0 AC-FT 963

5-0500. Bois de Sioux River near White Rock, S. Dak.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	0	0	0	0	0	0	2.2	438	520	1,100	1,540	498
2	0	0	0	0	0	0	2.4	431	602	1,040	1,600	496
3	0	0	0	0	0	0	2.5	445	596	889	1,590	482
4	0	0	0	0	0	0	2.7	452	770	1,040	1,570	459
5	0	0	0	0	0	0	12	455	1,100	1,170	1,550	444
6	0	0	0	0	0	0	50	450	1,220	757	1,550	435
7	0	0	0	0	0	0	110	440	1,240	282	1,540	415
8	0	0	0	0	0	0	180	442	935	216	1,530	401
9	0	0	0	0	0	0	200	433	655	120	1,510	393
10	0	0	0	0	0	0	155	433	699	249	1,470	397
11	0	0	0	0	0	0	125	433	581	617	1,450	381
12	0	0	0	0	0	0	87	429	348	1,080	1,440	360
13	0	0	0	0	0	0	97	431	164	1,290	1,430	292
14	0	0	0	0	0	0	140	474	111	1,350	1,420	181
15	0	0	0	0	0	0	146	534	352	1,340	1,400	174
16	0	0	0	0	0	0	115	639	631	1,330	1,370	171
17	0	0	0	0	0	0	106	615	635	1,320	1,360	167
18	0	0	0	0	0	0	102	648	1,110	1,340	1,340	160
19	0	0	0	0	0	0	70	566	642	1,410	1,290	152
20	0	0	0	0	0	0	48	220	718	1,270	1,150	148
21	0	0	0	0	0	0	50	51	790	1,010	1,000	143
22	0	0	0	0	0	0	47	142	859	943	577	138
23	0	0	0	0	0	0	44	544	943	908	469	136
24	0	0	0	0	0	0	44	568	961	985	490	134
25	0	0	0	0	0	0	42	467	1,070	1,120	484	133
26	0	0	0	0	0	0	179	229	1,150	1,220	482	129
27	0	0	0	0	0	10	334	83	1,170	1,300	420	120
28	0	0	0	0	0	30	438	58	1,170	1,290	482	101
29	0	0	0	0	-----	40	438	272	1,160	1,290	488	78
30	0	0	0	0	-----	1.5	445	490	1,160	1,290	486	73
31	0	-----	0	0	-----	1.9	-----	486	-----	1,480	482	-----
TOTAL	0	0	0	0	0	6.40	3,825.8	12,789	23,648	32,076	35,018	7,797
MEAN	0	0	0	0	0	0.14	128	413	788	1,035	1,130	260
MAX	0	0	0	0	0	1.9	445	639	1,240	1,480	1,600	498
MIN	0	0	0	0	0	0	2.2	51	111	120	469	73
AC-FT	0	0	0	0	0	8.7	7,590	25,370	46,910	63,620	69,460	15,470

CAL YR 1961: TOTAL 484.30 MEAN 1.33 MAX 18 MIN 0 AC-FT 961  
 MAY YR 1962: TOTAL 115,158.20 MEAN 316 MAX 1,600 MIN 0 AC-FT 228,400

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	69	4.0	13	3.6	4.0	9.7	30	79	52	418	19	3.7
2	69	3.1	9.2	3.6	4.3	9.9	30	67	152	344	22	1.8
3	69	6.3	14	3.5	4.7	10	37	62	232	302	19	3.7
4	68	3.6	7.6	3.5	5.3	10	36	54	242	287	23	6.4
5	67	5.5	7.0	3.5	6.2	10	39	58	240	132	16	13
6	66	6.8	6.3	3.5	7.8	10	36	53	253	77	15	8.1
7	66	3.3	5.9	3.6	8.2	10	46	43	348	96	12	5.9
8	66	8.1	5.5	3.6	8.5	10	32	32	390	93	13	4.0
9	65	7.1	5.3	3.6	8.7	10	28	31	457	88	9.3	4.6
10	65	8.1	5.1	3.6	8.9	10	35	30	491	86	10	5.0
11	63	7.6	5.0	3.6	8.9	11	74	29	360	81	9.3	3.9
12	63	8.7	4.9	3.6	8.9	12	78	32	375	79	5.0	1.8
13	64	9.0	4.9	3.5	8.8	13	142	37	567	31	3.5	5.5
14	65	6.4	4.9	3.5	8.8	14	151	35	758	6.6	6.4	7.9
15	67	4.2	4.9	3.4	8.7	16	152	35	818	8.7	6.2	2.0
16	60	4.4	4.9	3.4	8.7	17	213	36	888	8.1	3.5	4.4
17	61	7.6	4.8	3.4	8.9	17	225	40	930	7.9	4.6	3.1
18	59	8.7	4.8	3.4	9.1	18	207	37	936	6.8	5.9	1.2
19	37	9.0	4.7	3.4	9.2	18	211	38	903	7.3	3.9	1.2
20	26	11	4.6	3.4	9.1	18	205	40	862	7.9	4.4	1.7
21	25	8.4	4.5	3.4	9.0	18	204	37	832	6.8	5.5	1.2
22	20	7.6	4.4	3.4	9.0	18	195	36	810	6.4	4.4	2.4
23	21	8.4	4.2	3.5	8.9	19	141	34	790	6.8	4.4	4.4
24	22	9.3	4.0	3.5	8.9	24	106	36	760	6.4	5.2	2.9
25	21	9.0	3.8	3.5	9.0	29	96	40	680	9.3	5.0	2.7
26	22	12	3.7	3.5	9.1	31	84	36	620	11	7.6	2.6
27	18	13	3.7	3.5	9.3	32	79	38	588	30	5.0	1.8
28	13	12	3.6	3.6	9.5	29	76	46	513	24	3.5	1.5
29	8.7	10	3.6	3.6	-----	26	75	43	461	23	2.9	1.8
30	4.8	8.7	3.6	3.7	-----	35	71	42	443	22	2.6	1.7
31	4.8	-----	3.6	3.8	-----	30	-----	55	-----	20	2.7	-----
TOTAL	1,415.3	230.7	170.0	109.2	228.4	544.6	3,134	1,311	16,751	2,333.0	259.8	111.9
MEAN	45.7	7.69	5.48	3.52	8.16	17.6	104	42.3	558	75.3	8.38	3.73
MAX	69	13	14	3.8	9.5	35	225	79	936	418	23	13
MIN	4.8	3.1	3.6	3.4	6.0	9.7	28	29	52	6.4	2.6	1.2
AC-FT	2,810	458	337	217	453	1,080	6,220	2,600	33,230	4,640	515	222

CAL YR 1962: TOTAL 116,974.20 MEAN 320 MAX 1,600 MIN 0 AC-FT 232,000  
 MAY YR 1963: TOTAL 26,598.9 MEAN 72.9 MAX 936 MIN 1.2 AC-FT 52,760

5-0500. Bois de Sioux River near White Rock, S. Dak.--Continued

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	1.6	1.1	1.3	.50	.30	.20	.40	167	39	8.9	.30	1.2
2	1.7	2.4	1.2	.50	.30	.20	.50	156	40	6.2	.20	1.3
3	1.9	1.0	1.2	.50	.30	.20	.60	152	36	5.0	.10	1.3
4	2.2	1.0	1.2	.50	.30	.20	.70	155	36	6.0	.10	1.3
5	1.7	1.0	1.1	.50	.30	.20	1.0	147	41	12	.50	1.3
6	1.2	1.0	1.1	.50	.20	.20	3.5	156	36	11	.20	1.2
7	1.2	1.1	1.1	.50	.20	.20	13	140	27	8.9	.10	1.6
8	1.2	1.0	1.0	.50	.20	.20	41	127	36	5.0	0	1.2
9	1.0	1.0	.90	.50	.20	.20	68	122	15	5.7	0	3.0
10	1.0	1.0	.80	.50	.20	.20	71	116	21	6.2	0	1.7
11	.90	1.0	.80	.50	.20	.20	56	100	33	13	0	1.4
12	1.1	1.0	.70	.50	.20	.20	48	97	24	16	0	1.3
13	1.3	1.0	.70	.50	.20	.20	89	101	13	12	0	1.1
14	1.1	.80	.70	.50	.20	.20	122	94	11	9.2	0	1.3
15	1.1	1.1	.60	.50	.20	.20	148	89	11	12	0	1.1
16	1.1	.90	.60	.50	.20	.20	127	87	11	8.9	0	1.1
17	1.1	.90	.60	.50	.20	.30	113	85	18	5.0	0	1.1
18	1.1	.90	.60	.50	.20	.30	125	80	33	.70	0	1.0
19	1.1	1.0	.60	.50	.20	.30	135	75	22	6.5	0	1.0
20	1.0	1.0	.60	.50	.20	.30	159	79	7.7	2.2	0	1.0
21	1.7	1.1	.60	.40	.20	.30	167	78	8.6	.20	0	1.0
22	1.7	1.4	.60	.40	.20	.30	206	71	5.7	.70	0	1.2
23	3.2	1.4	.60	.40	.20	.30	204	65	11	2.6	0	1.3
24	2.2	1.3	.60	.40	.20	.30	204	64	18	.60	0	1.2
25	1.6	1.3	.60	.40	.20	.30	199	65	18	.50	0	1.1
26	1.4	1.2	.60	.40	.20	.30	197	52	9.6	1.0	4.4	1.4
27	1.3	1.3	.60	.40	.20	.30	195	49	16	8.8	1.3	1.1
28	1.3	1.4	.50	.40	.20	.30	190	50	17	.30	1.3	1.0
29	2.8	1.4	.50	.30	.20	.30	180	47	12	.10	1.3	.90
30	1.2	1.4	.50	.30	-----	.30	174	40	1.6	.20	1.3	2.2
31	1.2	-----	.50	.30	-----	.40	-----	43	-----	.10	1.2	-----
TOTAL	452.00	34.40	23.60	14.10	6.30	7.80	3,237.70	2,949	628.2	177.50	12.30	38.90
MEAN	1.46	1.15	.76	.45	.22	.25	108	95.1	20.9	5.73	.40	1.30
MAX	3.2	2.4	1.3	.50	.30	.40	206	167	41	16	4.4	3.0
MIN	.90	.80	.50	.30	.20	.20	.40	40	1.6	.10	0	.90
AC-FT	90	68	47	28	13	15	6,420	5,850	1,250	352	24	77

CAL YR 1964: TOTAL 24,886.10 MEAN 68.2 MAX 936 MIN .50 AC-FT 49,360

WAT YR 1964: TOTAL 7,175.00 MEAN 19.6 MAX 206 MIN 0 AC-FT 14,230

Note.--Shifting-control method used June 10 to Sept. 15.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	1.3	1.0	.80	0	0	0	0	724	755	729	12	3.3
2	1.0	1.0	.80	0	0	0	0	701	878	701	15	3.8
3	1.1	1.0	.80	0	0	0	0	667	942	673	14	2.5
4	1.0	1.1	.80	0	0	0	73	642	990	644	15	6.2
5	1.2	1.1	.80	0	0	0	80	615	1,040	617	17	2.0
6	1.2	1.1	.80	0	0	0	90	601	1,180	599	14	2.0
7	1.3	1.1	.80	0	0	0	102	446	1,240	572	8.6	1.6
8	1.2	1.1	.80	0	0	0	117	146	1,300	546	12	2.8
9	1.2	1.1	.80	0	0	0	140	148	1,300	516	11	2.0
10	1.3	1.0	.70	0	0	0	180	146	1,300	486	13	1.5
11	1.2	1.0	.70	0	0	0	220	143	1,300	282	14	2.0
12	1.2	1.0	.70	0	0	0	270	130	1,300	198	11	2.1
13	1.2	1.0	.60	0	0	0	290	127	1,290	274	16	2.5
14	1.1	1.0	.60	0	0	0	310	124	1,260	262	7.5	4.7
15	1.1	1.0	.50	0	0	0	340	130	1,240	256	8.3	3.1
16	1.1	1.0	.50	0	0	0	369	138	1,220	244	11	4.4
17	1.1	1.0	.40	0	0	0	399	139	1,200	234	6.3	5.3
18	1.2	1.0	.40	0	0	0	428	141	1,180	225	6.3	6.3
19	1.2	1.0	.40	0	0	0	444	131	1,160	216	6.6	6.6
20	1.2	1.0	.30	0	0	0	654	132	1,140	212	6.3	6.9
21	1.2	1.0	.30	0	0	0	885	261	1,120	202	4.7	6.0
22	1.2	1.0	.20	0	0	0	883	507	1,090	192	6.0	14
23	1.2	.90	.20	0	0	0	876	541	1,050	194	8.3	11
24	1.2	.90	.20	0	0	0	851	610	1,020	188	5.6	11
25	1.2	.90	.20	0	0	0	842	749	979	183	7.5	5.4
26	1.2	.80	.10	0	0	0	834	765	912	75	6.0	6.6
27	1.2	.80	.10	0	0	0	815	773	864	7.2	3.8	7.2
28	1.2	.80	.10	0	0	0	798	769	834	8.6	5.6	5.6
29	1.2	.80	.10	0	-----	0	777	767	785	12	6.9	8.3
30	1.0	.80	0	0	-----	0	749	765	757	11	3.5	11
31	1.0	-----	0	0	-----	0	-----	753	-----	7.2	5.6	-----
TOTAL	36.2	29.30	14.50	0	0	0	12,816	13,431	32,626	9,566.0	288.4	157.7
MEAN	1.17	.98	.47	0	0	0	427	433	1,088	309	9.30	5.26
MAX	1.3	1.1	.80	0	0	0	885	773	1,300	729	17	14
MIN	1.0	.80	0	0	0	0	0	124	755	7.2	3.5	1.5
AC-FT	72	58	29	0	0	0	25,420	26,640	64,710	18,970	572	313

CAL YR 1964: TOTAL 7,151.80 MEAN 19.5 MAX 206 MIN 0 AC-FT 14,190

WAT YR 1965: TOTAL 68,965.10 MEAN 189 MAX 1,300 MIN 0 AC-FT 136,800

5-0515. Red River of the North at Wahpeton, N. Dak.

Location.--Lat 46°15'55", long 96°35'40", in NE $\frac{1}{4}$  sec.8, T.132 N., R.47 W., on left bank in Wahpeton, 800 ft downstream from confluence of Bois de Sioux and Otter Tail Rivers and at mile 548.6.

Drainage area.--4,010 sq mi, approximately.

Records available.--April 1942 to September 1965. Gage-height records collected in this vicinity since 1917 are contained in reports of U.S. Weather Bureau.

Gage.--Water-stage recorder and concrete and wooden dam. Datum of gage is 943 ft above mean sea level, datum of 1929. Prior to Aug. 6, 1943, U.S. Weather Bureau staff gage 800 ft upstream, converted to present datum. Aug. 6, 1943, to Oct. 27, 1950, chain gage at present site and datum.

Average discharge.--22 years (1943-65), 516 cfs (373,600 acre-ft per year).

Extremes.--Maximum and minimum discharges for the water years 1961-65 are contained in the following table:

Water year	Maximum			Minimum		
	Date	Discharge (cfs)	Gage height (feet)	Date	Discharge (cfs)	Gage height (feet)
1961	June 8, 1961	548	4.72	Aug. 25, 1961	8	2.26
1962	June 11, 1962	5,650	13.98	Nov. 3, 1961	43	2.69
1963	June 11, 1963	3,830	11.38	Aug. 30, 1963	42	2.36
1964	May 6, 1964	1,700	7.59	Nov. 23, 1963	25	2.29
1965	Apr. 11, 1965	5,690	14.34	Mar. 19, 1965	101	a 2.98

a Occurred Nov. 20, 1964.

1942-65: Maximum discharge, 7,130 cfs Apr. 12, 1952 (gage height, 14.99 ft); minimum, 8 cfs Aug. 25, 1961 (gage height, 2.26 ft).

Maximum stage known, 17.0 ft in spring of 1897.

Remarks.--Records good except those for winter periods, which are fair. Flow regulated by Orwell Reservoir (capacity, 14,100 acre-ft at elevation 1,070 ft above mean sea level, adjustment of 1912), Lake Traverse (capacity, 137,000 acre-ft, available for flood control), numerous other controlled lakes and ponds, and several powerplants.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	75	146	140	130	185	235	269	396	403	168	141	43
2	76	144	180	125	180	235	275	396	416	161	146	46
3	75	141	175	135	180	255	266	393	446	192	144	47
4	75	136	175	140	185	260	252	384	501	227	139	51
5	73	136	175	140	175	295	232	377	512	232	141	54
6	76	136	170	140	160	315	232	400	515	232	141	56
7	78	136	160	140	180	325	241	393	515	232	136	55
8	78	130	155	130	170	325	238	371	519	232	141	44
9	78	88	155	125	155	325	230	368	537	227	130	39
10	81	101	155	150	160	330	227	358	530	227	125	49
11	81	141	150	170	160	330	235	342	522	230	101	52
12	83	153	150	160	165	330	263	345	522	218	97	54
13	84	163	150	165	160	325	269	355	519	205	99	60
14	84	153	150	140	155	325	249	371	508	202	99	50
15	84	156	145	145	155	325	205	374	497	207	95	60
16	83	141	140	160	150	320	125	374	466	205	68	101
17	83	102	150	160	155	315	308	380	425	192	68	99
18	83	88	150	155	140	315	361	390	419	171	95	99
19	83	134	145	150	155	315	305	403	419	168	63	97
20	86	181	140	145	190	310	290	406	400	176	43	101
21	91	156	135	140	190	300	317	406	308	179	36	116
22	125	139	130	170	200	295	342	396	269	171	30	108
23	134	125	150	170	220	296	355	393	311	168	21	106
24	134	127	150	160	220	302	358	419	384	168	15	108
25	130	148	155	150	210	296	355	416	432	168	10	110
26	132	136	150	190	230	290	345	422	432	166	10	112
27	132	91	140	200	235	281	374	416	380	163	13	119
28	132	56	125	190	235	216	406	409	281	161	14	123
29	144	38	140	185	-----	355	403	409	216	146	13	110
30	161	23	140	180	-----	287	396	406	166	153	32	101
31	148	-----	135	185	-----	272	-----	390	-----	146	39	-----
TOTAL	3,062	3,745	4,660	4,825	5,055	9,300	8,723	12,058	12,770	5,893	2,445	2,370
MEAN	98.8	125	150	156	161	300	291	389	426	190	78.9	79.9
MAX	161	181	180	200	235	355	406	422	537	232	146	123
MIN	73	23	125	125	140	216	125	342	166	146	10	39
AC-FT	6,070	7,430	9,240	9,570	10,030	18,450	17,300	23,920	25,330	11,690	4,850	4,700

CAL YR 1960: TOTAL 137,891

MEAN 377

MAX 2,200

MIN 14

AC-FT 273,500

WAT YR 1961: TOTAL 74,906

MEAN 205

MAX 537

MIN 10

AC-FT 148,600

5-0515. Red River of the North at Wahpeton, N. Dak.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962												
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	110	104	95	80	90	130	420	994	1,800	2,200	2,470	870
2	110	101	104	80	92	120	435	974	1,740	2,260	2,510	890
3	108	65	101	81	94	135	450	970	1,720	2,250	2,530	902
4	108	99	83	83	95	145	470	990	1,700	2,360	2,550	890
5	106	127	73	75	90	150	530	986	1,790	3,020	2,520	878
6	106	116	60	60	80	150	690	974	1,990	3,490	2,500	874
7	106	116	85	75	90	155	830	974	2,220	4,300	2,470	830
8	110	101	65	75	95	170	930	954	3,720	4,650	2,450	818
9	112	110	65	70	100	175	860	962	5,030	4,170	2,480	800
10	119	121	75	65	100	185	940	914	5,390	3,290	2,500	846
11	116	125	70	80	100	195	1,010	846	5,610	2,550	2,480	838
12	112	119	80	90	100	210	970	846	5,140	2,310	2,500	814
13	110	101	75	95	100	230	1,140	858	3,990	2,390	2,540	799
14	112	90	70	95	105	240	1,430	858	2,650	2,450	2,520	776
15	112	121	65	90	110	250	1,650	950	1,780	2,450	2,460	723
16	112	108	65	85	105	260	1,860	1,310	1,640	2,420	2,400	734
17	108	88	65	80	100	270	1,970	2,070	2,170	2,390	2,360	707
18	110	88	85	85	100	275	1,940	2,170	2,670	2,360	2,280	696
19	110	86	65	90	100	270	1,760	2,670	2,860	2,720	2,160	685
20	110	97	55	95	100	260	1,600	3,210	2,620	3,450	2,030	682
21	106	125	60	90	100	265	1,320	2,440	2,390	3,610	1,880	674
22	108	121	65	105	100	270	1,120	2,120	2,570	3,170	1,700	671
23	99	121	70	90	110	300	882	3,770	2,190	2,570	1,210	678
24	104	110	70	90	115	340	745	4,980	2,180	2,210	1,030	667
25	106	110	75	95	120	360	682	5,140	2,140	2,250	1,050	635
26	108	91	80	95	125	360	682	4,410	2,160	2,370	1,030	624
27	104	73	80	90	120	340	723	4,390	2,200	2,380	1,020	624
28	101	79	80	90	125	340	866	2,210	2,200	2,360	998	620
29	102	85	80	90	-----	370	954	1,730	2,190	2,350	970	595
30	102	90	80	85	-----	420	998	1,650	2,160	2,340	966	554
31	104	-----	80	80	-----	450	-----	1,480	-----	2,360	918	-----
TOTAL	3,351	3,088	2,326	2,614	2,866	7,790	30,827	59,800	80,240	85,450	61,482	22,393
MEAN	108	103	75.0	84.3	102	251	1,028	1,929	2,675	2,756	1,983	746
MAX	119	127	104	95	125	450	1,970	5,140	5,610	4,650	2,550	902
MIN	99	65	55	60	80	120	420	846	1,640	2,200	918	554
AC-FT	6,650	6,120	4,610	5,180	5,680	15,450	61,140	118,600	159,200	169,500	121,900	44,420

CAL YR 1961: TOTAL 72,204 MEAN 198 MAX 537 MIN 10 AC-FT 143,200  
 WAT YR 1962: TOTAL 362,227 MEAN 992 MAX 5,610 MIN 55 AC-FT 718,500

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963												
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	544	407	346	440	200	190	623	560	912	1,070	325	101
2	530	401	343	440	200	220	651	567	1,490	1,020	275	115
3	527	398	346	440	220	250	651	584	1,450	936	246	86
4	527	398	340	430	220	240	613	567	1,217	864	232	53
5	527	398	302	430	220	270	574	553	830	826	223	51
6	530	372	246	410	220	240	686	525	884	721	223	48
7	557	398	150	420	240	270	718	511	1,250	591	212	51
8	561	407	180	410	240	290	644	508	1,550	522	210	54
9	544	394	210	390	240	280	567	481	1,980	518	223	62
10	540	401	200	300	240	280	522	463	3,430	511	194	76
11	534	401	250	300	200	270	500	460	3,560	508	158	83
12	537	401	300	300	240	240	546	475	2,450	500	154	82
13	537	398	350	340	260	200	560	475	1,680	486	150	89
14	537	382	410	360	240	230	567	475	1,450	463	154	104
15	530	353	400	360	280	270	588	484	1,560	427	154	158
16	530	350	400	340	280	270	578	539	1,640	400	158	164
17	420	347	380	320	280	290	613	626	1,670	382	162	174
18	317	341	360	280	260	300	654	549	1,660	361	162	221
19	305	326	360	260	240	350	651	514	1,690	334	164	253
20	302	284	330	240	220	370	672	484	1,660	227	164	278
21	290	263	340	240	220	380	686	472	1,610	234	145	278
22	278	214	340	250	240	420	679	475	1,570	236	126	280
23	278	316	240	250	260	500	654	475	1,520	256	103	280
24	275	397	310	250	240	700	640	475	1,480	275	83	270
25	284	331	340	240	220	800	588	469	1,430	248	82	272
26	323	346	340	220	220	730	560	454	1,340	232	82	272
27	353	352	350	200	200	700	590	454	1,270	230	69	246
28	359	346	350	200	180	700	567	508	1,240	349	48	210
29	356	352	400	200	-----	750	550	475	1,160	364	50	184
30	350	346	450	200	-----	750	560	475	1,090	367	54	182
31	372	-----	450	220	-----	626	-----	619	-----	373	94	-----
TOTAL	13,454	10,820	10,123	9,680	6,520	12,326	18,226	15,791	47,736	14,908	4,869	4,777
MEAN	434	361	327	312	233	398	608	509	1,591	481	157	159
MAX	561	407	450	440	280	800	718	626	3,560	1,070	325	280
MIN	275	214	150	200	180	190	500	454	830	227	48	48
AC-FT	26,690	21,460	20,080	19,200	12,930	24,450	36,150	31,320	94,680	29,570	9,660	9,480

CAL YR 1962: TOTAL 387,859 MEAN 1,063 MAX 5,610 MIN 60 AC-FT 769,300  
 WAT YR 1963: TOTAL 189,230 MEAN 464 MAX 3,560 MIN 48 AC-FT 335,700

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

CAL YR 1963: TOTAL 151,626	MEAN 415	MAX 3,560	MIN 40	AC-FT 300,700
WAT YR 1964: TOTAL 118,736	MEAN 324	MAX 1,560	MIN 37	AC-FT 235,500

CAL YR 1964: TOTAL 122,625	MEAN 335	MAX 1,560	MIN 37	AC-FT 243,200
WAT YR 1965: TOTAL 278,283	MEAN 762	MAX 5,560	MIN 115	AC-FT 552,000

5-0516. Wild Rice River near Rutland, N. Dak.

Location.--Lat 46°01'20", long 97°30'40", in SE $\frac{1}{4}$ SE $\frac{1}{4}$  sec.36, T.130 N., R.55 W., on right bank 1,000 ft upstream from bridge on county highway, 2 miles south of Rutland, and 10 miles upstream from Lake Tawaukon.

Drainage area.--546 sq mi, of which about 250 sq mi is probably noncontributing.

Records available.--October 1959 to September 1965.

Gage.--Water-stage recorder. Datum of gage is 1,197.73 ft above mean sea level, datum of 1929. Prior to Dec. 13, 1960, staff gage at same site and datum.

Average discharge.--6 years, 7.11 cfs (5,150 acre-ft).

Extremes.--Maximums and minimums (discharge in cubic feet per second, gage height in feet).

Annual maximum discharge (\*) and peak discharges above base (30 cfs), water years 1961-65

Date	Time	Discharge	Gage height	Date	Time	Discharge	Gage height	Date	Time	Discharge	Gage height
Feb. 28, 1961	-	-	a 2.48	July 21, 1962	1800	93	5.19	Apr. 6, 1964	-	42	-
Mar. 27, 1961	-	* 2.5	2.25					Apr. 25, 1964	1000	* 46	3.52
				Mar. 25, 1963	0700	64	4.32	June 22, 1964	0200	36	3.32
Apr. 5, 1962	1200	72	4.33	Apr. 4, 1963	0900	* 68	4.19				
May 31, 1962	1000	88	4.94	June 13, 1963	1030	44	5.94	Apr. 13, 1965	0200	* 173	4.80
June 19, 1962	1200	87	5.25					May 27, 1965	0800	51	3.58
July 6, 1962	1200	* 135	5.69	Apr. 3, 1964	2100	-	a 4.68	June 30, 1965	2300	46	3.44

a Backwater from ice.

No flow for several months in each year.

1959-65: Maximum discharge, 173 cfs Apr. 13, 1965 (gage height, 4.80 ft); no flow for several months in each year.

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

Revisions.--WSP 1728: Drainage area.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

DAY	UCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	0	0	0	0	0	0	.90	.10	.10	0	0	0
2	0	0	0	0	0	0	.90	.10	.10	0	0	0
3	0	0	0	0	0	0	.80	0	0	0	0	0
4	0	0	0	0	0	0	.70	0	0	0	0	0
5	0	0	0	0	0	0	.70	0	0	0	0	0
6	0	0	0	0	0	.10	.80	.10	0	0	0	0
7	0	0	0	0	0	.20	.90	.20	0	0	0	0
8	0	0	0	0	0	.30	.90	.40	0	0	0	0
9	0	0	0	0	0	.20	.70	1.1	0	0	0	0
10	0	0	0	0	0	.20	.50	1.2	0	0	0	0
11	0	0	0	0	0	.20	.30	.80	0	0	0	0
12	0	0	0	0	0	.20	.30	.70	0	0	0	0
13	0	0	0	0	0	.40	.20	.70	0	0	0	0
14	0	0	0	0	0	.60	.20	.80	0	0	0	0
15	0	0	0	0	0	.40	.20	.70	0	0	0	0
16	0	0	0	0	0	.30	.10	.50	0	0	0	0
17	0	0	0	0	0	.20	.10	.70	0	0	0	0
18	0	0	0	0	0	.20	.10	.80	0	0	0	0
19	0	0	0	0	0	.20	.10	.60	0	0	0	0
20	0	0	0	0	0	.70	0	.90	0	0	0	0
21	0	0	0	0	0	1.1	0	1.0	0	0	0	0
22	0	0	0	0	0	1.4	0	1.0	0	0	0	0
23	0	0	0	0	0	1.6	.10	.90	0	0	0	0
24	0	0	0	0	0	1.2	.10	.80	0	0	0	0
25	0	0	0	0	0	.80	.10	.80	0	0	0	0
26	0	0	0	0	0	.80	.10	.70	0	0	0	0
27	0	0	0	0	0	2.2	.20	.50	0	0	0	0
28	0	0	0	0	0	1.8	.20	.40	0	0	0	0
29	0	0	0	0	0	1.5	.20	.30	0	0	0	0
30	0	0	0	0	0	1.4	.20	.20	0	0	0	0
31	0	0	0	0	0	1.1	0	.10	0	0	0	0
TOTAL	0	0	0	0	0	19.30	10.60	17.10	0.20	0	0	0
MEAN	0	0	0	0	0	.62	.35	.55	.007	0	0	0
MAX	0	0	0	0	0	2.2	.90	1.2	.10	0	0	0
MIN	0	0	0	0	0	0	0	0	0	0	0	0
AC-FT	0	0	0	0	0	38	21	34	.4	0	0	0

CAL YR 1960: TOTAL 1,313.40

MEAN 3.59

MAX 98

MIN 0

AC-FT 2,610

WAT YR 1961: TOTAL 47.20

MEAN .13

MAX 2.2

MIN 0

AC-FT 94

## 5-0516. Wild Rice River near Rutland, N. Dak.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962											
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	SEPT.
1	0	0	0	0	0	0	50	11	83	30	2.1
2	0	0	0	0	0	0	60	10	77	29	2.1
3	0	0	0	0	0	0	63	9.2	74	44	4.2
4	0	0	0	0	0	0	68	8.8	68	59	2.8
5	0	0	0	0	0	0	71	8.2	61	78	2.6
6	0	0	0	0	0	0	65	7.6	53	125	2.5
7	0	0	0	0	0	0	60	7.0	48	107	2.3
8	0	0	0	0	0	0	57	6.4	47	90	2.2
9	0	0	0	0	0	0	64	6.3	46	78	4.2
10	0	0	0	0	0	0	57	6.0	45	64	3.0
11	0	0	0	0	0	0	55	6.1	43	57	3.8
12	0	0	0	0	0	0	57	6.1	40	55	9.6
13	0	0	0	0	0	0	55	6.0	37	55	8.8
14	0	0	0	0	0	0	47	6.1	35	53	7.9
15	0	0	0	0	0	0	40	7.1	34	52	6.9
16	0	0	0	0	0	0	34	8.2	38	50	6.2
17	0	0	0	0	0	0	29	9.8	24	48	6.0
18	0	0	0	0	0	0	28	9.1	82	44	5.9
19	0	0	0	0	0	0	30	9.5	86	59	5.6
20	0	0	0	0	0	0	32	10	74	71	5.1
21	0	0	0	0	0	0	29	11	60	90	4.7
22	0	0	0	0	0	0	26	22	51	83	4.2
23	0	0	0	0	0	0	24	36	48	68	3.5
24	0	0	0	0	0	0	22	46	48	64	3.1
25	0	0	0	0	0	0	20	48	49	66	2.7
26	0	0	0	0	0	0	18	44	44	68	2.5
27	0	0	0	0	0	1.0	16	50	40	70	2.3
28	0	0	0	0	0	5.0	14	62	36	69	2.2
29	0	0	0	0	0	20	13	73	32	63	2.2
30	0	0	0	0	0	30	12	83	26	55	2.0
31	0	0	0	0	0	40	12	87	47	47	2.0
TOTAL	0	0	0	0	0	96.0	1,216	719.5	1,561	1,991	346.4
MEAN	0	0	0	0	0	3.10	40.5	23.2	52.0	64.2	11.2
MAX	0	0	0	0	0	40	71	87	86	125	59
MIN	0	0	0	0	0	0	0	0	0	0	0
AC-FT	0	0	0	0	0	190	2,410	1,430	3,100	3,950	687

CAL YR 1961: TOTAL 47.20 MEAN .13 MAX 2.2 MIN 0 AC-FT 96  
 WAT YR 1962: TOTAL 6,027.80 MEAN 16.5 MAX 125 MIN 0 AC-FT 11,960

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963											
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	SEPT.
1	5.2	4.5	5.5	.60	0	0	24	22	19	15	4.7
2	5.5	5.7	5.5	.60	0	0	23	20	18	14	5.0
3	5.7	5.0	5.5	.60	0	0	26	19	18	14	5.0
4	5.7	5.3	5.5	.40	0	0	41	18	19	13	4.8
5	5.7	5.7	5.0	.40	0	0	21	17	19	12	4.7
6	5.5	5.5	5.0	.20	0	0	22	16	19	12	4.7
7	5.3	5.5	4.5	.20	0	0	27	15	19	13	4.8
8	5.3	7.2	4.5	.10	0	0	27	14	19	13	5.0
9	5.7	6.4	4.5	.10	0	0	24	13	20	12	4.8
10	6.0	6.5	4.0	0	0	0	22	12	22	12	4.3
11	6.4	6.5	3.5	0	0	.20	20	12	29	11	4.3
12	6.5	6.4	3.0	0	0	.10	20	15	39	10	4.2
13	6.4	6.5	2.5	0	0	.10	18	14	43	9.7	3.6
14	6.0	6.7	2.5	0	0	.30	17	14	39	9.0	3.2
15	5.3	6.7	2.0	0	0	.50	17	15	35	8.3	2.8
16	4.7	6.7	2.0	0	0	.20	15	14	32	8.1	2.6
17	4.3	6.5	2.5	0	0	.20	15	13	30	7.4	2.4
18	4.0	6.2	2.7	0	0	.20	14	11	28	7.7	2.2
19	4.0	6.0	2.5	0	0	.20	14	10	27	8.8	2.0
20	3.6	5.7	2.5	0	0	.80	16	9.5	26	10	1.9
21	3.6	5.7	2.0	0	0	.60	18	8.8	25	9.9	1.7
22	3.6	5.7	2.0	0	0	1.5	19	9.5	24	9.5	2.4
23	3.6	5.7	1.5	0	0	15	20	9.7	23	9.2	3.8
24	3.6	5.3	1.5	0	0	29	20	9.7	22	8.3	5.2
25	3.6	5.4	1.5	0	0	41	19	9.2	22	6.9	5.3
26	3.8	5.5	1.5	0	0	32	17	9.0	21	6.2	5.0
27	3.8	5.5	1.0	0	0	27	15	15	20	6.0	5.0
28	4.0	5.5	1.0	0	0	26	18	19	18	6.0	5.2
29	4.0	5.7	1.0	0	0	24	22	22	18	5.7	5.2
30	4.3	5.8	.80	0	0	24	22	22	17	5.0	5.2
31	4.3	5.8	.80	0	0	24	20	20	17	4.7	4.7
TOTAL	149.0	176.0	89.80	3.20	0	246.90	614	447.4	730	297.4	125.7
MEAN	4.81	5.67	2.90	.10	0	7.96	20.5	14.4	24.3	9.59	4.05
MAX	6.5	7.2	5.5	.60	0	41	41	43	43	15	5.3
MIN	3.6	4.5	.80	0	0	0	14	8.8	17	4.7	1.7
AC-FT	296	349	178	6.4	0	490	1,220	887	1,450	590	249

CAL YR 1962: TOTAL 6,442.60 MEAN 17.7 MAX 125 MIN 0 AC-FT 12,780  
 WAT YR 1963: TOTAL 2,996.10 MEAN 8.21 MAX 43 MIN 0 AC-FT 5,940

## 5-0516. Wild Rice River near Rutland, N. Dak.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	1.9	2.5	1.5	0	0	.10	12	22	1.3	8.2	.30	.90
2	1.9	2.4	1.4	0	0	.20	12	21	1.2	3.0	.90	.90
3	1.9	2.2	1.4	0	0	.30	13	20	1.2	8.2	1.1	.70
4	1.9	2.0	1.3	0	0	.40	19	18	1.0	14	.80	.50
5	1.9	1.9	1.1	0	0	.20	28	18	1.0	18	.60	.50
6	1.7	1.9	1.1	0	0	.10	40	17	1.0	20	.50	.60
7	1.7	1.9	1.0	0	0	0	24	15	1.1	20	.40	1.1
8	1.7	1.9	.90	0	0	0	23	14	1.7	19	.30	2.4
9	1.8	1.8	.80	0	0	0	18	14	2.9	19	.20	2.9
10	1.8	1.7	.70	0	0	0	16	17	4.5	18	0	3.4
11	1.7	1.7	.60	0	0	0	15	18	4.7	17	0	2.6
12	1.7	1.6	.50	0	0	0	14	17	4.7	18	0	1.6
13	1.7	1.7	.30	0	0	.10	13	17	4.0	18	0	.80
14	1.7	1.5	.10	0	0	.10	18	15	3.0	16	0	.50
15	1.7	1.5	0	0	0	.20	22	14	2.8	13	0	.50
16	1.7	1.5	0	0	0	.40	24	14	2.8	11	0	.40
17	1.9	1.5	0	0	0	.30	22	13	3.0	8.8	0	.30
18	1.9	1.4	0	0	0	.30	22	12	6.8	8.0	0	.30
19	1.9	1.4	0	0	0	.30	23	10	14	6.5	0	.30
20	2.8	1.4	0	0	0	.20	26	9.9	70	4.9	.10	.20
21	3.6	1.4	0	0	0	.10	31	9.4	35	3.6	3.6	.20
22	5.3	1.6	0	0	0	0	34	7.8	34	2.7	7.2	.20
23	5.3	1.6	0	0	0	0	42	6.2	28	1.8	4.9	.40
24	5.0	1.6	0	0	0	0	43	5.3	25	1.2	4.0	.80
25	5.3	1.3	0	0	0	0	45	4.5	22	.80	3.2	.30
26	5.5	1.2	0	0	0	0	43	3.6	20	.60	2.3	.20
27	4.8	1.5	0	0	0	.30	39	2.3	16	.30	1.9	.20
28	4.3	1.6	0	0	0	1.3	34	1.8	13	.20	1.4	0
29	4.0	1.6	0	0	0	6.2	29	1.6	10	.10	1.6	0
30	3.5	1.5	0	0	0	9.3	25	1.5	8.0	.20	1.6	0
31	3.0	0	0	0	0	11	1.5	1.5	1.5	.10	1.1	0
TOTAL	86.5	50.3	12.70	0	0	31.40	769	361.4	303.7	285.20	37.80	23.70
MEAN	2.79	1.68	.41	0	0	1.01	25.6	11.7	10.1	9.20	1.22	.79
MAX	5.5	2.5	1.5	0	0	11	45	22	35	20	7.2	3.4
MIN	1.7	1.2	0	0	0	0	12	1.5	1.0	.10	0	0
AC-FT	172	100	25	0	0	62	1,530	717	602	566	75	47

CAL YR 1963: TOTAL 2,730.80 MEAN 7.48 MAX 43 MIN 0 AC-FT 5,420

WAT YR 1964: TOTAL 1,961.70 MEAN 5.36 MAX 45 MIN 0 AC-FT 3,890

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	0	0	0	0	0	0	0	17	26	43	.30	0
2	0	0	0	0	0	0	0	15	26	38	1.0	0
3	0	0	0	0	0	0	0	14	24	33	2.5	0
4	0	0	0	0	0	0	1.0	13	21	26	2.0	0
5	0	0	0	0	0	0	20	12	18	21	2.2	0
6	0	0	0	0	0	0	35	11	18	20	2.0	0
7	0	0	0	0	0	0	45	9.4	17	19	2.0	0
8	0	0	0	0	0	0	50	8.5	16	16	1.8	0
9	0	0	0	0	0	0	99	8.1	14	13	1.8	0
10	0	0	0	0	0	0	107	7.5	14	11	1.7	0
11	0	0	0	0	0	0	132	7.2	13	12	1.5	0
12	0	0	0	0	0	0	165	7.0	13	13	.90	0
13	0	0	0	0	0	0	170	6.4	12	11	.30	0
14	0	0	0	0	0	0	158	6.8	12	8.7	.10	0
15	0	0	0	0	0	0	138	8.7	12	8.1	0	0
16	0	0	0	0	0	0	122	9.4	11	5.7	0	0
17	0	0	0	0	0	0	109	9.8	10	4.4	0	0
18	0	0	0	0	0	0	93	9.6	9.8	3.4	0	0
19	0	0	0	0	0	0	78	9.4	8.5	3.2	0	0
20	0	0	0	0	0	0	68	10	7.5	3.2	0	0
21	0	0	0	0	0	0	58	9.4	6.8	2.9	0	0
22	0	0	0	0	0	0	49	8.5	5.7	2.6	0	0
23	0	0	0	0	0	0	42	11	5.2	4.9	0	0
24	0	0	0	0	0	0	37	14	4.3	4.6	0	0
25	0	0	0	0	0	0	32	20	4.4	3.4	0	0
26	0	0	0	0	0	0	28	40	5.6	3.3	0	0
27	0	0	0	0	0	0	24	49	16	2.9	0	0
28	0	0	0	0	0	0	22	46	22	1.5	0	0
29	0	0	0	0	0	0	20	41	32	.90	0	0
30	0	0	0	0	0	0	18	35	43	.70	0	0
31	0	0	0	0	0	0	31	31	50	.50	0	0
TOTAL	0	0	0	0	0	0	1,920.0	504.7	447.8	340.90	20.10	0
MEAN	0	0	0	0	0	0	64.0	16.3	14.9	11.0	.65	0
MAX	0	0	0	0	0	0	170	49	43	2.5	0	0
MIN	0	0	0	0	0	0	0	6.4	4.3	.50	0	0
AC-FT	0	0	0	0	0	0	3,810	1,000	888	676	40	0

CAL YR 1964: TOTAL 1,812.20

WAT YR 1965: TOTAL 3,233.50

MEAN 4.95

MEAN 8.86

MAX 45

MAX 170

MIN 0

MIN 0

AC-FT 3,590

AC-FT 6,410

5-0517. Wild Rice River near Cayuga, N. Dak.

Location--Lat 46°07'30", long 97°21'40", on line between secs.29 and 30, T.131 N., R.53 W., on left bank 20 ft downstream from county highway bridge, 1½ miles downstream from Shortfoot Creek, 2½ miles downstream from Crooked Creek, and 3½ miles northeast of Cayuga.

Drainage area--955 sq mi, of which about 390 sq mi is probably noncontributing.

Records available--May 1956 to September 1965.

Gage--Water-stage recorder. Datum of gage is 1,095.64 ft above mean sea level, datum of 1929 (levels by Bureau of Reclamation). Prior to Oct. 9, 1957, wire-weight gage three-quarters of a mile upstream at different datum.

Average discharge--3 years, 16.3 cfs (11,800 acre-ft per year).

Extremes--Maximum and minimum discharges for the water years 1961-65 are contained in the following table:

Water year	Maximum			Minimum		
	Date	Discharge (cfs)	Gage height (feet)	Date	Discharge (cfs)	Gage height (feet)
1961	Mar. 12, 1961	1.2	a 2.77	At times	0	-
1962	July 6, 1962	1,080	8.95	do.	0	-
1963	June 10, 1963	107	b 3.95	do.	0	-
1964	Apr. 27, 1964	153	4.30	do.	0	-
1965	Apr. 14, 1965	375	6.08	do.	0	-

a Maximum gage height for year, 3.56 ft Feb. 20, 1961, backwater from ice.

b Maximum gage height for year, 4.74 ft Mar. 3, 1963, backwater from ice.

1956-65: Maximum discharge, 1,080 cfs July 6, 1962 (gage height, 8.95 ft); no flow at times in each year.

Remarks--Records good except those for winter periods, which are fair. Some regulation by Fish and Wildlife Service reservoirs, of which Lake Tewauckon is the largest. Small diversions for irrigation. Records of chemical analyses for the water years 1961-65 are published in reports of the Geological Survey.

Revisions--WSP 1728: Drainage area.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961												
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	0	0	0	0	0	.10	0	0	0	0	0	0
2	0	0	0	0	0	.10	0	0	0	0	0	0
3	0	0	0	0	0	.10	0	0	0	0	0	0
4	0	0	0	0	0	.10	0	0	0	0	0	0
5	0	0	0	0	0	.10	0	0	0	0	0	0
6	0	0	0	0	0	.10	0	.30	0	0	0	0
7	0	0	0	0	0	.10	0	.30	0	0	0	0
8	0	0	0	0	0	.20	0	.20	0	0	0	0
9	0	0	0	0	0	.10	0	.10	0	0	0	0
10	0	0	0	0	0	.10	0	.10	0	0	0	0
11	0	0	0	0	0	.10	0	0	0	0	0	0
12	0	0	0	0	0	.50	0	0	0	0	0	0
13	0	0	0	0	0	.70	0	0	0	0	0	0
14	0	0	0	0	0	.50	0	0	0	0	0	0
15	0	0	0	0	0	.50	0	0	0	0	0	0
16	0	0	0	0	0	.60	0	0	0	0	0	0
17	0	0	0	0	0	.40	0	0	0	0	0	0
18	0	0	0	0	0	.40	0	0	0	0	0	0
19	0	0	0	0	0	.30	0	0	0	0	0	0
20	0	0	0	0	0	.20	0	0	0	0	0	0
21	0	0	0	0	0	.20	0	0	0	0	0	0
22	0	0	0	0	0	.10	0	0	0	0	0	0
23	0	0	0	0	0	.10	0	0	0	0	0	0
24	0	0	0	0	.10	.10	0	0	0	0	0	0
25	0	0	0	0	.10	.10	0	0	0	0	0	0
26	0	0	0	0	.10	.10	0	0	0	0	0	0
27	0	0	0	0	.10	.10	0	0	0	0	0	0
28	0	0	0	0	.10	.10	0	0	0	0	0	0
29	0	0	0	0	-----	0	0	0	0	0	0	0
30	0	0	0	0	-----	0	0	0	0	0	0	0
31	0	-----	0	0	-----	0	-----	0	-----	0	0	-----
TOTAL	0	0	0	0	0.50	6.20	0	1.00	0	0	0	0
MEAN	0	0	0	0	.018	.20	0	.032	0	0	0	0
MAX	0	0	0	0	.10	.70	0	.30	0	0	0	0
MIN	0	0	0	0	0	0	0	0	0	0	0	0
AC-FT	0	0	0	0	1.0	12	0	2.0	0	0	0	0
CAL YR 1960: TOTAL 2,262.10 MEAN 6.18 MAX 121 MIN 0 AC-FT 4,490												
WAT YR 1961: TOTAL 7.70 MEAN .021 MAX .70 MIN 0 AC-FT 15												

5-0517. Wild Rice River near Cayuga, N. Dak.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	0	0	0	0	0	0	25	80	240	99	150	6.0
2	0	0	0	0	0	0	25	72	254	122	138	4.4
3	0	0	0	0	0	0	60	69	229	232	139	3.8
4	0	0	0	0	0	0	170	65	227	523	127	3.6
5	0	0	0	0	0	0	130	59	211	438	109	2.6
6	0	0	0	0	0	0	125	54	190	820	119	2.0
7	0	0	0	0	0	0	192	52	188	813	112	1.7
8	0	0	0	0	0	0	245	46	196	616	91	1.5
9	0	0	0	0	0	0	280	47	199	551	79	1.5
10	.10	0	0	0	0	0	279	43	240	483	72	2.2
11	.10	0	0	0	0	0	213	38	193	433	73	2.2
12	0	0	0	0	0	0	217	38	184	388	73	2.0
13	0	0	0	0	0	0	211	36	180	346	63	1.7
14	0	0	0	0	0	0	190	33	172	307	56	1.5
15	0	0	0	0	0	0	201	41	164	286	47	1.5
16	0	0	0	0	0	0	200	45	162	264	42	1.8
17	0	0	0	0	0	0	180	48	162	240	39	1.7
18	0	0	0	0	0	0	165	50	162	222	37	1.4
19	0	0	0	0	0	0	150	56	145	473	34	1.0
20	0	0	0	0	0	0	143	58	136	428	31	.80
21	0	0	0	0	0	0	133	61	123	335	28	.60
22	0	0	0	0	0	0	123	72	117	334	26	.50
23	0	0	0	0	0	.20	117	175	110	339	23	.80
24	0	0	0	0	0	.10	110	204	103	316	21	.80
25	0	0	0	0	0	.10	102	349	98	282	19	.80
26	0	0	0	0	0	1.0	95	519	93	249	17	.50
27	0	0	0	0	0	5.0	105	474	91	223	14	.40
28	0	0	0	0	0	50	92	406	90	202	12	.20
29	0	0	0	0	0	75	85	356	89	184	12	.20
30	0	0	0	0	0	50	86	297	91	182	10	.20
31	0	0	0	0	0	40	0	253	0	163	8.0	0
TOTAL	0.20	0	0	0	0	221.40	4,449	4,200	4,839	10,893	1,821.0	49.90
MEAN	.007	0	0	0	0	7.14	148	135	161	351	58.7	1.66
MAX	.10	0	0	0	0	75	280	519	254	820	150	6.0
MIN	0	0	0	0	0	0	25	33	89	99	8.0	.20
AC-FT	.4	0	0	0	0	439	8,820	8,330	9,600	21,610	3,610	99

CAL YR 1961: TOTAL 7.90 MEAN .022 MAX .70 MIN 0 AC-FT 16  
WAT YR 1962: TOTAL 26,473.50 MEAN 72.5 MAX 820 MIN 0 AC-FT 52,510

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	.20	0	5.6	0	0	0	37	22	21	28	0	0
2	.10	0	5.6	0	0	0	38	21	29	26	0	0
3	0	0	6.0	0	0	0	34	23	34	23	0	0
4	0	0	5.6	0	0	.10	46	22	35	21	0	0
5	0	0	4.7	0	0	.10	47	19	36	19	0	0
6	0	0	5.3	0	0	.10	45	18	37	19	0	0
7	0	0	4.7	0	0	.10	39	19	38	19	0	0
8	.20	0	4.1	.10	0	.10	35	19	34	19	0	0
9	.10	0	3.6	.40	0	.20	38	19	65	19	0	0
10	0	0	3.3	.20	0	.20	34	18	90	19	0	0
11	0	0	2.0	0	0	.20	35	17	63	19	0	0
12	0	0	1.2	0	0	.30	35	19	72	18	0	0
13	0	0	1.2	0	0	.40	35	19	95	11	0	0
14	0	0	1.0	0	0	.40	35	20	104	7.6	0	0
15	0	0	.90	0	0	.60	36	17	99	5.3	0	0
16	0	0	1.0	0	0	.40	36	14	95	3.8	0	0
17	0	0	1.4	0	0	.20	34	14	94	2.6	0	0
18	0	0	1.7	0	0	.10	29	14	90	2.2	0	0
19	0	0	1.8	0	0	.10	24	14	85	2.6	0	0
20	0	0	1.7	0	0	0	23	12	76	2.0	0	0
21	0	0	1.7	0	0	2.0	21	11	67	1.2	0	0
22	0	0	1.3	0	0	8.0	19	12	60	.90	0	0
23	0	0	1.1	0	0	15	18	11	55	.50	0	0
24	0	0	1.1	0	0	19	17	9.5	53	.10	0	0
25	0	0	.90	0	0	24	17	9.5	47	0	0	0
26	0	0	.60	0	0	28	19	9.5	42	0	0	0
27	0	0	.50	0	0	35	17	17	42	0	0	0
28	0	1.3	.50	0	0	32	20	18	38	0	0	0
29	0	4.4	.50	0	0	38	22	18	34	0	0	0
30	0	5.3	.20	0	0	36	23	18	31	0	0	0
31	0	0	0	0	0	36	0	19	0	0	0	0
TOTAL	0.60	11.0	70.80	0.70	0	276.60	908	512.5	1,761	288.80	0	0
MEAN	.019	.37	2.28	.023	0	8.92	30.3	16.5	58.7	9.32	0	0
MAX	.20	5.3	6.0	.40	0	38	47	23	104	28	0	0
MIN	0	0	0	0	0	0	17	9.5	21	0	0	0
AC-FT	1.2	22	140	1.4	0	549	1,800	1,020	3,490	573	0	0

CAL YR 1962: TOTAL 26,555.70 MEAN 72.8 MAX 820 MIN 0 AC-FT 52,670  
WAT YR 1963: TOTAL 3,830.00 MEAN 10.5 MAX 104 MIN 0 AC-FT 7,600

5-0517. Wild Rice River near Cayuga, N. Dak.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964											
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	SEPT.
1	0	0	0	0	0	0	.90	105	2.9	14	1.5
2	0	0	0	0	0	0	1.0	100	2.5	13	1.4
3	0	0	0	0	0	0	.50	95	1.9	12	1.1
4	0	0	0	0	0	0	.50	90	1.5	12	.90
5	0	0	0	0	0	0	1.7	86	1.3	15	.60
6	0	0	0	0	0	0	2.3	72	1.4	26	.50
7	0	0	0	0	0	0	2.1	65	1.3	31	.30
8	0	0	0	0	0	0	1.2	56	3.1	25	.10
9	0	0	0	0	0	0	16	51	3.8	21	.10
10	0	0	0	0	0	0	51	45	5.3	19	.10
11	0	0	0	0	0	0	50	39	5.3	15	0
12	0	0	0	0	0	0	54	38	4.1	15	0
13	0	0	0	0	0	0	68	33	2.7	14	0
14	0	0	0	0	0	.20	81	29	1.9	12	0
15	0	0	0	0	0	.30	74	27	1.5	12	0
16	0	0	0	0	0	.70	79	26	1.3	10	0
17	0	0	0	0	0	.60	81	23	1.1	9.5	0
18	0	0	0	0	0	.50	76	19	1.2	9.0	0
19	0	0	0	0	0	.40	76	21	35	8.0	0
20	0	0	0	0	0	.30	76	20	36	7.2	0
21	0	0	0	0	0	.20	86	15	25	6.0	2.9
22	0	0	0	0	0	.10	100	12	15	5.3	2.9
23	0	0	0	0	0	0	102	12	10	4.7	1.9
24	0	0	0	0	0	0	119	11	7.2	4.1	1.6
25	0	0	0	0	0	0	133	9.5	5.6	3.3	1.3
26	0	0	0	0	0	0	138	7.6	5.0	2.9	.90
27	0	0	0	0	0	0	147	6.0	6.0	2.5	.80
28	0	0	0	0	0	0	138	5.6	7.2	1.8	.70
29	0	0	0	0	0	0	124	5.0	9.0	1.4	.60
30	0	0	0	0	0	0	110	4.4	12	1.3	.50
31	0	0	0	0	0	.10	-----	3.5	-----	1.2	.40
TOTAL	0	0	0	0	0	3.40	1,989.20	1,131.6	227.9	334.2	21.10
MEAN	0	0	0	0	0	.11	66.3	36.5	7.60	10.8	.68
MAX	0	0	0	0	0	.70	147	105	36	31	2.9
MIN	0	0	0	0	0	0	.50	3.5	1.1	1.2	0
AC-FT	0	0	0	0	0	6.7	3,950	2,240	452	663	42

CAL YR 1963: TOTAL 3,747.60 MEAN 10.3 MAX 104 MIN 0 AC-FT 7,430  
 WAT YR 1964: TOTAL 3,709.00 MEAN 10.1 MAX 147 MIN 0 AC-FT 7,360

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965											
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	SEPT.
1	0	0	0	0	0	0	.10	72	126	20	14
2	0	0	0	0	0	0	.20	64	122	21	13
3	0	0	0	0	0	0	.20	57	112	22	13
4	0	0	0	0	0	0	.50	50	86	22	11
5	0	0	0	0	0	0	40	46	72	23	10
6	0	0	0	0	0	0	30	41	71	27	10
7	0	0	0	0	0	0	50	38	63	30	11
8	0	0	0	0	0	0	60	31	61	31	9.7
9	0	0	0	0	0	0	80	25	57	33	9.7
10	0	0	0	0	0	0	120	20	54	34	8.7
11	0	0	0	0	0	0	180	14	50	36	7.8
12	0	0	0	0	0	0	220	12	48	38	6.2
13	0	0	0	0	0	0	280	10	47	38	4.5
14	0	0	0	0	0	0	365	9.2	46	38	3.6
15	0	0	0	0	0	0	356	12	44	38	3.2
16	0	0	0	0	0	0	344	12	41	35	2.6
17	0	0	0	0	0	0	327	12	38	30	2.2
18	0	0	0	0	0	0	303	11	35	29	2.0
19	0	0	0	0	0	0	273	13	30	26	1.6
20	0	0	0	0	0	0	254	13	24	25	1.5
21	0	0	0	0	0	0	230	10	20	24	1.2
22	0	0	0	0	0	0	207	11	17	24	1.1
23	0	0	0	0	0	0	179	12	13	38	1.0
24	0	0	0	0	0	0	156	22	11	36	1.1
25	0	0	0	0	0	0	143	41	9.2	32	2.6
26	0	0	0	0	0	0	126	86	8.2	30	2.0
27	0	0	0	0	0	0	111	131	19	27	3.6
28	0	0	0	0	0	0	100	129	20	23	3.2
29	0	0	0	0	0	0	90	121	20	20	2.2
30	0	0	0	0	0	0	82	136	20	17	1.5
31	0	0	0	0	0	0	-----	136	-----	15	1.0
TOTAL	0	0	0	0	0	0	4,707.00	1,397.2	1,384.4	882	165.8
MEAN	0	0	0	0	0	0	157	45.1	46.1	28.5	5.35
MAX	0	0	0	0	0	0	365	136	126	38	14
MIN	0	0	0	0	0	0	.10	9.2	8.2	15	1.0
AC-FT	0	0	0	0	0	0	9,340	2,770	2,750	1,750	329

CAL YR 1964: TOTAL 3,709.00 MEAN 10.1 MAX 147 MIN 0 AC-FT 7,360  
 WAT YR 1965: TOTAL 8,552.00 MEAN 23.4 MAX 365 MIN 0 AC-FT 16,960

5-0530. Wild Rice River near Abercrombie, N. Dak.

Location.--Lat 46°28'05", long 96°47'00", in NE $\frac{1}{4}$ NE $\frac{1}{4}$  sec.36, T.135 N., R.49 W., on right bank 420 ft upstream from bridge on county highway, three-quarters of a mile upstream from rubble masonry dam which serves as control,  $3\frac{1}{2}$  miles northwest of Abercrombie, and 7 miles downstream from Antelope Creek.

Drainage area (revised).--2,080 sq mi, of which about 590 sq mi is probably noncontributing.

Records available.--April 1932 to September 1965. Monthly discharge only for some periods, published in WSP 1305.

Gage.--Water-stage recorder and masonry control. Datum of gage is 907.94 ft above mean sea level, datum of 1929. Prior to Dec. 7, 1939, chain gage at site 420 ft downstream at datum 5.0 ft lower. Dec. 7, 1939, to Nov. 24, 1952, staff gage at site three-quarters of a mile downstream from present site at present datum.

Average discharge.--33 years, 64.2 cfs (46,480 acre-ft per year); median of yearly mean discharges, 30 cfs (21,700 acre-ft per year).

Extremes.--Maximums and minimums (discharge in cubic feet per second, gage height in feet).

Annual maximum discharge (\*) and peak discharges above base (300 cfs), water years 1961-65

Date	Time	Discharge	Gage height	Date	Time	Discharge	Gage height	Date	Time	Discharge	Gage height
Mar. 3, 1961	2330	* 36	2.20	June 11, 1962	0100	2,780	16.42	June 13, 1963	1620	* 1,460	10.21
Apr. 8, 1962	-	1,350	-	July 9, 1962	1630	* 3,610	18.45	Apr. 17, 1964	1200	* 415	3.65
Apr. 14, 1962	-	1,400	-	July 21, 1962	2100	3,480	18.06	Apr. 12, 1965	1100	* 2,820	16.50
May 17, 1962	1700	771	6.40	Aug. 12, 1962	1600	797	6.83				
May 25, 1962	1500	2,880	16.70	June 3, 1963	0900	874	7.09				

a Occurred July 10, 1962.

b Occurred July 22, 1962.

No flow at times in each year.

1932-65: Maximum discharge, 5,500 cfs Apr. 2, 1943 (gage height, 21.02 ft, from floodmark); no flow at times in each year. Flood in spring of 1897 reached a stage of 27.5 ft, present site and datum, from floodmarks pointed out by local residents.

Remarks.--Records good except those below 20 cfs, which are fair. Some regulation by Fish and Wildlife Service reservoirs, of which Lake Tewaukon is the largest. Some small diversions for irrigation.

Revisions (water years).--WSP 1388: 1939, 1941 (M).

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	0	0	0	0	0	0	13	10	4.0	0	0	0
2	0	0	0	0	0	5.1	13	11	3.6	0	0	0
3	0	0	0	0	0	19	12	10	3.2	0	0	0
4	0	0	0	0	0	33	11	9.5	2.5	0	0	0
5	0	0	0	0	0	29	11	8.9	2.3	0	0	0
6	0	0	0	0	0	25	12	11	2.2	0	0	0
7	0	0	0	0	0	29	11	11	2.0	0	0	0
8	0	0	0	0	0	29	9.5	11	2.0	0	0	0
9	0	0	0	0	0	23	8.1	11	2.2	0	0	0
10	0	0	0	0	0	18	7.2	9.7	1.6	0	0	0
11	0	0	0	0	0	19	6.7	8.9	1.5	0	0	0
12	0	0	0	0	0	28	6.5	9.2	1.1	0	0	0
13	0	0	0	0	0	29	5.7	11	1.0	0	0	0
14	0	0	0	0	0	30	6.0	12	.70	0	0	0
15	0	0	0	0	0	27	6.5	13	.50	0	0	0
16	0	0	0	0	0	24	6.2	13	.30	0	0	0
17	0	0	0	0	0	25	6.5	13	.20	0	0	0
18	0	0	0	0	0	30	6.7	13	.10	0	0	0
19	0	0	0	0	0	29	6.2	13	0	0	0	0
20	0	0	0	0	0	24	6.2	13	0	0	0	0
21	0	0	0	0	0	20	7.5	13	0	0	0	0
22	0	0	0	0	0	20	7.5	13	0	0	0	0
23	0	0	0	0	0	19	8.1	12	0	0	0	0
24	0	0	0	0	0	18	10	11	0	0	0	0
25	0	0	0	0	0	17	10	11	0	0	0	0
26	0	0	0	0	0	16	9.7	9.5	0	0	0	0
27	0	0	0	0	0	15	9.2	8.1	0	0	0	0
28	0	0	0	0	0	14	8.6	7.0	0	0	0	0
29	0	0	0	0	0	13	8.1	6.0	0	0	0	0
30	0	0	0	0	0	13	7.8	5.2	0	0	0	0
31	0	0	0	0	0	13	0	4.5	0	0	0	0
TOTAL	0	0	0	0	0	653.1	257.5	322.5	31.00	0	0	0
MEAN	0	0	0	0	0	21.1	8.58	10.4	1.03	0	0	0
MAX	0	0	0	0	0	33	13	13	4.0	0	0	0
MIN	0	0	0	0	0	0	5.7	4.5	0	0	0	0
AC-FT	0	0	0	0	0	1,300	511	640	61	0	0	0

CAL YR 1960: TOTAL 8,758.80

MEAN 23.9

MAX 620

MIN 0

AC-FT 17,370

WAT YR 1961: TOTAL 1,264.10

MEAN 3.46

MAX 33

MIN 0

AC-FT 2,510

## RED RIVER OF THE NORTH BASIN

5-0530. Wild Rice River near Abercrombie, N. Dak.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962												
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	0	0	0	0	0	0	0	191	538	164	656	40
2	0	0	0	0	0	0	0	170	164	597	37	58
3	0	0	0	0	0	0	0	173	446	220	547	35
4	0	0	0	0	0	0	0	164	456	672	505	32
5	0	0	0	0	0	0	2.0	149	481	1,170	467	28
6	0	0	0	0	0	0	700	136	487	1,580	429	24
7	0	0	0	0	0	0	1,000	122	506	2,300	394	20
8	0	0	0	0	0	0	1,170	112	1,520	3,150	354	18
9	0	0	0	0	0	0	880	103	2,220	3,580	320	18
10	0	0	0	0	0	0	850	92	2,680	3,430	296	20
11	0	0	0	0	0	0	880	83	2,760	2,980	579	19
12	0	0	0	0	0	0	950	76	2,510	2,430	759	18
13	0	0	0	0	0	0	1,140	70	2,120	1,900	708	15
14	0	0	0	0	0	0	1,330	67	1,580	1,490	573	14
15	0	0	0	0	0	0	1,300	65	1,120	1,250	491	14
16	0	0	0	0	0	0	1,280	69	874	1,120	424	16
17	0	0	0	0	0	0	1,250	585	789	1,040	360	14
18	0	0	0	0	0	0	1,220	622	821	977	286	14
19	0	0	0	0	0	0	1,090	546	831	2,000	226	11
20	0	0	0	0	0	0	903	653	785	2,830	182	9.7
21	0	0	0	0	0	0	700	649	655	3,350	149	9.7
22	0	0	0	0	0	0	511	918	545	3,330	122	11
23	0	0	0	0	0	0	440	1,820	482	2,960	110	11
24	0	0	0	0	0	0	345	2,550	434	2,490	94	10
25	0	0	0	0	0	0	282	2,860	395	2,080	83	8.4
26	0	0	0	0	0	0	252	2,700	380	1,670	76	7.1
27	0	0	0	0	0	0	245	2,280	334	1,370	69	5.6
28	0	0	0	0	0	0	226	1,760	265	1,140	61	4.5
29	0	0	0	0	0	0	201	1,240	216	947	55	4.5
30	0	0	0	0	0	0	198	876	195	817	64	6.8
31	0	0	0	0	0	0	0	653	0	725	44	0
TOTAL	0	0	0	0	0	0	19,405.0	22,563	27,871	55,186	10,064	495.3
MEAN	0	0	0	0	0	0	647	728	929	1,787	325	16.5
MAX	0	0	0	0	0	0	1,330	2,860	2,760	3,580	769	40
MIN	0	0	0	0	0	0	0	65	195	164	44	4.5
AC-FT	0	0	0	0	0	0	38,490	44,750	55,280	105,900	19,960	982
CAL YR 1961:	TOTAL	1,266.10		MEAN	3.46	MAX	33	MIN	0	AC-FT	2,510	
WAT YR 1962:	TOTAL	135,786.30		MEAN	372	MAX	3,580	MIN	0	AC-FT	269,300	

[illegible]

## 5-0530. Wild Rice River near Abercrombie, N. Dak.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	0	0	0	0	0	0	4.0	132	11	21	7.8	.20
2	0	0	0	0	0	0	11	129	9.3	23	5.8	.10
3	0	0	0	0	0	0	30	132	8.1	24	4.4	0
4	0	0	0	0	0	0	70	143	6.9	22	3.6	0
5	0	0	0	0	0	0	119	146	6.3	18	2.7	.70
6	0	0	0	0	0	0	110	154	5.6	19	2.4	1.7
7	0	0	0	0	0	0	104	167	4.9	16	1.8	2.5
8	0	0	0	0	0	1.0	87	248	5.1	15	1.6	2.5
9	0	0	0	0	0	1.0	94	230	5.8	12	1.6	2.0
10	0	0	0	0	0	2.0	96	170	4.8	11	1.4	1.6
11	0	0	0	0	0	4.0	98	143	3.8	8.7	1.1	1.4
12	0	0	0	0	0	6.0	93	126	4.0	5.8	.90	.70
13	0	0	0	0	0	11	89	114	3.4	4.6	.80	.80
14	0	0	0	0	0	23	82	102	2.4	5.1	.60	1.4
15	0	0	0	0	0	36	157	95	1.7	6.9	.50	1.2
16	0	0	0	0	0	63	339	87	1.6	8.1	.40	.90
17	0	0	0	0	0	37	409	76	1.7	9.9	.20	.60
18	0	0	0	0	0	48	361	72	20	13	.20	.40
19	0	0	0	0	0	46	280	64	104	16	.10	.20
20	0	0	0	0	0	42	207	57	140	26	.10	.10
21	0	0	0	0	0	37	184	50	87	32	.50	0
22	0	0	0	0	0	32	207	45	55	30	.60	.10
23	0	0	0	0	0	28	184	39	64	23	.60	.30
24	0	0	0	0	0	26	174	33	82	19	.60	.20
25	0	0	0	0	0	24	180	27	71	15	.50	.20
26	0	0	0	0	0	13	174	23	52	13	.40	.20
27	0	0	0	0	0	9.0	154	19	36	11	.30	.10
28	0	0	0	0	0	6.0	148	16	24	11	.20	.10
29	0	0	0	0	0	6.0	137	14	19	9.6	.20	0
30	0	0	0	0	0	4.0	132	13	19	7.2	.20	0
31	0	0	0	0	0	4.0	0	11	0	6.6	.20	0
TOTAL	0	0	0	0	0	508.10	4,514.0	2,877	859.3	462.5	42.30	20.20
MEAN	0	0	0	0	0	16.4	150	92.8	28.6	14.9	1.36	.67
MAX	0	0	0	0	0	63	409	248	140	32	7.8	2.5
MIN	0	0	0	0	0	0	4.0	11	1.6	4.6	.10	0
AC-FT	0	0	0	0	0	1,010	8,950	5,710	1,700	917	84	40

CAL YR 1963: TOTAL 19,489.30 MEAN 53.4 MAX 1,440 MIN 0 AC-FT 38,660  
 WAT YR 1964: TOTAL 9,283.40 MEAN 25.4 MAX 409 MIN 0 AC-FT 18,410

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	0	0	0	0	0	0	0	251	98	44	72	2.5
2	0	0	0	0	0	0	.10	223	98	54	62	2.4
3	0	0	0	0	0	0	2.0	195	111	55	56	2.0
4	0	0	0	0	0	0	2.0	168	119	51	51	1.7
5	0	0	0	0	0	0	7.0	143	113	44	47	1.2
6	0	0	0	0	0	0	25	128	151	37	52	.90
7	0	0	0	0	0	0	372	117	210	35	54	.50
8	0	0	0	0	0	0	940	106	212	51	44	.60
9	0	0	0	0	0	0	1,140	96	233	87	35	.40
10	0	0	0	0	0	0	1,780	94	225	83	28	.30
11	0	0	0	0	0	0	2,500	85	210	72	24	.20
12	0	0	0	0	0	0	2,790	77	190	92	20	.40
13	0	0	0	0	0	0	2,500	69	172	126	18	.40
14	0	0	0	0	0	0	1,900	65	151	148	16	.50
15	0	0	0	0	0	0	1,290	69	132	117	15	.50
16	0	0	0	0	0	0	875	65	113	90	13	.70
17	0	0	0	0	0	0	631	61	96	76	11	1.5
18	0	0	0	0	0	0	511	59	83	61	9.8	1.6
19	0	0	0	0	0	0	453	61	74	51	8.2	1.7
20	0	0	0	0	0	0	418	56	67	46	7.9	3.4
21	0	0	0	0	0	0	403	54	59	42	7.3	4.0
22	0	0	0	0	0	0	405	49	52	40	6.2	3.6
23	0	0	0	0	0	0	416	48	47	44	5.2	5.9
24	0	0	0	0	0	0	425	48	39	92	7.0	11
25	0	0	0	0	0	0	424	49	36	113	8.2	17
26	0	0	0	0	0	0	413	48	36	87	7.3	11
27	0	0	0	0	0	0	388	51	39	102	6.7	7.0
28	0	0	0	0	0	0	353	77	41	146	5.2	4.9
29	0	0	0	0	0	0	319	123	41	146	3.8	5.2
30	0	0	0	0	0	0	288	126	38	123	3.4	17
31	0	0	0	0	0	0	0	108	0	94	2.7	0
TOTAL	0	0	0	0	0	0	21,970.10	2,969	3,286	2,449	276.9	110.00
MEAN	0	0	0	0	0	0	732	95.8	110	79.0	22.8	3.67
MAX	0	0	0	0	0	0	2,790	251	233	148	72	17
MIN	0	0	0	0	0	0	0	48	36	35	2.7	.20
AC-FT	0	0	0	0	0	0	43,580	5,890	6,520	4,860	1,400	218

CAL YR 1964: TOTAL 9,283.40 MEAN 25.4 MAX 409 MIN 0 AC-FT 18,410  
 WAT YR 1965: TOTAL 31,491.00 MEAN 86.3 MAX 2,790 MIN 0 AC-FT 62,460

5-0540. Red River of the North at Fargo, N. Dak.

Location.--Lat 46°51'40", long 96°47'00", in NW $\frac{1}{4}$ NE $\frac{1}{4}$  sec.18, T.139 N., R.48 W., at city water plant on 4th Street South in Fargo, 25 miles upstream from mouth of Shyenenne River and at mile 453.

Drainage area.--6,800 sq mi, approximately.

Records available.--May 1901 to September 1965. Published as "at Moorhead, Minn." 1901. Monthly discharge only for some periods, published in WSP 1308.

Gage.--Water-stage recorder and concrete control. Datum of gage is 861.8 ft above mean sea level, datum of 1929. Prior to Sept. 1, 1914, staff gage at site  $\frac{1}{2}$  miles downstream at datum 1.0 ft lower. Sept. 1, 1914, to July 31, 1928, staff gage at site 1 mile downstream at datum 9.3 ft higher. Aug. 1, 1928, to Apr. 12, 1959, staff gage at site 1 mile downstream at datum 5.6 ft higher. Aug. 13, 1959, to Sept. 30, 1960, water-stage recorder at site 2 miles upstream at datum 5.6 ft higher. Oct. 1, 1960, to Sept. 30, 1962, water-stage recorder at present site at datum 5.6 ft higher. Since Sept. 30, 1960, auxiliary water-stage recorder 2 miles upstream.

Average discharge.--64 years, 511 cfs (369,900 acre-ft per year, unadjusted); median of yearly mean discharges, 420 cfs (304,000 acre-ft per year, unadjusted).

Extremes.--Maximum and minimum discharges for the water years 1961-65 are contained in the following table:

Water year	Maximum			Minimum		
	Date	Discharge (cfs)	Gage height (feet)	Date	Discharge (cfs)	Gage height (feet)
1961	June 9, 1961	1,020	9.24	Sept. 1, 1961	10	7.42
1962	June 14, 1962	9,580	22.83	Jan. 13, 1962	55	7.72
1963	June 14, 1963	4,930	19.97	Sept. 14, 1963	52	13.34
1964	Apr. 18, 1964	2,400	16.22	Aug. 18, 1964	28	13.23
1965	Apr. 15, 1965	11,400	30.5	Nov. 22, 1965	107	13.56

1901-65: Maximum discharge, 16,300 cfs Apr. 15, 16, 1952; maximum gage height, 28.79 ft Apr. 16, 1952, datum then in use; no flow for many days in each year for period 1932-41.

Maximum stage known, 40.1 ft Apr. 7, 1897, site and datum in use prior to 1914 (discharge, 25,000 cfs).

Remarks.--Records good. Flow regulated by Orwell Reservoir (capacity, 14,100 acre-ft at elevation 1,070 ft above mean sea level, adjustment of 1912), Lake Traverse (capacity, 137,000 acre-ft, available for flood control), other controlled lakes and ponds and several powerplants. Some small diversions for municipal supply. Figures of daily discharge do not include diversion by City of Fargo. Records of chemical analyses and water temperatures for the water years 1961-65 are published in reports of the Geological Survey.

Revisions (water years).--WSP 1308: 1902-4, 1906-7, 1910-14, 1916, 1918, 1924. WSP 1388: 1905-6, 1917-20(M), 1935(M), 1938-39(M), 1943.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

SEASONAL IN CUBIC FEET PER SECOND WATER FLOW OCTOBER 1960 TO SEPTEMBER 1961													
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	
1	60	150	45	140	176	232	348	423	373	232	145	14	
2	80	150	48	132	181	282	330	416	373	149	145	13	
3	90	145	65	132	181	336	306	410	373	154	132	12	
4	80	136	80	128	181	354	330	404	354	140	124	13	
5	68	132	158	124	181	442	336	404	373	145	120	17	
6	68	132	196	128	186	488	318	430	410	154	116	23	
7	68	136	196	132	191	501	300	430	430	172	108	27	
8	65	128	176	132	186	508	282	430	494	181	100	32	
9	62	128	163	128	181	482	277	430	928	191	104	36	
10	62	120	154	124	176	470	271	416	638	196	104	74	
11	65	87	150	120	168	460	254	398	527	201	108	42	
12	65	77	145	124	163	450	254	404	514	201	104	42	
13	65	100	132	136	158	440	249	456	488	212	96	48	
14	65	128	132	150	158	436	266	456	475	212	84	50	
15	65	150	136	154	154	423	288	534	468	207	74	48	
16	65	172	132	145	150	423	288	520	456	196	71	45	
17	62	168	124	140	150	423	266	482	449	186	84	40	
18	60	140	124	154	140	430	201	456	430	181	87	42	
19	62	116	128	158	120	442	249	436	391	168	80	60	
20	62	96	132	154	124	442	330	436	379	163	84	74	
21	62	108	128	163	132	456	362	436	385	163	84	80	
22	60	150	140	142	158	423	324	404	464	163	74	77	
23	65	176	108	120	172	449	362	423	354	172	55	80	
24	74	172	108	132	176	430	391	416	282	168	48	87	
25	90	140	112	145	181	449	410	398	266	163	40	84	
26	108	140	116	136	191	494	423	410	306	154	36	84	
27	120	136	124	154	206	462	430	404	360	154	32	84	
28	120	136	124	136	222	423	423	404	379	150	27	87	
29	124	96	124	168	-----	367	410	404	385	172	23	80	
30	154	62	128	172	-----	312	416	398	312	196	19	84	
31	145	-----	136	176	-----	330	-----	385	-----	181	18	-----	
TOTAL	2,461	3,907	3,944	4,377	4,743	13,092	9,654	13,279	12,756	5,494	2,526	1,579	
MEAN	79.4	130	127	141	169	422	322	422	425	177	81.5	52.6	
MAX	154	176	196	176	222	508	430	534	928	232	145	87	
MIN	60	62	45	120	120	232	201	385	266	140	40	12	
AC-FT	4,880	7,750	7,820	8,680	9,410	25,970	19,150	26,340	25,300	10,900	5,010	3,130	
(+)	466	386	401	408	355	373	368	484	738	654	771	434	
MEAN+	87.0	137	134	148	176	428	328	436	438	188	94.0	59.9	
AC-FT+	5,350	8,140	8,220	9,090	9,760	26,340	19,520	26,820	26,040	11,550	5,780	3,570	
CAL YR 1960: TOTAL	157,583	MEAN	431	MAX	3,700	MIN	45	AC-PT	312,600	MEAN	439	AC-FT	318,400
WAT YR 1961: TOTAL	77,812	MEAN	213	MAX	928	MIN	12	AC-PT	154,300	MEAN	221	AC-FT	160,200

+ Diversion in acre-feet, by city of Fargo.

+ Adjusted for diversion.

## 5-0540. Red River of the North at Fargo, N. Dak.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.		
1	100	107	80	71	90	107	377	1,300	5,330	2,490	4,070	1,040		
2	100	96	80	74	84	96	419	1,330	4,390	2,490	3,680	1,000		
3	96	104	80	77	80	104	455	1,300	3,560	2,660	3,500	968		
4	96	104	80	80	87	123	514	1,250	2,790	3,620	3,400	960		
5	96	104	87	80	84	134	697	1,200	2,370	4,440	3,330	960		
6	93	77	93	70	71	123	1,430	1,190	2,300	4,700	3,260	952		
7	90	80	80	60	65	107	1,760	1,180	2,350	5,590	3,160	936		
8	90	90	71	60	77	119	2,140	1,160	3,210	6,660	3,020	944		
9	93	96	65	60	74	130	2,270	1,140	5,040	7,270	2,890	912		
10	96	93	65	60	77	134	2,370	1,120	6,390	7,870	2,790	896		
11	123	104	65	60	77	143	2,440	1,100	7,650	8,120	3,040	888		
12	111	130	60	60	80	156	2,600	1,070	8,700	8,160	3,520	896		
13	115	138	65	58	87	177	3,000	1,000	9,350	7,940	3,770	896		
14	115	126	65	65	90	177	3,500	968	9,570	7,000	3,830	880		
15	111	119	65	71	100	173	3,850	976	9,390	6,300	3,770	864		
16	104	115	65	77	100	173	4,250	1,020	8,780	5,650	3,400	848		
17	96	111	65	80	90	191	4,900	1,260	8,250	5,230	3,330	808		
18	104	104	62	80	77	220	6,000	1,990	7,210	4,840	3,000	800		
19	104	87	68	77	77	236	6,400	3,070	6,340	4,620	2,760	785		
20	111	71	68	71	80	252	5,970	3,810	5,770	4,770	2,600	770		
21	104	74	68	74	80	262	5,300	4,250	5,280	5,650	2,430	755		
22	104	96	68	77	87	230	4,510	4,830	4,890	6,440	2,290	748		
23	96	119	71	84	87	225	3,450	5,530	4,460	7,060	2,110	755		
24	100	130	71	87	96	215	2,330	6,540	3,940	7,310	1,890	755		
25	100	130	74	90	100	225	1,610	7,240	3,360	7,140	1,490	755		
26	104	130	74	93	93	257	1,290	7,790	2,790	6,700	1,250	755		
27	107	126	74	93	96	329	1,180	8,270	2,610	6,030	1,180	718		
28	100	107	77	93	104	359	1,150	8,510	2,530	5,480	1,160	704		
29	104	84	80	93	-----	371	1,140	8,340	2,500	5,080	1,130	690		
30	107	80	74	93	-----	371	1,220	7,040	2,460	4,760	1,100	697		
31	104	-----	-----	90	-----	377	-----	6,540	-----	4,380	1,070	-----		
TOTAL	3,174	3,118	2,231	2,358	2,390	6,296	78,522	103,914	153,650	176,450	83,420	25,335		
MEAN	102	104	72.0	76.1	85.4	203	2,617	3,352	5,122	5,692	2,691	845		
MAX	123	138	93	93	104	377	6,400	8,510	9,770	8,160	4,070	1,040		
MIN	90	71	60	58	65	96	377	968	2,300	2,490	1,070	690		
AC-FT	6,300	6,180	4,430	4,680	4,740	12,490	155,700	206,100	304,800	350,000	165,500	50,250		
(+)	409	379	404	400	345	396	392	442	471	450	580	418		
MEAN*	109	110	78.5	82.6	91.6	210	2,624	3,359	5,130	5,699	2,700	852		
AC-FT*	6,700	6,560	4,830	5,080	5,090	12,880	156,100	206,600	305,200	350,400	166,000	50,670		
CAL YR 1961: TOTAL	76,023	76,023	MEAN	208	MAX	928	MIN	58	AC-PT	150,800	MEAN	216	AC-PT*	156,600
WAT YR 1962: TOTAL	640,858	640,858	MEAN	1,756	MAX	9,570	MIN	58	AC-PT	1,271,000	MEAN	1,763	AC-PT*	1,276,000

+ Diversion in acre-feet, by city of Fargo.

\* Adjusted for diversion.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	
1	657	414	383	328	179	170	1,290	563	962	1,190	358	110	
2	620	420	377	352	183	174	1,050	563	1,570	1,120	377	114	
3	607	457	383	352	174	183	815	569	2,290	1,070	346	92	
4	594	463	370	352	170	193	778	575	2,940	1,010	298	92	
5	588	470	370	352	174	193	808	594	3,150	938	246	95	
6	582	457	358	358	183	204	778	594	2,650	882	204	92	
7	594	470	230	352	183	209	946	588	2,090	838	183	88	
8	601	476	138	346	188	214	1,240	575	2,280	726	204	88	
9	607	457	165	346	193	219	1,160	538	2,410	613	230	75	
10	613	470	240	334	198	235	987	538	2,410	544	198	71	
11	613	470	257	322	204	263	852	519	2,730	519	214	71	
12	610	476	252	292	204	269	755	507	3,520	513	214	63	
13	600	476	269	252	198	257	664	507	4,210	494	170	57	
14	600	476	304	263	198	240	651	519	4,820	494	138	52	
15	590	476	328	281	204	230	651	557	4,550	476	142	54	
16	590	470	340	322	209	230	657	594	3,800	457	151	60	
17	588	445	358	328	204	240	657	778	3,230	420	147	71	
18	582	439	358	328	204	240	651	726	2,560	401	151	114	
19	594	432	352	322	198	235	651	762	2,190	395	147	130	
20	439	420	340	298	193	263	691	705	1,970	377	138	170	
21	395	408	334	263	188	281	698	657	1,870	346	134	224	
22	377	377	328	263	183	281	620	620	1,780	346	170	275	
23	370	340	310	235	179	358	712	576	1,730	219	174	286	
24	346	281	292	240	183	488	705	563	1,640	219	151	292	
25	346	275	252	252	188	726	691	557	1,580	235	130	281	
26	340	264	246	235	183	938	677	563	1,520	246	134	281	
27	334	408	286	224	183	1,100	638	800	1,460	257	122	275	
28	370	389	286	209	174	1,150	601	1,190	1,390	252	170	281	
29	395	383	286	193	-----	1,090	582	845	1,310	263	193	269	
30	414	377	292	193	-----	978	588	670	1,280	286	151	246	
31	420	-----	298	183	-----	1,160	-----	613	-----	340	122	-----	
TOTAL	15,976	12,736	9,382	8,953	5,302	13,034	23,320	19,325	71,892	16,409	5,907	4,608	
MEAN	515	425	303	289	189	420	778	630	2,396	529	191	149	
MAX	657	476	383	358	209	1,160	1,290	1,190	4,820	1,190	377	292	
MIN	334	275	138	183	170	170	582	507	962	219	122	52	
AC-FT	31,690	25,260	18,610	17,760	10,520	25,850	46,270	38,730	142,600	32,550	11,720	8,860	
(+)	482	449	475	464	431	479	457	553	627	922	652	540	
MEAN*	523	432	310	296	197	428	785	639	2,407	544	201	158	
AC-FT*	32,170	25,710	19,080	18,220	10,950	26,330	46,730	39,280	143,200	33,470	12,370	9,400	
CAL YR 1962: TOTAL	670,429	MEAN	1,837	MAX	9,570	MIN	58	AC-PT	1,330,000	MEAN	1,844	AC-PT*	1,335,000
WAT YR 1963: TOTAL	206,914	MEAN	567	MAX	4,820	MIN	52	AC-PT	410,400	MEAN	576	AC-PT*	416,900

+ Diversion in acre-feet, by city of Fargo.

\* Adjusted for diversion.

## 5-0540. Red River of the North at Fargo, N. Dak.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	198	188	142	122	170	151	286	1,100	796	538	263	52
2	170	193	136	126	170	134	298	1,150	780	507	252	58
3	165	183	126	134	170	115	352	1,190	772	507	230	58
4	160	183	119	138	174	107	414	1,190	744	507	204	58
5	156	183	119	142	174	107	582	1,180	740	482	188	58
6	160	198	142	147	179	100	829	1,170	748	476	189	58
7	188	209	156	138	174	96	1,050	1,310	744	432	142	64
8	214	204	179	138	174	93	1,030	1,900	764	432	122	58
9	224	204	151	142	174	90	901	2,030	756	414	103	55
10	224	209	111	138	165	90	856	1,730	726	395	83	58
11	240	204	80	138	155	96	919	1,400	698	482	64	70
12	246	204	73	138	183	103	1,060	1,310	677	513	64	70
13	240	209	119	138	188	115	1,210	1,200	664	494	52	67
14	240	209	165	138	183	134	1,010	1,130	651	482	42	67
15	246	204	170	138	188	151	1,370	1,130	651	445	35	119
16	246	193	160	142	188	188	1,530	1,120	657	408	35	142
17	240	174	165	130	183	219	1,880	1,100	638	383	31	138
18	224	170	174	130	188	252	2,330	1,070	780	340	31	151
19	224	160	193	130	188	292	2,280	1,060	698	292	35	165
20	230	156	193	130	188	275	1,860	1,020	780	275	39	156
21	240	151	193	134	179	263	1,690	982	919	298	93	156
22	235	156	188	138	170	252	1,680	973	937	304	64	170
23	235	138	179	151	170	252	1,490	964	937	281	55	193
24	240	111	165	147	151	269	1,450	946	892	281	58	193
25	240	96	165	147	147	275	1,390	901	748	275	64	188
26	224	103	165	138	130	286	1,280	892	657	275	67	183
27	193	134	165	130	126	310	1,190	865	626	292	64	183
28	179	156	156	142	138	292	1,100	856	626	298	64	183
29	165	166	151	142	147	304	1,070	838	626	292	61	179
30	165	160	126	156	-----	304	1,070	829	588	275	61	193
31	179	-----	119	160	-----	292	-----	820	-----	257	58	-----
TOTAL	6,530	5,198	4,653	4,302	4,924	6,007	35,457	35,396	22,044	11,937	2,912	3,544
MEAN	211	173	150	139	170	194	1,182	1,142	735	385	93.9	118
MAX	246	209	193	160	188	310	2,330	2,030	937	538	263	193
MIN	156	96	73	122	126	90	286	820	588	257	31	52
AC-FT	12,950	10,310	9,230	8,530	9,770	11,910	70,330	70,210	43,720	23,680	5,780	7,030
(+)	505	601	510	516	484	479	679	658	658	930	755	536
MEAN±	221	182	158	147	178	202	1,153	1,153	746	400	106	127
AC-FT±	13,550	10,810	9,750	9,050	10,230	12,400	70,810	70,890	44,380	24,610	6,530	7,560

CAL YR 1963: TOTAL 185,201 MEAN 507 MAX 4,820 MIN 52 AC-FT 367,300 MEAN ± 517 AC-FT ± 374,100  
 CAL YR 1964: TOTAL 142,903 MEAN 390 MAX 2,330 MIN 31 AC-FT 283,400 MEAN ± 400 AC-FT ± 290,600

† Diversion in acre-feet, by city of Fargo.

‡ Adjusted for diversion.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	193	230	209	214	183	198	224	2,190	2,180	2,190	698	432
2	188	230	204	214	188	204	214	2,100	2,220	2,110	657	426
3	183	230	209	209	188	198	263	2,030	2,180	2,040	657	414
4	179	230	224	204	204	198	257	1,960	2,160	2,000	651	401
5	174	224	224	198	183	198	286	1,870	2,280	1,930	670	383
6	246	219	209	193	188	214	395	1,810	2,420	1,820	698	358
7	334	224	209	219	193	230	613	1,790	2,560	1,720	626	346
8	358	224	214	204	179	224	991	1,760	2,890	1,740	626	334
9	328	214	209	204	179	214	1,490	1,740	3,340	1,760	651	314
10	252	224	219	204	204	204	3,500	1,610	3,580	1,790	632	340
11	235	224	224	198	193	204	5,700	1,390	3,700	1,830	626	346
12	219	198	230	165	174	209	7,400	1,270	3,720	1,810	601	328
13	230	198	235	188	188	214	8,400	1,220	3,680	1,800	569	334
14	246	193	224	198	188	214	10,000	1,230	3,540	1,720	651	364
15	252	193	209	193	183	204	11,300	1,280	3,360	1,600	513	328
16	269	214	198	188	170	209	10,700	1,290	3,180	1,610	448	340
17	219	219	174	179	170	198	8,850	1,290	3,040	1,570	470	389
18	179	230	165	179	179	198	6,800	1,310	2,940	1,490	470	476
19	179	230	183	179	193	193	5,100	1,360	2,770	1,330	576	476
20	198	170	183	193	198	198	3,950	1,380	2,790	1,170	445	626
21	230	126	193	193	179	179	3,150	1,380	2,730	1,170	420	657
22	240	111	214	188	188	130	2,800	1,380	2,670	1,150	408	677
23	198	138	230	198	174	142	2,750	1,400	2,610	1,170	408	684
24	198	170	230	188	174	188	2,650	1,450	2,560	1,090	432	740
25	246	209	219	193	179	230	2,550	1,640	2,500	1,090	432	756
26	286	246	219	193	179	235	2,500	1,770	2,450	1,100	463	764
27	257	219	209	193	179	240	2,480	1,850	2,450	1,100	501	764
28	281	235	204	193	193	240	2,380	1,990	2,400	1,130	482	756
29	252	209	209	193	-----	240	2,300	2,050	2,360	1,090	432	780
30	230	198	214	183	-----	240	2,240	2,090	2,270	1,000	432	772
31	224	-----	209	183	-----	235	-----	2,170	-----	796	432	-----
TOTAL	7,337	6,217	6,505	6,006	5,170	6,422	112,203	51,080	83,620	46,956	16,616	15,225
MEAN	237	207	210	194	167	207	3,740	1,668	2,787	1,515	536	508
MAX	358	257	235	219	204	240	11,300	2,190	3,720	2,190	698	780
MIN	174	111	165	165	170	130	214	1,220	2,160	796	408	328
AC-FT	14,440	12,330	12,900	11,910	10,250	12,740	222,600	101,300	165,900	93,140	32,960	30,200
(+)	573	547	559	555	531	580	563	594	606	662	681	524
MEAN±	246	216	219	203	194	217	3,750	1,657	2,798	1,525	547	516
AC-FT±	15,120	12,880	13,460	12,470	10,790	13,320	223,100	101,900	166,500	93,800	33,640	30,720

CAL YR 1964: TOTAL 146,577 MEAN 400 MAX 2,330 MIN 31 AC-FT 290,700 MEAN ± 410 AC-FT ± 297,900  
 CAL YR 1965: TOTAL 363,353 MEAN 995 MAX 11,300 MIN 111 AC-FT 720,700 MEAN ± 1,005 AC-FT ± 727,700

† Diversion in acre-feet, by city of Fargo.

‡ Adjusted for diversion.

5-0545. Sheyenne River above Harvey, N. Dak.

Location.--Lat 47°42'10", long 99°56'55", in SW $\frac{1}{4}$ SE $\frac{1}{4}$  sec.24, T.149 N., R.73 W., on right bank just downstream from county road, 2 miles upstream from unnamed tributary and  $4\frac{1}{2}$  miles south of Harvey.

Drainage area.--424 sq mi, of which about 270 sq mi is probably noncontributing.

Records available.--September 1955 to September 1965.

Gage.--Water-stage recorder. Datum of gage is 1,547.30 ft above mean sea level, datum of 1929.

Average discharge.--10 years, 3.40 cfs (2,460 acre-ft per year); median of yearly mean discharges, 2.6 cfs (1,900 acre-ft per year).

Extremes.--Maximums and minimums (discharge in cubic feet per second, gage height in feet).

Annual maximum discharge (*) and peak discharges above base (15 cfs, revised), water years 1961-65											
Date	Time	Discharge	Gage height	Date	Time	Discharge	Gage height	Date	Time	Discharge	Gage height
Feb. 1961	-	-	a 7.70	July 6, 1962	0600	22	6.61	June 19, 1964	0900	53	7.44
Apr. 5, 1961	0500	* 14	5.19	July 10, 1962	0330	21	6.57	Mar. 9, 1965	-	26	a 8.77
Mar. 24, 1962	1000	* 110	8.51	June 8, 1963	0800	* 65	7.32	Apr. 9, 1965	-	* 95	8.43
May 19, 1962	2400	27	6.23					July 23, 1965	0200	16	5.77
June 15, 1962	0630	35	7.47	Apr. 1, 1964	1620	* 54	a 8.15				
June 23, 1962	1900	21	6.57	May 3, 1964	1630	23	5.76				

a Backwater from ice.

No flow at times in each year.

1955-65: Maximum discharge, 224 cfs Apr. 11, 1956 (gage height, 8.92 ft); maximum gage height, 9.50 ft Mar. 23, 1960 (backwater from ice); no flow at times in each year.

Remarks.--Records fair except those for winter periods, which are poor.

Revisions.--WSP 1728: Drainage area.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961												
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	.40	.90	.40	0	0	1.5	2.5	1.7	.90	0	.20	0
2	.50	.90	.30	0	0	1.0	3.0	1.7	.90	0	.30	0
3	.50	.90	.30	0	0	1.0	4.0	1.6	.80	0	.30	0
4	.50	.80	.20	0	0	.80	6.0	1.6	.80	0	.10	0
5	.40	.80	.20	0	0	.60	6.0	1.6	.70	0	0	0
6	.40	.80	.10	0	0	.40	6.0	1.7	.60	0	0	0
7	.40	.80	.10	0	0	.20	5.5	2.3	.40	0	0	0
8	.40	.80	.10	0	0	.20	5.5	2.7	.40	0	0	0
9	.40	.70	.10	0	.10	.10	5.0	1.8	.30	0	0	0
10	.40	.60	.10	.10	.10	.10	4.5	2.3	.90	0	0	.10
11	.40	.60	.10	.10	.10	.10	4.4	2.1	.70	0	0	.20
12	.50	.50	.10	.10	.10	.10	2.9	2.1	.40	0	0	.10
13	.60	.50	.20	.10	0	.10	2.6	2.0	.40	0	0	.20
14	.60	.50	.30	.10	0	.20	2.7	2.0	.30	.20	0	.20
15	.60	.50	.40	.10	0	1.0	2.4	1.9	.20	.10	0	.10
16	.60	.60	.40	.10	0	2.0	1.9	1.9	.10	.10	0	.10
17	.60	.60	.40	.10	0	2.5	2.0	1.9	.10	0	0	.10
18	.60	.60	.40	.10	0	3.5	1.9	1.8	.10	0	0	.10
19	.40	.60	.40	.10	0	5.0	2.0	1.6	.10	0	0	1.0
20	.40	.60	.20	.10	0	5.5	2.6	1.5	0	0	0	2.0
21	.40	.90	.10	0	.20	5.0	2.4	1.4	0	0	0	1.8
22	.60	2.2	.10	0	.50	4.5	2.1	1.4	0	.30	0	1.6
23	.60	.60	.10	0	.50	4.0	1.9	1.3	0	.20	0	1.5
24	.70	.40	.10	0	.20	3.5	1.6	1.3	0	.10	0	1.4
25	.70	.60	0	0	1.0	2.5	2.0	1.3	0	0	0	1.3
26	.70	.70	0	0	.80	1.5	2.4	1.2	0	0	0	1.2
27	.70	.70	0	0	.80	1.0	1.7	1.1	0	0	0	1.1
28	.70	.60	0	0	1.0	1.0	1.7	1.1	0	0	0	1.0
29	.70	.50	0	0	-----	2.0	1.7	1.1	0	.40	0	.90
30	.90	.50	0	0	-----	2.5	1.7	.90	0	.60	0	.80
31	.90	-----	0	0	-----	2.5	-----	.90	-----	.20	0	-----
TOTAL	17.20	21.30	5.20	1.10	5.40	55.90	92.6	50.80	9.10	2.20	0.90	16.80
MEAN	.55	.71	.17	.036	.19	1.80	3.09	1.64	.30	.071	.029	.56
MAX	.90	2.2	.40	.10	1.0	5.5	6.0	2.7	.90	.60	.30	2.0
MIN	.40	.40	0	0	0	.10	1.6	.90	0	0	0	0
AC-FT	34	42	10	2.2	11	111	184	101	18	4.4	1.8	33

CAL YR 1960: TOTAL 1,542.30 MEAN 4.21 MAX 170 MIN 0 AC-FT 3,060

WAT YR 1961: TOTAL 278.50 MEAN .76 MAX 6.0 MIN 0 AC-FT 552

## 5-0545. Sheyenne River above Harvey, N. Dak.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	.80	.50	.40	0	0	0	10	2.0	6.6	2.9	2.0	.50
2	.70	.50	.30	0	0	0	8.0	1.9	4.8	3.0	1.7	.50
3	.70	.50	.20	0	0	0	7.0	1.9	3.8	3.0	1.5	.50
4	.60	.50	.20	0	0	0	6.0	1.7	3.2	4.4	1.2	.50
5	.50	.50	.30	0	0	0	5.4	1.7	3.0	3.1	1.1	.40
6	.40	.60	.30	0	0	0	5.2	1.8	2.7	13	1.0	.40
7	.40	.70	.20	0	0	0	3.8	1.9	2.5	11	.80	.40
8	.40	.80	.10	0	0	0	3.7	2.0	2.3	10	.80	.50
9	.40	.90	.10	0	0	0	2.8	2.0	1.9	14	.70	.80
10	.40	1.1	.10	0	0	0	2.4	2.2	1.7	18	.70	.70
11	.40	1.3	.10	0	0	0	2.3	2.3	1.5	12	.90	.80
12	.40	1.3	.10	0	0	0	2.1	2.5	1.4	7.6	.80	.80
13	.40	1.2	.10	0	0	0	2.0	3.3	1.3	5.3	.70	.80
14	.40	1.2	.10	0	0	0	1.9	8.6	1.9	4.2	.70	.80
15	.40	1.2	.10	0	0	0	1.9	9.6	27	3.6	.60	.80
16	.40	1.1	.10	0	0	0	2.2	8.4	14	3.5	.60	.80
17	.40	.90	0	0	0	0	2.2	13	5.4	3.6	.60	.80
18	.40	.80	0	0	0	0	2.1	15	5.2	3.2	.60	.70
19	.40	.80	0	0	0	0	2.0	23	2.3	6.9	.60	.70
20	.40	.80	0	0	0	0	1.9	19	1.9	6.0	.50	.80
21	.50	.80	0	0	0	0	1.9	10	2.4	5.1	.50	.70
22	.50	.90	0	0	0	0	1.9	9.5	2.5	4.2	.50	.70
23	.50	.80	0	0	0	40	1.9	10	17	3.6	.50	.70
24	.50	.80	0	0	0	80	2.2	7.7	17	3.4	.50	.70
25	.60	.80	0	0	0	50	2.1	5.9	9.8	3.6	.50	.70
26	.50	.80	0	0	0	65	2.2	4.6	6.4	4.1	.50	.70
27	.40	.70	0	0	0	75	2.2	4.0	4.8	3.9	.50	.80
28	.40	.60	0	0	0	55	2.3	3.2	4.0	3.4	.50	.80
29	.50	.50	0	0	0	40	2.4	4.8	3.5	2.8	.50	.80
30	.50	.40	0	0	0	20	2.2	9.5	3.1	2.6	.50	.80
31	.50	0	0	0	0	12	0	9.8	0	2.2	.50	0
TOTAL	14.70	24.30	2.80	0	0	439.0	96.2	202.8	166.9	179.2	23.60	20.40
MEAN	.47	.81	.090	0	0	14.2	3.21	6.54	5.56	5.78	.76	.68
MAX	.80	1.3	.40	0	0	80	10	23	27	18	2.0	.80
MIN	.40	.40	0	0	0	0	1.9	1.7	1.3	2.2	.50	.40
AC-FT	29	48	5.6	0	0	871	191	402	331	355	47	40

CAL YR 1961: TOTAL 276.60 MEAN .76 MAX 6.0 MIN 0 AC-FT 549  
WAT YR 1962: TOTAL 1,169.90 MEAN 3.21 MAX 80 MIN 0 AC-FT 2,320

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	.80	1.4	1.5	.10	0	0	3.9	4.5	2.9	1.5	6.1	.30
2	.80	1.3	1.4	.10	0	0	2.9	4.0	3.7	1.6	6.1	.30
3	.80	1.2	1.2	.10	0	0	2.8	3.5	2.7	1.7	3.4	.30
4	.90	1.2	1.9	.10	0	0	2.8	3.4	2.5	1.5	2.2	.30
5	.90	2.0	1.2	.10	0	1.0	3.9	3.3	2.3	1.4	1.6	.20
6	.90	1.8	1.2	.10	0	1.0	4.4	3.1	7.3	1.2	1.0	.20
7	.90	2.0	1.2	.10	0	1.0	4.9	3.2	9.3	1.1	.80	.10
8	1.0	2.1	1.2	.10	0	1.0	3.9	3.0	54	.90	.80	.10
9	1.0	1.9	1.1	.10	0	2.0	3.7	3.0	26	.80	.50	.10
10	1.0	1.8	1.0	.10	0	2.0	3.4	4.3	13	.60	.50	.10
11	1.0	1.7	.90	.10	0	2.0	3.1	4.8	11	.60	.60	.10
12	1.0	1.6	.80	.10	0	2.0	2.9	8.3	9.0	.70	.80	.10
13	.90	1.5	.80	.10	0	2.0	2.7	14	7.1	.50	.80	.20
14	1.0	1.5	.80	.10	0	2.0	2.7	9.6	5.2	.40	.70	.20
15	1.2	1.5	.80	0	0	4.0	3.0	6.5	4.1	.40	.60	.20
16	1.5	1.7	.90	0	0	4.0	3.6	5.3	3.3	.30	.50	.20
17	1.5	1.5	.90	0	0	4.0	4.1	5.0	2.6	.30	.40	.30
18	1.5	1.5	.90	0	0	.80	4.0	4.5	2.2	.20	.40	.40
19	1.2	1.5	.90	0	0	1.0	4.6	4.2	1.9	.20	.30	.40
20	1.2	1.4	.90	0	0	1.4	5.1	4.2	1.5	.20	.20	.50
21	1.2	1.3	.80	0	0	1.6	4.4	3.9	1.2	.10	.10	.50
22	1.2	1.2	.70	0	0	11	3.7	3.7	1.6	.10	.10	.40
23	1.2	1.2	.60	0	0	11	3.4	3.3	4.7	.10	.10	.50
24	1.2	1.3	.40	0	0	10	3.3	3.1	6.8	0	.10	.60
25	1.2	1.3	.20	0	0	9.0	3.2	2.9	4.8	.70	.20	.50
26	1.2	1.4	.10	0	0	7.8	3.1	2.9	3.4	11	.20	.50
27	1.2	1.5	.10	0	0	7.4	3.3	3.2	2.6	9.5	.30	.40
28	1.2	1.5	.10	0	0	7.1	4.7	2.8	2.1	3.9	.30	.50
29	1.2	1.5	.10	0	0	6.9	6.5	2.7	1.6	1.6	.30	.40
30	1.2	1.5	.10	0	0	5.8	5.6	2.6	1.6	1.5	.40	.40
31	1.2	0	.10	0	0	5.1	0	2.7	0	4.4	.30	0
TOTAL	34.20	45.8	24.80	1.40	0	88.90	113.6	135.5	201.8	49.00	30.50	9.30
MEAN	1.10	1.53	.80	.045	0	2.87	3.79	4.37	6.73	1.58	.98	.31
MAX	1.5	2.1	1.9	.10	0	11	6.5	14	54	11	6.1	.60
MIN	.80	1.2	.10	0	0	0	2.7	2.6	1.2	0	.10	.10
AC-FT	68	91	49	2.8	0	176	225	269	400	97	61	18

CAL YR 1962: TOTAL 1,232.90 MEAN 3.38 MAX 80 MIN 0 AC-FT 2,450  
WAT YR 1963: TOTAL 734.80 MEAN 2.01 MAX 54 MIN 0 AC-FT 1,460

5-0545. Sheyenne River above Harvey, N. Dak.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	.40	.80	1.0	0	.10	0	42	3.3	.80	2.8	.60	2.6
2	.50	.90	1.0	0	.10	0	33	3.3	.60	2.6	.50	1.9
3	.40	.90	.30	0	.10	0	34	13	.50	2.6	.30	1.4
4	.40	.90	.70	0	.10	0	26	17	.40	2.5	.30	1.1
5	.50	.90	.50	0	.10	0	16	6.1	.20	3.1	.20	.90
6	.50	.90	.50	0	.10	0	14	5.1	.40	2.8	.20	.80
7	.60	.90	.50	0	.10	0	14	5.1	.40	2.8	.10	.80
8	.50	.90	.50	0	.10	0	13	5.0	.83	2.3	.10	.70
9	.60	.90	.40	0	.10	.10	10	4.8	11	6.5	.10	.80
10	.60	.90	.30	0	0	.10	9.7	5.4	10	8.5	.10	.80
11	.60	.80	.30	0	0	.20	9.5	4.0	9.4	5.7	.20	.80
12	.50	.80	.20	0	0	.40	7.1	3.5	6.7	4.1	.20	.80
13	.60	.90	.10	0	0	.40	7.8	3.2	4.8	3.4	.20	.80
14	.60	1.1	0	0	0	.30	5.6	2.6	4.5	2.9	.20	.80
15	.60	1.1	0	0	0	.30	7.3	2.3	3.7	2.5	.20	.80
16	.70	1.1	0	0	0	.30	5.2	2.1	2.8	2.5	.20	.80
17	.70	1.1	0	0	0	.20	4.2	2.0	3.3	2.5	.20	1.0
18	.80	1.1	0	0	0	0	3.7	1.9	20	2.3	.20	1.0
19	.80	1.1	0	0	0	0	3.4	1.5	52	2.3	.20	.80
20	.80	1.2	0	0	0	0	3.0	1.4	25	2.2	.20	.90
21	2.1	1.0	0	0	0	0	3.0	1.4	18	1.9	1.6	.90
22	2.3	1.0	0	0	0	0	2.8	1.4	17	1.9	2.9	1.2
23	2.2	1.0	0	0	0	0	2.9	1.4	13	1.6	3.8	1.2
24	1.5	1.0	0	0	0	0	2.8	1.5	10	1.3	3.6	1.2
25	1.2	1.0	0	0	0	0	2.7	1.4	7.4	1.1	2.5	1.5
26	1.1	1.1	0	0	0	0	2.7	1.5	5.3	.90	1.9	7.4
27	.90	1.1	0	0	0	0	3.6	1.2	4.1	.80	1.4	8.3
28	.80	1.1	0	.10	0	0	4.7	.90	3.4	.80	1.4	5.2
29	.80	1.0	0	.10	0	0	4.1	.90	3.2	.70	1.4	3.2
30	.90	1.0	0	.10	-----	.10	3.4	.90	2.9	.60	2.0	2.3
31	.90	-----	0	.10	-----	.10	-----	.80	-----	.60	2.5	-----
TOTAL	26.40	29.50	6.80	0.40	0.90	2.50	301.2	105.90	249.10	79.10	29.50	52.70
MEAN	.85	.98	.22	.013	.031	.081	10.0	3.42	8.30	2.55	.95	1.70
MAX	2.3	1.2	1.0	.10	.10	.40	42	17	52	8.5	3.8	8.3
MIN	.40	.80	0	0	0	0	2.7	.80	.20	.60	.10	.70
AC-FT	52	59	13	.8	1.8	5.0	597	210	494	157	59	105

CAL YR 1963: TOTAL 692.70

MEAN 1.90

MAX 54

MIN 0

AC-FT 1,370

WAT YR 1964: TOTAL 884.00

MEAN 2.42

MAX 52

MIN 0

AC-FT 1,750

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	2.3	1.9	.60	0	0	0	0	5.2	2.8	3.1	1.1	.90
2	2.1	2.0	.90	0	0	0	.30	5.7	3.0	2.6	1.0	.90
3	2.1	1.9	.60	0	0	0	.40	5.8	3.1	2.7	.80	.90
4	1.7	1.9	.40	0	0	0	8.0	5.3	3.2	2.6	.80	1.4
5	1.4	1.9	.20	0	0	0	7.5	5.0	2.7	2.3	.70	1.1
6	1.4	1.9	.10	0	0	3.0	9.0	8.0	2.5	2.2	1.9	1.1
7	1.4	1.8	.10	0	0	10	35	7.7	2.3	2.1	1.9	1.3
8	1.4	1.7	.10	0	0	15	48	6.1	2.1	4.7	2.9	1.1
9	1.4	1.7	.10	0	0	26	90	7.0	1.7	4.2	2.7	1.2
10	1.3	1.8	.10	0	0	16	83	12	1.5	3.2	1.8	.90
11	1.3	1.9	.10	0	0	12	78	9.0	1.3	3.0	1.4	1.3
12	1.3	1.9	0	0	0	9.0	75	6.8	1.2	6.6	1.0	1.5
13	1.4	1.9	0	0	0	6.0	70	6.4	1.6	8.2	.80	1.6
14	1.4	1.9	0	0	0	3.0	75	5.9	2.5	7.1	.70	3.5
15	1.2	1.9	0	0	0	1.7	50	5.4	2.3	5.0	.60	3.9
16	1.1	1.8	0	0	0	.80	29	4.9	2.0	4.2	.50	5.3
17	1.1	1.7	0	0	0	.60	23	4.6	1.6	3.7	.50	5.6
18	1.1	1.4	0	0	0	.40	19	4.2	1.4	3.4	.60	4.5
19	1.1	1.7	0	0	0	.30	17	3.7	1.9	3.4	.60	3.1
20	1.1	1.6	0	0	0	.20	13	3.5	1.9	4.1	.50	2.4
21	1.2	1.6	0	0	0	.20	11	3.4	1.5	3.8	.50	1.9
22	1.2	1.5	0	0	0	.20	8.9	3.1	1.4	5.7	.50	2.4
23	1.3	1.0	0	0	0	.20	7.8	3.3	1.4	12	.50	3.4
24	1.3	1.0	0	0	0	.20	6.7	4.4	1.1	7.2	.50	3.7
25	1.3	2.2	0	0	0	.10	6.4	6.1	.90	4.4	.50	3.1
26	1.3	1.8	0	0	0	0	6.3	6.3	1.0	3.4	.60	2.4
27	1.3	1.2	0	0	0	0	6.1	5.9	1.3	2.7	.80	2.5
28	1.4	.60	0	0	0	0	5.7	4.9	1.2	2.1	.80	2.5
29	1.4	.60	0	0	-----	0	5.1	4.2	1.1	1.9	1.3	3.8
30	1.5	.60	0	0	-----	0	5.1	3.4	1.1	1.7	1.0	7.3
31	1.5	-----	0	0	-----	0	-----	3.1	-----	1.4	1.0	-----
TOTAL	43.3	48.30	3.00	0	0	104.90	799.80	170.3	54.60	124.7	30.80	76.50
MEAN	1.40	1.61	.097	0	0	3.38	26.7	5.49	1.82	4.02	.99	2.55
MAX	2.3	2.2	.60	0	0	26	90	12	3.2	12	2.9	7.3
MIN	1.1	.60	0	0	0	0	0	3.1	.90	1.4	.50	.90
AC-FT	86	96	6.0	0	0	208	1,590	338	108	247	61	152

CAL YR 1964: TOTAL 915.90

MEAN 2.50

MAX 52

MIN 0

AC-FT 1,820

WAT YR 1965: TOTAL 1,456.20

MEAN 3.99

MAX 90

MIN 0

AC-FT 2,890

## RED RIVER OF THE NORTH BASIN

5-0551. North Fork Sheyenne River near Wellsburg, N. Dak.

Location--Lat 47°52'34", long 99°43'05", at north line of sec.26, T.151 N., R.71 W., on right bank 7 ft downstream from bridge on county highway, 1 mile upstream from mouth, and 3½ miles northeast of Wellsburg.

Drainage area--693 sq mi, of which about 490 sq mi is probably noncontributing (includes 227 sq mi in closed basins).

Records available--September 1957 to September 1965.

Gage--Water-stage recorder. Altitude of gage is 1,455 ft (from topographic map).

Average discharge--8 years, 2.48 cfs (1,800 acre-ft per year).

Extremes--Maximums and minimums (discharge in cubic feet per second, gage height in feet).

Annual maximum discharge (\*) and peak discharges above base (25 cfs), water years 1961-65

Date	Time	Discharge	Gage height	Date	Time	Discharge	Gage height	Date	Time	Discharge	Gage height
Apr. 21, 1961	0800	* 1.7	1.92	Aug. 3, 1963	1830	* 32	3.52	Apr. 14, 1965	2400	57	2.92
Mar. 29, 1962	2100	* 51	2.75	Apr. 7, 1964	-	38	-	July 20, 1965	1030	a	5.82
May 23, 1962	0600	33	2.74	June 20, 1964	2200	* 51	3.64	July 23, 1965	0600	* 115	4.78

a Backwater from wind.

No flow for several months in each year.

1957-65: Maximum discharge, 216 cfs Apr. 2, 1960 (gage height, 3.39 ft); no flow for several months in each year.

Remarks--Records fair.

Revisions--WSP 1728: Drainage area.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	0	0	0	0	0	0	0	.80	0	0	0	0
2	0	0	0	0	0	0	0	.70	0	0	0	0
3	0	0	0	0	0	0	0	.60	0	0	0	0
4	0	0	0	0	0	0	0	.50	0	0	0	0
5	0	0	0	0	0	0	0	.50	0	0	0	0
6	0	0	0	0	0	0	0	.50	0	0	0	0
7	0	0	0	0	0	0	0	.60	0	0	0	0
8	0	0	0	0	0	0	0	.50	0	0	0	0
9	0	0	0	0	0	0	0	.50	0	0	0	0
10	0	0	0	0	0	0	0	.50	0	0	0	0
11	0	0	0	0	0	0	.10	.60	0	0	0	0
12	0	0	0	0	0	0	.30	.60	0	0	0	0
13	0	0	0	0	0	0	1.0	.60	0	0	0	0
14	0	0	0	0	0	0	1.2	.50	0	0	0	0
15	0	0	0	0	0	0	1.3	.40	0	0	0	0
16	0	0	0	0	0	0	1.3	.40	0	0	0	0
17	0	0	0	0	0	0	1.3	.30	0	0	0	0
18	0	0	0	0	0	0	1.4	.30	0	0	0	0
19	0	0	0	0	0	0	1.3	.20	0	0	0	0
20	0	0	0	0	0	0	1.4	.20	0	0	0	0
21	0	0	0	0	0	0	1.6	.20	0	0	0	0
22	0	0	0	0	0	0	1.5	.20	0	0	0	0
23	0	0	0	0	0	0	1.5	.10	0	0	0	0
24	0	0	0	0	0	0	1.5	.10	0	0	0	0
25	0	0	0	0	0	0	1.6	.10	0	0	0	0
26	0	0	0	0	0	0	1.4	.10	0	0	0	0
27	0	0	0	0	0	0	1.3	.10	0	0	0	0
28	0	0	0	0	0	0	1.2	0	0	0	0	0
29	0	0	0	0	0	0	1.0	0	0	0	0	0
30	0	0	0	0	0	0	.90	0	0	0	0	0
31	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	24.10	10.70	0	0	0	0
MEAN	0	0	0	0	0	0	.80	.35	0	0	0	0
MAX	0	0	0	0	0	0	1.6	.80	0	0	0	0
MIN	0	0	0	0	0	0	0	0	0	0	0	0
AC-FT	0	0	0	0	0	0	48	21	0	0	0	0
CAL YR 1960: TOTAL	1,639.60			MEAN 4.48	MAX 191	MIN 0	AC-FT 3,250					
WAT YR 1961: TOTAL	34.80			MEAN .095	MAX 1.6	MIN 0	AC-FT 69					

## 5-0551. North Fork Shesenne River near Wellsburg, N. Dak.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	0	0	0	0	0	0	35	.20	7.3	1.8	0	0
2	0	0	0	0	0	0	30	.20	6.9	1.5	0	0
3	0	0	0	0	0	0	25	.10	5.8	1.4	0	0
4	0	0	0	0	0	0	20	.10	5.3	2.6	0	0
5	0	0	0	0	0	0	15	.10	4.8	2.7	0	0
6	0	0	0	0	0	0	13	0	4.8	4.4	.10	0
7	0	0	0	0	0	0	19.1	0	5.3	4.2	0	0
8	0	0	0	0	0	0	10	0	5.8	3.7	0	0
9	0	0	0	0	0	0	5.8	0	5.8	3.1	0	0
10	0	0	0	0	0	0	5.0	0	5.8	2.5	0	0
11	0	0	0	0	0	0	4.2	0	5.8	1.8	.30	0
12	0	0	0	0	0	0	3.7	0	5.8	1.5	.40	0
13	0	0	0	0	0	0	3.5	0	5.5	1.2	.40	0
14	0	0	0	0	0	0	3.5	.20	5.3	.80	.30	0
15	0	0	0	0	0	0	3.5	.40	7.3	.60	.20	0
16	0	0	0	0	0	0	2.9	.50	6.5	.40	.20	0
17	0	0	0	0	0	0	2.6	1.2	5.8	.40	.20	0
18	0	0	0	0	0	0	2.4	2.5	5.5	.40	.10	0
19	0	0	0	0	0	0	2.1	12	5.0	.40	.10	0
20	0	0	0	0	0	0	1.8	26	4.8	.30	0	0
21	0	0	0	0	0	0	1.3	28	5.0	.20	0	0
22	0	0	0	0	0	0	1.0	31	4.2	.10	0	0
23	0	0	0	0	0	0	.80	32	3.8	.10	0	0
24	0	0	0	0	0	0	.60	26	3.5	0	0	0
25	0	0	0	0	0	0	.50	20	3.2	0	0	0
26	0	0	0	0	0	1.0	.50	14	2.9	0	0	0
27	0	0	0	0	0	23	.40	10	2.7	0	0	0
28	0	0	0	0	0	28	.40	7.3	2.5	0	0	0
29	0	0	0	0	0	46	.40	6.9	2.3	0	0	0
30	0	0	0	0	0	45	.30	8.7	2.0	0	0	0
31	0	0	0	0	0	40	0	7.3	0	0	0	0
TOTAL	0	0	0	0	0	183.0	204.30	234.70	147.0	36.10	2.30	0
MEAN	0	0	0	0	0	5.90	6.81	7.57	4.90	1.16	.076	0
MAX	0	0	0	0	0	46	35	32	7.3	4.4	.40	0
MIN	0	0	0	0	0	0	.30	0	2.0	0	0	0
AC-FT	0	0	0	0	0	363	405	466	292	72	4.6	0

CAL YR 1961: TOTAL 34.80

MEAN .095

MAX 1.6

MIN 0

AC-FT 69

WAT YR 1962: TOTAL 807.40

MEAN 2.21

MAX 46

MIN 0

AC-FT 1,600

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	0	0	0	0	0	0	.60	3.8	1.9	.50	29	.10
2	0	0	0	0	0	0	.60	3.5	1.4	.40	30	0
3	0	0	0	0	0	0	.60	3.2	1.2	.30	31	0
4	0	0	0	0	0	0	.60	3.1	1.0	.20	31	0
5	0	0	0	0	0	0	1.3	2.9	.80	.10	30	0
6	0	0	0	0	0	0	1.8	2.7	.80	.10	29	0
7	0	0	0	0	0	0	3.0	2.4	.60	0	27	0
8	0	0	0	0	0	0	5.3	2.1	.60	0	26	0
9	0	0	0	0	0	0	6.1	2.1	.90	0	24	0
10	0	0	0	0	0	0	6.1	2.1	1.0	0	21	0
11	0	0	0	0	0	0	5.7	2.3	1.0	0	19	0
12	0	0	0	0	0	0	4.7	3.2	1.0	0	16	0
13	0	0	0	0	0	0	4.3	4.3	1.0	0	13	0
14	0	0	0	0	0	0	4.3	5.5	1.0	0	10	0
15	0	0	0	0	0	0	4.9	7.2	1.0	0	8.1	0
16	0	0	0	0	0	0	5.1	8.1	.90	0	6.1	0
17	0	0	0	0	0	0	5.3	7.2	.80	0	4.9	0
18	0	0	0	0	0	0	5.7	6.3	.70	0	3.6	0
19	0	0	0	0	0	0	5.9	5.7	.60	0	2.8	0
20	0	0	0	0	0	0	5.9	5.3	.50	0	2.0	0
21	0	0	0	0	0	0	5.7	5.3	.40	0	1.5	0
22	0	0	0	0	0	.10	5.3	4.7	.30	0	1.2	0
23	0	0	0	0	0	.10	5.1	4.5	.50	0	.80	0
24	0	0	0	0	0	.10	4.5	4.3	.60	0	.50	0
25	0	0	0	0	0	.10	4.0	4.2	.60	0	.40	0
26	0	0	0	0	0	.10	3.6	4.0	.70	0	.30	0
27	0	0	0	0	0	0	3.5	3.6	.60	0	.20	0
28	0	0	0	0	0	0	3.6	3.2	.60	7.8	.20	0
29	0	0	0	0	0	0	3.8	2.9	.60	25	.10	0
30	0	0	0	0	0	.20	3.6	2.5	.60	28	.10	0
31	0	0	0	0	0	.70	0	2.1	0	29	.10	0
TOTAL	0	0	0	0	0	1.40	120.50	124.3	24.20	91.40	368.90	0.10
MEAN	0	0	0	0	0	.045	4.02	4.01	.81	2.95	11.9	.003
MAX	0	0	0	0	0	.70	6.1	8.1	1.9	29	31	.10
MIN	0	0	0	0	0	0	.60	2.1	.30	0	.10	0
AC-FT	0	0	0	0	0	2.8	239	247	48	181	732	.2

CAL YR 1962: TOTAL 807.40

MEAN 2.21

MAX 46

MIN 0

AC-FT 1,600

WAT YR 1963: TOTAL 730.80

MEAN 2.00

MAX 31

MIN 0

AC-FT 1,450



Location.--Lat 47°55'10", long 99°34'47", on north line of sec.11, T.151 N., R.70 W., on downstream wingwall of county highway bridge, 2 miles upstream from mouth and 3½ miles southwest of Maddock.

Annual maximum discharge (*) and peak discharges above base (20 cfs), water years 1961-65											
Date	Time	Discharge	Gage height	Date	Time	Discharge	Gage height	Date	Time	Discharge	Gage height
Mar. 15, 1961	1900	* 145	2.15	July 27, 1963	1430	* 104	1.94	Apr. 8, 1965	0400	* 99	5.95
				Aug. 2, 1963	0330	79	1.79	July 19, 1965	1630	33	4.82
Mar. 26, 1962	0700	* 209	2.27					July 22, 1965	1820	11	5.84
Apr. 5, 1962	2000	28	1.28	Apr. 2, 1964	-	140	-				
May 20, 1962	0200	40	1.45	June 18, 1964	2300	* 159	2.45				

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961												
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	0	0	0	0	0	0	.20	.10	0	0	0	0
2	0	0	0	0	0	0	.20	.10	0	0	0	0
3	0	0	0	0	0	0	.20	.10	0	0	0	0
4	0	0	0	0	0	0	.30	.10	0	0	0	0
5	0	0	0	0	0	0	.20	.10	0	0	0	0
6	0	0	0	0	0	0	.20	.20	0	0	0	0
7	0	0	0	0	0	0	.20	.10	0	0	0	0
8	0	0	0	0	0	0	.20	.10	0	0	0	0
9	0	0	0	0	0	0	.20	.10	0	0	0	0
10	0	0	0	0	0	0	.20	.10	0	0	0	0
11	0	0	0	0	0	0	.20	.10	0	0	0	0
12	0	0	0	0	0	0	.20	.10	0	0	0	0
13	0	0	0	0	0	0	.20	.10	0	0	0	0
14	0	0	0	0	0	6.1	.20	.10	0	0	0	0
15	0	0	0	0	0	53	.20	.10	0	0	0	0
16	0	0	0	0	0	18	.20	.10	0	0	0	0
17	0	0	0	0	0	9.4	.10	.10	0	0	0	0
18	0	0	0	0	0	12	.10	.10	0	0	0	0
19	0	0	0	0	0	7.4	.10	.10	0	0	0	0
20	0	0	0	0	0	5.8	.20	.10	0	0	0	0
21	0	0	0	0	0	5.4	.10	.10	0	0	0	0
22	0	0	0	0	0	3.4	.10	.10	0	0	0	0
23	0	0	0	0	0	2.3	.10	0	0	0	0	0
24	0	0	0	0	0	1.8	.10	0	0	0	0	0
25	0	0	0	0	0	1.3	.10	0	0	0	0	0
26	0	0	0	0	0	1.0	.10	0	0	0	0	0
27	0	0	0	0	0	.70	.10	0	0	0	0	0
28	0	0	0	0	0	.60	.10	0	0	0	0	0
29	0	0	0	0	-----	.50	.10	0	0	0	0	0
30	0	0	0	0	-----	.40	.10	0	0	0	0	0
31	0	-----	0	0	-----	.20	-----	0	-----	0	0	-----
TOTAL	0	0	0	0	0	129.30	4.80	2.30	0	0	0	0
MEAN	0	0	0	0	0	4.17	.16	.074	0	0	0	0
MAX	0	0	0	0	0	53	.30	.20	0	0	0	0
MIN	0	0	0	0	0	0	.10	0	0	0	0	0
AC-FT	0	0	0	0	0	256	9.5	4.6	0	0	0	0

CAL YR 1960: TOTAL	1,701.10	MEAN	4.65	MAX	203	MIN	0	AC-FT	3,370
WAT YR 1961: TOTAL	136.40	MEAN	.37	MAX	53	MIN	0	AC-FT	271

## 5-0552. Big Coulee near Maddock, N. Dak.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962											
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	SEPT.
1	0	0	0	0	0	0	14	0	4.9	.10	0
2	0	0	0	0	0	0	13	0	4.4	.10	0
3	0	0	0	0	0	0	13	0	3.7	.40	0
4	0	0	0	0	0	0	15	0	2.9	.70	0
5	0	0	0	0	0	0	22	0	2.6	.60	0
6	0	0	0	0	0	0	22	0	1.9	.90	0
7	0	0	0	0	0	0	14	0	1.7	.50	0
8	0	0	0	0	0	0	6.7	0	1.4	.20	0
9	0	0	0	0	0	0	6.9	0	1.4	.10	0
10	0	0	0	0	0	0	4.0	0	2.0	.10	0
11	0	0	0	0	0	0	3.1	0	1.9	.10	0
12	0	0	0	0	0	0	2.7	0	1.6	.10	0
13	0	0	0	0	0	0	2.2	0	1.4	.10	0
14	0	0	0	0	0	0	1.4	0	1.1	.10	0
15	0	0	0	0	0	0	1.1	0	1.9	0	0
16	0	0	0	0	0	0	.70	0	1.9	0	0
17	0	0	0	0	0	0	.40	.20	2.0	0	0
18	0	0	0	0	0	0	.20	6.0	1.9	0	0
19	0	0	0	0	0	0	.10	20	1.3	0	0
20	0	0	0	0	0	0	.10	26	1.2	0	0
21	0	0	0	0	0	0	.10	14	1.1	0	0
22	0	0	0	0	0	0	0	9.8	.60	0	0
23	0	0	0	0	0	0	0	9.2	.50	0	0
24	0	0	0	0	0	1.0	0	8.6	.40	0	0
25	0	0	0	0	0	35	0	6.7	.30	0	0
26	0	0	0	0	0	142	0	4.6	.30	0	0
27	0	0	0	0	0	106	0	3.5	.20	0	0
28	0	0	0	0	0	66	0	2.9	.10	0	0
29	0	0	0	0	-----	38	0	4.0	.10	0	0
30	0	0	0	0	-----	24	0	4.6	.10	0	0
31	0	-----	0	0	-----	23	0	4.4	-----	0	-----
TOTAL	0	0	0	0	0	435.0	142.70	124.50	46.80	4.00	0
MEAN	0	0	0	0	0	14.0	4.76	4.02	1.56	.13	0
MAX	0	0	0	0	0	142	22	26	4.9	.90	0
MIN	0	0	0	0	0	0	0	0	.10	0	0
AC-FT	0	0	0	0	0	863	283	247	93	7.9	0
CAL YR 1961: TOTAL	136.40					MEAN .37					
WAT YR 1962: TOTAL	753.00					MEAN 2.06					
						MAX 53					
						MIN 0					
						AC-FT 271					
						AC-FT 1,490					

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963											
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	SEPT.
1	0	0	0	0	0	0	0	0	.30	.10	32
2	0	0	0	0	0	0	0	0	.30	.10	48
3	0	0	0	0	0	0	0	0	.40	.10	18
4	0	0	0	0	0	0	0	0	.30	.10	9.4
5	0	0	0	0	0	0	0	0	.30	.10	5.3
6	0	0	0	0	0	0	0	0	.30	.10	4.2
7	0	0	0	0	0	0	.80	0	.20	.10	3.0
8	0	0	0	0	0	0	2.6	0	.30	.10	2.3
9	0	0	0	0	0	0	2.1	0	.40	0	1.6
10	0	0	0	0	0	0	2.0	0	.30	0	1.2
11	0	0	0	0	0	0	1.8	0	.20	0	.90
12	0	0	0	0	0	0	1.2	.10	.40	0	.50
13	0	0	0	0	0	0	.60	.30	.80	0	.40
14	0	0	0	0	0	0	.20	1.6	1.3	0	.20
15	0	0	0	0	0	0	.10	2.3	2.1	0	.20
16	0	0	0	0	0	0	.10	2.4	1.5	0	.20
17	0	0	0	0	0	0	0	1.8	.50	0	.10
18	0	0	0	0	0	0	0	5.5	.40	0	.10
19	0	0	0	0	0	0	0	6.4	.30	0	.10
20	0	0	0	0	0	0	0	4.4	.30	0	.10
21	0	0	0	0	0	0	0	3.1	.30	0	0
22	0	0	0	0	0	0	0	2.4	.40	0	0
23	0	0	0	0	0	.10	0	1.0	.80	0	0
24	0	0	0	0	0	.20	0	.90	.30	0	0
25	0	0	0	0	0	.60	0	.80	.40	0	0
26	0	0	0	0	0	1.6	0	.60	.30	16	0
27	0	0	0	0	0	1.3	0	.60	.20	88	0
28	0	0	0	0	0	.80	0	.40	.30	91	0
29	0	0	0	0	-----	.20	0	.40	.30	79	0
30	0	0	0	0	-----	0	0	.40	.20	58	0
31	0	-----	0	0	-----	0	-----	.30	-----	40	-----
TOTAL	0	0	0	0	0	4.80	11.50	35.70	14.20	372.80	127.90
MEAN	0	0	0	0	0	.15	.38	1.15	.47	12.0	4.13
MAX	0	0	0	0	0	1.6	2.6	6.4	2.1	91	48
MIN	0	0	0	0	0	0	0	0	.20	0	0
AC-FT	0	0	0	0	0	9.5	23	71	28	739	254
CAL YR 1962: TOTAL	753.00					MEAN 2.06					
WAT YR 1963: TOTAL	566.90					MEAN 1.55					
						MAX 91					
						MIN 0					
						AC-FT 1,490					
						AC-FT 1,120					

5-0552. Big Coulee near Maddock, N. Dak.--Continued

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	0	0	0	0	0	0	15	.60	.10	7.4	0	0
2	0	0	0	0	0	0	90	.60	0	6.7	0	0
3	0	0	0	0	0	0	110	3.0	0	4.8	0	0
4	0	0	0	0	0	0	70	3.8	0	3.8	0	0
5	0	0	0	0	0	0	28	4.2	0	6.9	0	0
6	0	0	0	0	0	0	21	4.8	0	5.3	0	0
7	0	0	0	0	0	0	21	4.2	0	4.5	0	0
8	0	0	0	0	0	0	26	3.8	.50	3.1	0	0
9	0	0	0	0	0	0	24	3.3	.20	2.3	0	0
10	0	0	0	0	0	0	21	2.3	.10	1.8	0	0
11	0	0	0	0	0	.10	15	2.6	.10	1.3	0	0
12	0	0	0	0	0	.10	13	1.5	.60	1.0	0	0
13	0	0	0	0	0	.10	13	1.3	1.5	.90	0	0
14	0	0	0	0	0	.20	11	.90	4.0	.60	0	0
15	0	0	0	0	0	.20	9.1	.60	3.1	.40	0	0
16	0	0	0	0	0	.20	6.7	.60	2.4	.40	0	0
17	0	0	0	0	0	.20	5.1	.60	3.8	.20	0	0
18	0	0	0	0	0	.20	3.5	.50	52	.10	0	0
19	0	0	0	0	0	.20	3.0	.40	114	.10	0	0
20	0	0	0	0	0	.10	2.4	.40	59	.10	0	0
21	0	0	0	0	0	.10	2.0	.40	38	.20	0	0
22	0	0	0	0	0	.10	.80	.40	29	.10	0	0
23	0	0	0	0	0	.10	1.0	.30	26	.10	0	0
24	0	0	0	0	0	.10	1.0	.20	22	.10	0	0
25	0	0	0	0	0	0	1.2	.20	18	0	0	0
26	0	0	0	0	0	0	1.2	.10	14	0	0	0
27	0	0	0	0	0	0	1.0	.10	11	0	0	0
28	0	0	0	0	0	0	1.2	.10	8.8	0	0	0
29	0	0	0	0	0	0	.60	.10	8.1	0	0	0
30	0	0	0	0	0	0	.60	.10	7.4	0	0	0
31	0	0	0	0	0	0	0	.10	0	0	0	0
TOTAL	0	0	0	0	0	2.00	518.40	42.10	423.70	52.30	0	0
MEAN	0	0	0	0	0	.065	17.3	1.36	14.1	1.69	0	0
MAX	0	0	0	0	0	.20	110	4.8	114	7.4	0	0
MIN	0	0	0	0	0	0	.60	.10	0	0	0	0
AC-FT	0	0	0	0	0	4.0	1,030	84	840	104	0	0

CAL YR 1963: TOTAL 566.90

MEAN 1.55

MAX 91

MIN 0

AC-FT 1,120

WAT YR 1964: TOTAL 1,038.50

MEAN 2.84

MAX 114

MIN 0

AC-FT 2,060

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	0	0	0	0	0	0	0	2.0	1.9	1.0	7.4	1.1
2	0	0	0	0	0	0	.60	2.0	2.1	.90	6.9	1.0
3	0	0	0	0	0	0	.40	1.8	2.0	.50	7.8	.90
4	0	0	0	0	0	0	.40	2.0	1.8	1.4	7.4	1.2
5	0	0	0	0	0	0	.40	2.8	1.9	1.8	7.0	1.0
6	0	0	0	0	0	0	.50	2.8	2.0	1.2	8.4	.90
7	0	0	0	0	.20	25	2.6	1.8	1.1	1.1	8.0	.90
8	0	0	0	0	.30	85	2.6	1.1	1.1	1.1	7.2	.80
9	0	0	0	0	2.0	78	8.4	.90	.90	7.0	.80	.80
10	0	0	0	0	15	46	8.0	.90	.70	6.7	.80	.80
11	0	0	0	0	0	8.0	55	4.0	.80	.80	6.3	1.2
12	0	0	0	0	0	6.0	59	2.3	.80	3.3	6.1	1.4
13	0	0	0	0	0	4.0	49	2.0	1.0	1.4	5.7	1.4
14	0	0	0	0	0	3.0	31	1.7	1.4	1.0	4.8	1.8
15	0	0	0	0	0	2.5	19	1.7	1.5	.80	4.3	1.8
16	0	0	0	0	0	2.0	14	1.6	1.5	.60	4.0	2.1
17	0	0	0	0	0	1.5	12	1.6	1.7	.60	3.6	2.4
18	0	0	0	0	0	1.0	9.7	1.8	1.2	.60	3.1	6.7
19	0	0	0	0	0	.50	8.6	1.8	.90	7.8	3.9	7.4
20	0	0	0	0	0	.20	7.2	1.8	.60	12	2.8	6.1
21	0	0	0	0	0	0	6.5	1.8	.50	6.5	1.2	5.0
22	0	0	0	0	0	0	6.1	1.8	.60	17	1.0	5.2
23	0	0	0	0	0	0	6.1	1.8	.60	34	.80	6.1
24	0	0	0	0	0	0	3.8	1.7	.50	49	.90	5.9
25	0	0	0	0	0	0	2.6	1.7	.30	36	1.3	7.8
26	0	0	0	0	0	0	2.6	2.1	.40	24	1.1	7.2
27	0	0	0	0	0	0	2.6	2.0	.50	18	1.1	7.6
28	0	0	0	0	0	0	2.3	1.8	.30	16	1.1	7.4
29	0	0	0	0	0	0	2.4	1.7	.30	14	1.4	7.8
30	0	0	0	0	0	0	2.3	1.7	.20	11	1.2	7.6
31	0	0	0	0	0	0	0	1.8	0	9.1	1.1	0
TOTAL	0	0	0	0	0	46.20	538.10	75.2	32.00	274.10	130.60	109.50
MEAN	0	0	0	0	0	1.49	17.9	2.43	1.07	8.84	4.21	3.65
MAX	0	0	0	0	0	15	85	8.4	2.1	45	8.4	7.8
MIN	0	0	0	0	0	0	0	1.6	.20	.50	.80	.80
AC-FT	0	0	0	0	0	92	1,070	149	63	544	259	217

CAL YR 1964: TOTAL 1,038.50

MEAN 2.84

MAX 114

MIN 0

AC-FT 2,060

WAT YR 1965: TOTAL 1,205.70

MEAN 3.30

MAX 85

MIN 0

AC-FT 2,390

5-0560. Sheyenne River near Warwick, N. Dak.

Location.--Lat 47°48'20", long 98°42'57", on south quarter of line between secs.15 and 16, T.150 N., R.63 W., on left bank on downstream side of highway bridge, 3.3 miles south of Warwick.

Drainage area.--2,070 sq mi, approximately, of which about 1,310 sq mi is probably noncontributing, (includes 227 sq mi in closed basins).

Records available.--October 1949 to September 1965. Monthly discharge only for some periods, published in WSP 1308.

Gage.--Water-stage recorder and rubble masonry control. Altitude of gage is 1,370 ft (by barometer).

Average discharge.--16 years, 46.3 cfs (33,520 acre-ft per year); median of yearly mean discharges, 33 cfs (23,900 acre-ft per year).

Extremes.--Maximums and minimums (discharge in cubic feet per second, gage height in feet).

Annual maximum discharge (\*) and peak discharges above base (200 cfs), water years 1961-65

Date	Time	Discharge	Gage height	Date	Time	Discharge	Gage height	Date	Time	Discharge	Gage height
Mar. 26, 1961	-	* 81	2.55	June 18, 1962	1000	242	3.03	Apr. 12, 1965	2000	* 1,000	4.64
Apr. 1, 1962	2000	* 436	3.50	June 25, 1963	0900	* 116	2.68	July 29, 1965	0200	643	3.83
Apr. 7, 1962	0600	392	3.41	Apr. 9, 1964	2400	* 247	3.13				

Annual minimum discharge, water years 1961-65

Water year	Date	Discharge	Gage height	Water year	Date	Discharge	Gage height
1961	(a)	0	-	1964	Oct. 10, 1963,	0.30	b 2.06
1962	Oct. 1, 1961	.30	2.02	Feb. 24, 1964			
1963	Feb. 7, 1963	.50	2.03	1965	Jan. 11, 12, 1965	1.3	-

a Aug. 7 to Sept. 1, Sept. 3-9, 1961.  
b Occurred Feb. 24, 1964.

1949-65: Maximum discharge and date (corrected), 4,250 cfs Apr. 18, 1956 (gage height, 7.83 ft); no flow Aug. 7 to Sept. 1, Sept. 3-9, 1961.

Note.--The maximum discharge and date have been inadvertently published in error since water year 1956.

Remarks.--Records good above 10 cfs and fair below. Records include flow of spring which enters below gage and just above control. Records of chemical analyses and water temperatures for the water years 1961-65 are published in reports of the Geological Survey.

Revisions (water years).--WSP 1438: 1952(M). WSP 1728: Drainage area.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	1.0	2.1	.50	.70	.70	2.1	40	13	5.4	2.5	1.0	0
2	.70	2.5	.50	.70	.70	2.5	39	11	3.5	1.0	.70	.10
3	1.0	2.5	.50	.70	.70	2.5	35	8.8	4.1	.30	.50	0
4	1.0	2.1	.50	.70	.70	2.5	37	7.9	3.5	.40	.20	0
5	1.0	1.7	1.0	.70	.70	3.0	35	8.8	2.5	.50	.20	0
6	.70	1.3	1.0	1.0	.70	3.5	35	12	2.5	.50	.20	0
7	1.0	1.3	.70	1.0	.70	4.1	35	16	2.1	.30	0	0
8	1.3	1.3	.70	1.0	.70	4.8	37	17	2.5	.50	0	0
9	1.7	.70	.70	.70	.70	4.1	39	24	2.1	.50	0	0
10	2.5	1.0	.70	.70	.70	4.1	42	25	2.5	.70	0	.30
11	3.0	1.0	1.0	.70	.70	4.1	40	22	2.5	1.0	0	1.0
12	4.8	1.0	1.0	.70	.70	4.1	37	17	2.1	1.7	0	1.0
13	2.5	1.0	1.0	.70	.70	6.1	37	15	1.7	3.0	0	1.3
14	1.7	1.0	1.0	.70	.70	7.0	34	17	1.3	4.8	0	1.3
15	1.7	1.0	1.0	.50	.50	6.1	26	17	1.7	3.5	0	.70
16	1.3	1.3	1.0	.50	.70	5.4	25	16	1.7	2.5	0	.50
17	1.0	1.3	1.0	.50	.70	7.0	26	15	1.7	2.5	0	.30
18	1.0	1.3	1.0	.70	.70	8.8	24	15	1.3	2.1	0	.30
19	1.0	1.3	1.0	.70	.70	9.8	22	15	1.0	1.3	0	1.0
20	1.0	1.3	1.0	.70	.70	13	24	15	.70	1.3	0	2.5
21	1.0	1.3	.70	.70	1.0	22	25	15	.70	1.7	0	1.7
22	1.0	1.0	.50	.70	1.3	42	30	15	.70	2.5	0	1.3
23	.70	1.0	.50	.70	1.5	53	35	15	.70	1.7	0	1.0
24	1.0	1.0	.70	1.0	1.5	60	34	13	.70	1.3	0	1.3
25	1.0	1.0	.70	.70	1.5	70	25	12	.50	1.0	0	1.0
26	1.3	1.3	.70	.70	2.1	81	21	12	.30	.70	0	1.0
27	2.1	1.3	.70	.70	2.1	73	25	11	.20	.70	0	1.3
28	1.7	1.0	.50	.70	2.1	60	35	7.9	.10	.70	0	.50
29	2.1	.70	.50	1.0	-----	58	26	6.1	.10	1.3	0	1.3
30	2.5	.70	.70	.70	-----	53	19	5.4	2.1	1.3	0	.50
31	2.1	-----	.70	.50	-----	42	-----	4.8	-----	1.3	0	-----
TOTAL	47.40	38.30	23.70	22.40	26.90	718.6	944	424.7	52.50	45.00	2.80	21.20
MEAN	1.53	1.28	.76	.72	.96	23.2	31.5	13.7	1.75	1.45	.090	.71
MAX	4.8	2.5	1.0	1.0	2.1	81	42	25	5.4	4.8	1.0	2.5
MIN	.70	.70	.50	.50	.50	2.1	19	4.8	.10	.30	0	0
AC-FT	94	76	47	44	53	1,430	1,870	842	104	89	5.6	42

CAL YR 1960: TOTAL 18,155.90 MEAN 49.6 MAX 1,430 MIN .10 AC-FT 36,010  
MAY YR 1961: TOTAL 2,367.50 MEAN 6.49 MAX 81 MIN 0 AC-FT 4,700

5-0560. Sheyenne River near Warwick, N. Dak.--Continued

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	.50	1.0	2.1	2.1	1.3	1.3	406	14	116	25	26	15
2	.70	1.7	1.7	2.1	1.3	1.0	354	17	101	25	16	1.3
3	.70	1.0	1.7	2.1	1.3	1.3	247	17	81	25	25	7.9
4	1.0	.70	2.1	2.1	1.3	1.3	207	16	65	28	17	5.4
5	.70	1.0	2.1	2.1	1.3	1.0	251	13	56	22	16	4.1
6	.70	1.3	2.1	1.7	1.3	1.0	330	12	46	32	15	4.8
7	.70	1.3	2.5	1.7	1.3	1.3	378	12	49	35	17	4.8
8	1.3	1.7	2.1	1.7	1.3	1.0	285	13	49	34	19	12
9	2.1	1.7	2.5	1.7	1.3	1.0	191	13	51	32	19	7.0
10	3.0	1.7	2.1	1.7	1.3	1.0	145	12	44	29	19	6.1
11	3.0	2.1	2.1	1.7	1.3	1.3	116	12	37	24	20	4.8
12	2.5	2.1	2.1	1.7	1.3	1.3	104	12	35	21	16	6.1
13	2.1	2.5	1.7	1.7	1.3	1.3	84	12	34	19	13	8.8
14	2.5	2.5	1.7	1.7	1.3	1.3	70	19	32	15	16	12
15	2.5	3.0	1.7	1.7	1.3	1.3	58	26	87	13	16	11
16	3.0	3.5	2.1	1.7	1.3	1.3	56	35	140	11	15	8.8
17	2.5	4.1	2.1	1.3	1.3	1.3	51	44	218	12	13	5.4
18	1.3	3.0	2.1	1.3	1.3	1.3	51	42	238	16	13	3.5
19	1.3	3.0	2.1	1.3	1.3	1.3	46	101	214	17	12	3.0
20	1.3	3.0	2.1	1.3	1.3	1.3	40	110	176	19	11	3.5
21	1.3	3.0	2.1	1.3	1.3	1.3	35	107	138	20	9.8	4.1
22	2.1	3.0	2.5	1.3	1.3	1.3	32	104	107	25	13	5.4
23	1.3	3.0	2.5	1.3	1.3	1.3	25	104	84	19	24	6.1
24	1.0	3.0	2.1	1.0	1.3	1.7	22	116	70	20	20	7.0
25	1.3	3.0	2.1	1.3	1.3	2.1	22	142	60	22	25	7.9
26	1.0	3.0	2.5	1.3	1.3	4.1	22	138	53	21	12	3.5
27	1.3	3.0	2.1	1.3	1.3	15	20	122	46	21	11	3.0
28	1.3	3.0	2.1	1.3	1.3	42	19	110	40	25	11	3.0
29	1.3	3.0	2.1	1.3	1.3	61	19	110	35	24	10	3.0
30	1.7	2.5	2.1	1.3	1.3	199	17	116	30	26	7.9	4.1
31	1.3	-----	2.1	1.3	-----	363	-----	119	-----	28	11	-----
TOTAL	48.30	71.40	65.1	48.4	36.4	715.7	3,703	1,842	2,532	705	488.7	198.1
MEAN	1.56	2.38	2.10	1.56	1.30	23.1	123	59.4	84.4	22.7	15.8	6.60
MAX	3.0	4.1	2.5	2.1	1.3	363	406	162	238	35	26	15
MIN	.50	.70	1.7	1.0	1.3	1.0	17	12	30	11	7.9	3.0
AC-FT	96	142	129	96	72	1,420	7,340	3,650	5,020	1,400	969	393

CAL YR 1961: TOTAL 2,442.90 MEAN 6.69 MAX 81 MIN 0 AC-FT 4,250

WAT YR 1962: TOTAL 10,454.10 MEAN 28.6 MAX 406 MIN .50 AC-FT 20,740

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	6.1	4.8	7.9	2.1	1.3	1.3	51	25	20	19	2.5	3.4
2	7.0	4.8	7.9	2.1	1.3	1.3	35	28	20	16	3.0	3.5
3	7.9	4.8	7.0	2.1	1.3	1.3	28	25	17	15	2.1	2.1
4	8.8	4.8	7.0	3.0	1.3	1.3	30	25	16	15	2.1	2.1
5	8.8	5.4	6.1	3.5	1.3	1.3	44	25	15	15	1.7	2.1
6	7.9	7.0	5.4	3.5	1.3	1.7	51	19	17	13	1.3	2.1
7	7.0	7.0	6.1	3.5	1.3	1.7	56	17	19	13	1.7	2.1
8	7.9	7.9	5.4	3.5	1.3	1.7	46	17	19	13	1.7	1.7
9	7.0	7.9	5.4	3.5	1.3	1.7	37	17	26	11	1.7	1.7
10	5.4	7.9	5.4	3.5	1.7	1.3	35	20	24	9.8	1.7	1.3
11	5.4	7.9	4.8	3.0	1.7	2.5	28	20	19	8.8	1.7	1.3
12	4.8	8.8	4.1	3.0	1.3	2.1	32	19	15	7.9	1.3	1.3
13	4.8	7.9	4.1	2.5	1.3	1.7	25	24	15	7.0	1.0	1.3
14	5.4	7.0	4.1	2.1	1.7	1.3	26	25	16	5.4	1.0	1.3
15	6.1	6.1	3.5	2.1	1.7	2.5	26	37	19	4.8	1.0	2.1
16	3.5	6.1	4.1	1.7	1.7	2.5	28	37	17	4.1	1.0	1.3
17	3.0	5.4	4.1	1.7	1.7	1.7	28	25	12	3.5	1.0	1.7
18	3.5	5.4	4.8	1.3	1.7	8.0	40	22	13	3.0	1.3	1.3
19	3.5	5.4	4.8	1.7	1.7	20	37	22	9.8	2.5	10	1.7
20	9.8	5.4	4.8	1.7	2.1	26	28	22	11	2.1	16	1.7
21	12	4.8	4.8	1.3	2.1	34	28	20	9.8	1.7	15	1.3
22	7.9	4.1	4.8	1.7	1.7	42	30	21	7.9	1.3	8.8	1.3
23	5.4	4.8	4.1	1.5	1.7	42	20	20	7.0	1.0	7.9	1.3
24	5.4	5.4	3.5	1.4	1.7	42	22	20	6.1	.77	6.1	1.7
25	5.4	6.1	3.5	1.4	1.7	37	22	20	83	1.3	5.4	2.1
26	5.4	6.1	3.0	1.3	1.0	35	22	21	90	4.8	3.0	1.3
27	5.4	6.1	3.0	1.3	1.3	37	21	60	4.1	2.5	1.3	1.3
28	4.8	6.1	3.0	1.3	1.3	40	24	21	39	4.1	2.1	1.3
29	4.8	7.9	2.5	1.3	-----	46	25	20	26	3.5	1.7	1.3
30	4.1	9.8	2.1	1.3	-----	44	26	19	22	2.1	1.7	1.3
31	4.8	-----	2.1	1.3	-----	49	-----	19	-----	2.1	1.7	-----
TOTAL	189.0	188.9	143.2	66.2	42.5	530.9	960	693	690.6	215.6	110.7	51.3
MEAN	6.10	6.30	4.62	2.14	1.52	17.1	32.0	22.4	23.0	6.95	3.57	1.71
MAX	12	9.8	7.9	3.5	2.1	49	56	37	90	19	16	3.5
MIN	3.0	4.1	2.1	1.3	1.0	1.3	22	17	6.1	.77	1.0	1.3
AC-FT	375	375	284	131	84	1,050	1,900	1,370	1,370	421	220	102

CAL YR 1962: TOTAL 10,790.4 MEAN 29.6 MAX 406 MIN 1.0 AC-FT 21,400

WAT YR 1963: TOTAL 3,881.90 MEAN 10.6 MAX 90 MIN .70 AC-FT 7,700

5-0560. Sheyenne River near Warwick, N. Dak.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964											
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	SEPT.
1	1.7	1.0	1.3	.70	1.3	1.7	3.0	32	3.5	73	6.1
2	1.3	1.3	1.3	1.0	1.3	2.1	8.8	28	3.0	63	7.0
3	1.3	1.3	1.3	1.0	1.7	2.1	12	32	2.1	56	7.0
4	1.3	1.3	1.3	1.3	1.7	1.7	20	35	2.5	44	15
5	1.0	1.7	1.0	1.3	1.0	1.3	35	37	4.8	39	8.8
6	1.0	1.7	1.0	1.3	1.0	1.7	35	63	5.4	34	7.0
7	.70	1.7	1.3	1.0	1.0	1.7	39	92	7.9	30	6.1
8	.70	2.1	1.3	1.0	1.0	1.3	116	70	17	26	6.1
9	1.0	2.1	1.0	1.3	1.0	1.7	218	60	28	25	6.1
10	.70	2.1	1.0	1.3	1.0	1.7	226	49	39	22	4.8
11	1.0	2.1	1.0	1.3	1.0	1.3	203	40	60	20	2.1
12	1.3	1.7	1.0	1.0	1.0	1.7	191	46	135	16	3.5
13	1.3	1.7	1.0	1.0	1.3	2.1	188	46	104	13	4.8
14	1.3	1.7	1.0	1.3	1.3	1.3	184	44	53	12	4.8
15	.70	1.7	1.0	1.3	1.3	1.7	180	44	24	15	4.8
16	1.0	1.7	1.0	1.3	1.0	2.1	162	42	17	16	4.8
17	1.0	1.7	1.0	1.3	1.0	1.7	128	39	17	16	5.4
18	1.3	1.7	1.0	1.3	1.3	1.3	101	34	34	19	4.8
19	1.0	1.7	1.0	1.3	1.7	1.7	84	26	58	20	4.1
20	1.0	1.7	1.0	1.3	1.7	1.3	70	26	40	20	4.1
21	1.7	1.7	1.0	1.0	1.7	1.3	68	24	35	19	4.1
22	2.1	2.1	1.0	1.0	2.1	1.0	60	19	60	17	4.1
23	1.7	2.1	.70	1.0	2.1	1.3	51	19	110	17	4.8
24	1.7	2.1	.70	1.3	.70	1.3	49	16	132	17	4.8
25	1.3	2.5	.70	.70	1.0	1.3	42	11	151	16	4.8
26	1.3	4.0	1.0	.70	1.0	1.3	39	8.9	148	17	5.4
27	1.0	3.0	1.3	.70	1.0	1.0	37	7.9	135	24	7.0
28	.50	1.7	1.3	.70	1.0	1.0	35	7.0	119	16	5.4
29	1.0	1.7	1.3	.70	1.7	1.0	35	4.8	110	11	6.1
30	1.0	1.3	1.0	.70	-----	.70	37	4.8	90	4.8	6.1
31	1.3	.70	1.0	1.0	-----	1.0	-----	4.1	-----	6.1	-----
TOTAL	36.20	55.9	32.50	33.10	36.40	45.40	2,656.8	1,017.4	1,745.2	743.9	167.2
MEAN	1.17	1.86	1.05	1.07	1.26	1.46	88.6	32.8	58.2	24.0	5.39
MAX	2.1	4.0	1.3	1.3	2.1	2.1	226	92	151	73	8.8
MIN	.50	1.0	.70	.70	.70	.70	41	2.1	4.8	1.0	3.0
AC-FT	72	111	64	66	72	90	5,270	2,920	3,460	1,480	332
CAL YR 1963: TOTAL	3,485.40			MEAN 9.55	MAX 90	MIN .50	AC-FT 6,910				
WAT YR 1964: TOTAL	6,920.80			MEAN 18.9	MAX 226	MIN .50	AC-FT 13,730				

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965											
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	SEPT.
1	17	15	7.0	3.0	2.5	1.7	11	34	30	11	276
2	22	12	7.0	3.0	2.5	2.1	12	30	25	7.9	203
3	20	12	7.0	2.1	2.5	2.1	13	35	28	8.8	165
4	12	9.8	6.1	2.1	2.5	1.7	21	37	40	9.8	145
5	8.8	12	6.1	1.7	2.5	1.7	32	32	39	8.8	122
6	9.8	11	13	1.7	3.0	6.1	28	34	34	7.9	101
7	12	11	16	1.7	3.0	17	37	32	28	6.1	87
8	16	9.8	11	1.7	3.5	24	78	49	24	7.0	76
9	15	9.8	8.8	1.7	3.5	26	158	40	22	5.4	65
10	12	9.8	7.9	1.7	3.5	32	354	34	21	4.8	60
11	11	8.8	7.0	1.3	4.1	30	661	39	20	4.8	51
12	9.8	7.9	6.1	1.3	4.1	22	891	49	17	6.1	42
13	9.8	7.9	6.1	1.7	4.1	17	910	49	15	6.1	39
14	19	7.9	6.1	1.7	4.1	19	859	42	13	6.1	34
15	17	7.9	4.8	1.7	4.1	20	745	42	12	8.8	32
16	17	7.0	4.8	2.1	4.1	20	631	39	12	9.8	30
17	17	7.0	4.1	2.1	3.5	19	532	39	12	9.8	28
18	16	7.0	4.1	2.1	3.5	19	440	44	12	7.9	25
19	13	7.0	4.1	2.1	3.5	16	363	44	11	8.8	21
20	15	7.0	3.5	2.1	3.5	11	308	44	11	12	19
21	13	8.8	4.1	2.1	3.0	8.8	238	39	8.8	19	17
22	13	7.0	4.1	2.1	3.0	7.0	191	37	7.9	34	16
23	15	7.0	4.8	2.1	2.5	5.4	146	35	8.1	31	26
24	24	7.0	4.1	2.1	2.1	5.4	119	34	8.8	104	15
25	34	7.0	4.1	2.1	1.7	5.4	90	32	7.9	251	13
26	28	7.0	3.5	2.1	1.7	5.4	70	40	7.9	426	13
27	25	7.0	3.5	2.1	2.1	5.4	56	50	9.8	354	13
28	17	7.0	3.5	2.5	2.1	5.4	46	40	7.9	625	12
29	16	7.0	3.5	2.5	-----	6.1	42	35	7.0	625	15
30	15	7.0	3.5	2.5	-----	8.8	39	35	7.9	537	13
31	15	-----	3.5	2.5	-----	11	-----	35	-----	402	12
TOTAL	504.2	259.4	182.8	63.3	85.8	381.5	8,123	1,200	508.7	3,815.7	1,773
MEAN	16.3	8.65	5.90	2.04	3.06	12.3	271	38.7	17.0	123	57.2
MAX	34	15	16	3.0	4.1	32	910	50	40	625	276
MIN	8.8	7.0	3.5	1.3	1.7	1.7	11	30	7.0	4.8	12
AC-FT	1,000	515	363	126	170	757	16,110	2,380	1,010	7,570	3,520
CAL YR 1964: TOTAL	7,742.60			MEAN 21.2	MAX 226	MIN .70	AC-FT 15,360				
WAT YR 1965: TOTAL	17,623.8			MEAN 48.3	MAX 910	MIN 1.3	AC-FT 34,960				

5-0561. Mauvais Coulee near Cando, N. Dak.

Location.--Lat 46°28'53", long 99°06'08", in SE $\frac{1}{4}$ NE $\frac{1}{4}$ SW $\frac{1}{4}$  sec.1, T.157 N., R.66 W., on left bank a third of a mile upstream from highway bridge, 4 miles upstream from West Fork, 5 $\frac{1}{2}$  miles southeast of Cando, and 7 miles northeast of Maza.

Drainage area.--387 sq mi, of which about 10 sq mi is probably noncontributing.

Records available.--May 1956 to September 1965.

Gage.--Water-stage recorder. Datum of gage is 1,445 ft above mean sea level (unadjusted). Prior to July 2, 1957, staff gage at present site and datum.

Average discharge.--9 years, 5.95 cfs (4,310 acre-ft per year).

Extremes.--Maximums and minimums (discharge in cubic feet per second, gage height in feet).

Annual maximum discharge (\*) and peak discharges above base (25 cfs), water years 1961-65

Date	Time	Discharge	Gage height	Date	Time	Discharge	Gage height	Date	Time	Discharge	Gage height
Apr. 10, 1961	1800	* 0.30	2.04	Apr. 10, 1964	1500	-	a 4.71	June 2, 1965	2200	66	4.12
Apr. 11, 1962	0300	* 310	8.13	Apr. 15, 1964	0700	* 100	4.67	July 29, 1965	1430	* 295	6.95
Mar. 23, 1963	2100	-	a 3.31	Apr. 16, 1965	1930	293	6.39	Sept. 4, 1965	0500	97	4.63
June 2, 1963	1900	* .50	3.01	May 9, 1965	2300	237	5.79	Sept. 24, 1965	0600	116	4.52
				May 26, 1965	1400	52	3.97				

a Backwater from ice.

No flow at times in each year.

1956-65: Maximum discharge, 570 cfs Apr. 10, 1960 (gage height, 8.14 ft, backwater from ice);

no flow at times in each year.

Flood of June 16, 1954, reached a stage of 9.83 ft, and flood of Apr. 20, 1956, reached a stage of 10.71 ft, from floodmarks, by local resident.

Remarks.--Records fair.

Revisions.--WSP 1728: Drainage area.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0	0	0	0
29	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0
31	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	1.50	0	0	0	0	0
MEAN	0	0	0	0	0	0	.050	0	0	0	0	0
MAX	0	0	0	0	0	0	.30	0	0	0	0	0
MIN	0	0	0	0	0	0	0	0	0	0	0	0
AC-FT	0	0	0	0	0	0	3.0	0	0	0	0	0

CAL YR 1960: TOTAL 5,873.00 MEAN 16.0 MAX 550 MIN 0 AC-FT 11,650

WAT YR 1961: TOTAL 1.50 MEAN .004 MAX .30 MIN 0 AC-FT 3.0

## RED RIVER OF THE NORTH BASIN

5-0561. Mauvais Coulee near Cando, N. Dak.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962												
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	0	0	0	0	0	0	0	3.4	4.0	.20	0	0
2	0	0	0	0	0	0	2.9	3.4	.20	0	0	0
3	0	0	0	0	0	0	0	2.3	3.0	.20	0	0
4	0	0	0	0	0	0	0	1.7	2.9	.30	0	0
5	0	0	0	0	0	0	0	1.0	2.8	.30	0	0
6	0	0	0	0	0	0	0	.80	2.6	.30	0	0
7	0	0	0	0	0	0	0	.70	2.5	.30	0	0
8	0	0	0	0	0	0	5.0	.60	2.4	.20	0	0
9	0	0	0	0	0	0	30	.40	2.3	.20	0	0
10	0	0	0	0	0	0	240	.40	2.2	.10	0	0
11	0	0	0	0	0	0	290	.40	2.1	.10	0	0
12	0	0	0	0	0	0	250	.40	2.0	.10	0	0
13	0	0	0	0	0	0	210	.60	1.9	0	0	0
14	0	0	0	0	0	0	120	1.4	1.6	0	0	0
15	0	0	0	0	0	0	150	1.4	2.1	0	0	0
16	0	0	0	0	0	0	100	1.4	2.3	0	0	0
17	0	0	0	0	0	0	66	1.6	1.9	0	0	0
18	0	0	0	0	0	0	39	1.3	1.8	0	0	0
19	0	0	0	0	0	0	26	1.6	1.9	0	0	0
20	0	0	0	0	0	0	21	1.3	1.7	0	0	0
21	0	0	0	0	0	0	18	1.2	1.5	0	0	0
22	0	0	0	0	0	0	13	1.2	1.4	0	0	0
23	0	0	0	0	0	0	11	1.4	1.3	0	0	0
24	0	0	0	0	0	0	9.3	1.3	1.1	0	0	0
25	0	0	0	0	0	0	8.0	1.2	.90	0	0	0
26	0	0	0	0	0	0	6.2	1.2	.80	0	0	0
27	0	0	0	0	0	0	5.0	1.1	.60	0	0	0
28	0	0	0	0	0	0	4.6	1.0	.40	.10	0	0
29	0	0	0	0	-----	0	4.2	1.6	.30	.10	0	0
30	0	0	0	0	-----	0	4.0	3.7	.30	.10	0	0
31	0	-----	0	0	-----	0	-----	4.2	-----	.10	0	-----
TOTAL	0	0	0	0	0	0	1,630.3	44.70	56.00	2.90	0	0
MEAN	0	0	0	0	0	0	54.3	1.44	1.87	.094	0	0
MAX	0	0	0	0	0	0	290	4.2	4.0	.30	0	0
MIN	0	0	0	0	0	0	0	.40	.30	0	0	0
AC-FT	0	0	0	0	0	0	3,230	89	111	5.8	0	0
CAL YR 1961:	TOTAL	1.50		MEAN	.004	MAX	.30	MIN	0	AC-FT	3.0	
WAT YR 1962:	TOTAL	1,733.90		MEAN	4.75	MAX	290	MIN	0	AC-FT	3,440	

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963												
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	0	0	0	0	0	0	0	0	.20	0	.10	0
2	0	0	0	0	0	0	0	0	.20	0	.10	0
3	0	0	0	0	0	0	0	0	.30	0	0	0
4	0	0	0	0	0	0	0	0	.30	0	0	0
5	0	0	0	0	0	0	0	0	.20	0	0	0
6	0	0	0	0	0	0	.10	0	.20	0	0	0
7	0	0	0	0	0	0	.10	0	.20	0	0	0
8	0	0	0	0	0	0	.10	0	.30	0	0	0
9	0	0	0	0	0	0	0	0	.30	0	0	0
10	0	0	0	0	0	0	0	0	.30	0	0	0
11	0	0	0	0	0	0	0	0	.30	0	0	0
12	0	0	0	0	0	0	0	.10	.30	0	0	0
13	0	0	0	0	0	0	0	.20	.30	0	0	0
14	0	0	0	0	0	0	0	.20	.20	0	0	0
15	0	0	0	0	0	0	0	.20	.20	0	0	0
16	0	0	0	0	0	0	0	.20	.20	0	0	0
17	0	0	0	0	0	0	.10	.20	.20	0	0	0
18	0	0	0	0	0	0	.20	.20	.20	0	0	0
19	0	0	0	0	0	0	.10	.20	.20	0	0	0
20	0	0	0	0	0	0	.10	.20	.10	0	0	0
21	0	0	0	0	0	0	0	.10	.10	0	0	0
22	0	0	0	0	0	0	.10	.10	.10	0	0	0
23	0	0	0	0	0	0	.10	.10	.20	0	0	0
24	0	0	0	0	0	0	.10	.10	.20	0	0	0
25	0	0	0	0	0	0	.10	.10	.20	0	0	0
26	0	0	0	0	0	0	0	.10	.20	.10	0	0
27	0	0	0	0	0	0	0	.10	.10	.20	0	0
28	0	0	0	0	0	0	0	.10	.10	.20	0	0
29	0	0	0	0	0	0	0	.10	.10	.10	0	0
30	0	0	0	0	0	0	0	.10	.10	.10	0	0
31	0	---	0	0	---	0	---	.20	---	.10	0	---
TOTAL	0	0	0	0	0	0.30	0.90	2.90	6.10	0.80	0.20	0
MEAN	0	0	0	0	0	.010	.030	.094	.20	.026	.007	0
MAX	0	0	0	0	0	.10	.20	.20	.30	.20	.10	0
MIN	0	0	0	0	0	0	0	0	.10	0	0	0
AC-FT	0	0	0	0	0	.6	1.8	5.8	12	1.6	.4	0
GAL YR 1962: TOTAL 1,733.90 MEAN 4.75 MAX 290 MIN 0 AC-FT 3,440												
WAT YR 1963: TOTAL 11.20 MEAN .031 MAX .30 MIN 0 AC-FT 22												

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

GAL YR 1963: TOTAL	11.20	MEAN	.031	MAX	.30	MIN	0	AC-FT	22
WAT YR 1964: TOTAL	968.70	MEAN	2.65	MAX	99	MIN	0	AC-FT	1,920

CAL YR 1964: TOTAL	980.60	MEAN 2.68	MAX 99	MIN 0	AC-FT 1,940
WAT YR 1965: TOTAL	10,720.30	MEAN 29.4	MAX 291	MIN 0	AC-FT 21,260

5-0562. Edmore Coulee near Edmore, N. Dak.

Location.--Lat 48°20'10", long 98°39'40", on line between secs.17 and 18, T.156 N., R.62 W., on left downstream wingwall of bridge on county highway, 11 miles southwest of Edmore and 13 miles upstream from Sweetwater Lake.

Drainage area.--382 sq mi, of which about 100 sq mi is probably noncontributing.

Records available.--April to June 1956, June 1957 to September 1965.

Gage.--Water-stage recorder. Prior to June 26, 1957, staff gage at same site and datum.

Average discharge.--8 years (1957-65) 5.74 cfs (4,160 acre-ft per year).

Extremes.--Maximums and minimums (discharge in cubic feet per second, gage height in feet).

Annual maximum discharge (*) and peak discharges above base (50 cfs), water years 1961-65											
Date	Time	Discharge	Gage height	Date	Time	Discharge	Gage height	Date	Time	Discharge	Gage height
Apr. 5, 1961	2200	* 10	1.93	June 11, 1963	2000	337	4.53	May 9, 1964	0400	* 95	3.72
Apr. 16, 1962	1000	-	a 5.55	Aug. 14, 1963	1000	69	3.41	Apr. 14, 1965	0400	* 378	5.67
Apr. 20, 1962	0600	* 501	5.27	Apr. 13, 1964	1300	87	3.64	May 11, 1965	1200	54	3.46
June 7, 1963	0800	* 360	4.59	Apr. 18, 1964	1900	73	3.29				

a Backwater from ice.

No flow for several months in each year.

1956-65: Maximum discharge, 875 cfs Apr. 23, 1956 (gage height, 6.30 ft, backwater from ice); no flow for several months in each year.

Remarks.--Records fair.

Revisions.--WSP 1728: Drainage area.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961												
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	0	0	0	0	0	0	.20	0	0	0	0	0
2	0	0	0	0	0	0	.10	0	0	0	0	0
3	0	0	0	0	0	0	.30	0	0	0	0	0
4	0	0	0	0	0	0	7.5	0	0	0	0	0
5	0	0	0	0	0	0	9.8	0	0	0	0	0
6	0	0	0	0	0	0	9.6	0	0	0	0	0
7	0	0	0	0	0	0	6.8	0	0	0	0	0
8	0	0	0	0	0	0	6.4	0	0	0	0	0
9	0	0	0	0	0	0	5.6	0	0	0	0	0
10	0	0	0	0	0	0	4.5	0	0	0	0	0
11	0	0	0	0	0	0	3.1	0	0	0	0	0
12	0	0	0	0	0	0	2.7	0	0	0	0	0
13	0	0	0	0	0	0	2.5	0	0	0	0	0
14	0	0	0	0	0	0	2.5	0	0	0	0	0
15	0	0	0	0	0	0	2.0	0	0	0	0	0
16	0	0	0	0	0	0	1.5	0	0	0	0	0
17	0	0	0	0	0	0	1.3	0	0	0	0	0
18	0	0	0	0	0	0	.80	0	0	0	0	0
19	0	0	0	0	0	0	.40	0	0	0	0	0
20	0	0	0	0	0	0	.50	0	0	0	0	0
21	0	0	0	0	0	0	.60	0	0	0	0	0
22	0	0	0	0	0	0	.40	0	0	0	0	0
23	0	0	0	0	0	0	.40	0	0	0	0	0
24	0	0	0	0	0	0	.30	0	0	0	0	0
25	0	0	0	0	0	.10	.30	0	0	0	0	0
26	0	0	0	0	0	.20	.30	0	0	0	0	0
27	0	0	0	0	0	1.0	.20	0	0	0	0	0
28	0	0	0	0	0	1.2	.10	0	0	0	0	0
29	0	0	0	0	-----	1.3	.10	0	0	0	0	0
30	0	0	0	0	-----	.60	0	0	0	0	0	0
31	0	-----	0	0	-----	.40	-----	0	-----	0	0	-----
TOTAL	0	0	0	0	0	4.80	70.80	0	0	0	0	0
MEAN	0	0	0	0	0	.15	2.36	0	0	0	0	0
MAX	0	0	0	0	0	1.3	9.8	0	0	0	0	0
MIN	0	0	0	0	0	0	0	0	0	0	0	0
AC-FT	0	0	0	0	0	9.5	140	0	0	0	0	0
CAL YR 1960: TOTAL 4,573.30 MEAN 12.5 MAX 587 MIN 0 AC-FT 9,070												
WAT YR 1961: TOTAL 75.60 MEAN .21 MAX 9.8 MIN 0 AC-FT 150												

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963												
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	.20	0	0	0	0	0	29	2.6	0	.60	6.6	4.6
2	.10	0	0	0	0	0	27	2.7	0	.20	5.8	2.8
3	.10	0	0	0	0	0	25	1.4	0	0	4.3	1.7
4	.10	0	0	0	0	0	24	.90	0	0	3.4	1.5
5	0	0	0	0	0	0	22	.80	0	0	2.7	.50
6	0	0	0	0	0	0	18	.60	7.0	0	2.1	.10
7	0	0	0	0	0	0	16	.50	337	0	2.0	0
8	0	0	0	0	0	0	14	.30	259	.10	2.2	0
9	0	0	0	0	0	0	11	.10	205	0	5.1	0
10	0	0	0	0	0	0	8.3	.10	137	0	9.4	0
11	0	0	0	0	0	0	6.6	.10	228	0	26	0
12	0	0	0	0	0	0	5.6	.30	268	0	53	0
13	0	0	0	0	0	0	8.5	.80	155	0	68	0
14	0	0	0	0	0	0	12	.90	91	0	68	0
15	0	0	0	0	0	0	12	1.4	69	0	59	0
16	0	0	0	0	0	0	12	2.0	47	0	51	0
17	0	0	0	0	0	0	10	1.9	36	0	44	0
18	0	0	0	0	0	0	8.1	1.2	24	0	37	0
19	0	0	0	0	0	0	6.0	.80	23	0	29	0
20	0	0	0	0	0	0	5.0	.70	21	0	22	0
21	0	0	0	0	0	0	4.0	.50	14	0	15	0
22	0	0	0	0	0	5.0	3.0	.40	10	0	14	0
23	0	0	0	0	0	10	2.1	.40	13	.90	14	0
24	0	0	0	0	0	20	2.2	.20	12	1.6	13	0
25	0	0	0	0	0	30	2.6	.10	12	2.6	12	0
26	0	0	0	0	0	35	2.6	0	11	4.6	12	0
27	0	0	0	0	0	34	2.6	0	7.7	5.1	12	0
28	0	0	0	0	0	33	2.3	0	4.6	5.5	10	0
29	0	0	0	0	0	32	2.2	0	3.8	5.8	9.0	0
30	0	0	0	0	0	31	2.2	0	1.6	6.4	7.5	0
31	0	0	0	0	0	31	-----	0	-----	7.1	6.0	-----
TOTAL	0.50	0	0	0	0	261.0	305.9	21.70	1,996.2	40.50	625.1	11.20
MEAN	.016	0	0	0	0	8.42	10.2	.70	66.5	1.31	20.2	.37
MAX YR 1962:	.20	0	0	0	0	35	29	2.7	337	7.1	68	4.6
MIN	0	0	0	0	0	0	2.1	0	0	0	2.0	0
AC-FT	1.0	0	0	0	0	518	607	43	3,960	80	1,240	22
CAL YR 1962:	TOTAL 3,916.90			MEAN 10.7	MAX 487		MIN 0	AC-FT 7,770				
MAX YR 1963:	TOTAL 3,262.10			MEAN 8.94	MAX 337		MIN 0	AC-FT 6,470				

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965												
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	0	0	0	0	0	0	0	16	5.8	.40	.30	0
2	0	0	0	0	0	0	0	15	8.6	.40	.30	0
3	0	0	0	0	0	0	0	12	13	.40	.20	0
4	0	0	0	0	0	0	0	9.5	14	.40	.20	0
5	0	0	0	0	0	0	0	8.1	11	.40	.10	0
6	0	0	0	0	0	0	0	8.5	10	.40	0	0
7	0	0	0	0	0	0	0	8.8	9.6	.30	0	0
8	0	0	0	0	0	0	0	8.8	9.0	.30	0	0
9	0	0	0	0	0	0	.10	8.6	6.5	.20	0	0
10	0	0	0	0	0	0	15	17	6.1	.20	0	0
11	0	0	0	0	0	0	47	51	4.7	.10	0	0
12	0	0	0	0	0	0	128	43	4.6	.20	0	0
13	0	0	0	0	0	0	322	43	4.4	.20	0	0
14	0	0	0	0	0	0	362	39	4.3	.20	0	0
15	0	0	0	0	0	0	330	31	3.1	.20	0	0
16	0	0	0	0	0	0	284	26	3.0	.40	0	0
17	0	0	0	0	0	0	194	25	2.8	.40	0	0
18	0	0	0	0	0	0	150	18	2.8	.40	0	0
19	0	0	0	0	0	0	111	12	2.8	.60	0	0
20	0	0	0	0	0	0	98	10	2.0	4.0	0	0
21	0	0	0	0	0	0	76	10	1.5	8.0	0	0
22	0	0	0	0	0	0	61	9.6	1.3	6.0	0	0
23	0	0	0	0	0	0	52	8.8	1.2	4.0	0	0
24	0	0	0	0	0	0	46	7.8	1.1	2.0	0	0
25	0	0	0	0	0	0	41	7.0	.90	1.0	0	.30
26	0	0	0	0	0	0	35	6.9	.80	.80	0	.40
27	0	0	0	0	0	0	28	6.8	.60	.80	0	.50
28	0	0	0	0	0	0	25	6.7	.60	.60	0	.80
29	0	0	0	0	0	0	22	6.5	.60	.60	0	.90
30	0	0	0	0	0	0	19	5.7	.60	.40	0	1.4
31	0	0	0	0	0	0	0	5.4	.40	.40	0	.40
TOTAL	0	0	0	0	0	0	2,446.10	491.5	137.30	34.70	1.10	4.30
MIN	0	0	0	0	0	0	81.5	15.9	1.12	4.58	.036	.14
MAX	0	0	0	0	0	0	362	51	14	8.0	.30	1.4
MIN	0	0	0	0	0	0	0	5.4	.60	.10	0	0
AC-FT	0	0	0	0	0	0	4,850	975	272	69	2.2	8.5
CAL YR 1964:	TOTAL	1,320.40	MEAN	3.61	MAX	85	MIN	0	AC-FT	2,620		
WAT YR 1965:	TOTAL	3,115.00	MEAN	8.53	MAX	362	MIN	0	AC-FT	6,180		

5-0563. Little Coulee at Leeds, N. Dak.

Location--Lat 48°17', long 99°27', in center of sec.31, T.156 N., R.68 W., on right downstream wingwall of left one of twin box culverts on U.S. Highway 2, a quarter of a mile west of Leeds.

Drainage area--280 sq mi, of which about 140 sq mi is probably noncontributing.

Records available--October 1955 to September 1965.

Gage--Staff gage read once or twice daily. Datum of gage is 1,489.92 ft above mean sea level, datum of 1929.

Average discharge--10 years, 1.38 cfs (999 acre-ft per year).

Extremes--Maximums and minimums (discharge in cubic feet per second, gage height in feet).

Annual maximum discharge (*) and peak discharges above base (25 cfs), water years 1961-65											
Date	Time	Discharge	Gage height	Date	Time	Discharge	Gage height	Date	Time	D'scharge	Gage height
1961	-	(a)	-	Apr. 4, 1962	0800	* 41	5.10	Apr. 4, 1964	1400	* c 25	5.02
Mar. 28, 1962	1800	-	b 5.64	1963	-	(a)	-	Apr. 12, 1965	-	* c 60	-

a No flow during entire year.

b Backwater from ice or snow.

c Maximum daily.

No flow for most of each year.

1955-65: Maximum discharge, 515 cfs Apr. 15, 1956 (gage height, 7.2 ft); no flow for most or all of each year.

Remarks--Records fair.

Discharge, in cubic feet per second, water years October 1960 to September 1965

Mar. 29, 1962....	1.0	May 27, 1962....	1.6	May 9, 1964....	0.10	May 7, 1965....	6.0
30.....	2.0	28.....	2.8	8.....	.30	8.....	5.0
31.....	1.0	29.....	4.1	9.....	.20	9.....	5.0
Apr. 1.....	1.0	30.....	4.1	10.....	.10	10.....	5.0
2.....	10	31.....	2.8	19.....	1.0	11.....	5.0
3.....	18	June 1.....	2.8	20.....	8.0	12.....	4.0
4.....	31	2.....	1.6	21.....	6.0	13.....	4.0
5.....	30	3.....	1.6	22.....	4.0	14.....	4.0
6.....	18	4.....	2.8	23.....	2.0	15.....	4.0
7.....	10	5.....	4.1	24.....	1.0	16.....	3.6
8.....	4.1	6.....	4.1	25.....	.50	17.....	2.6
9.....	.80	7.....	4.1	26.....	.20	18.....	1.2
10.....	.50	8.....	2.8	27.....	.10	19.....	.60
11.....	.60	9.....	.80	Apr. 10, 1965....	5.0	20.....	.40
14.....	11	10.....	.50	11.....	.40	21.....	.40
15.....	13	11.....	.20	12.....	.60	22.....	.30
16.....	8.7	12.....	.10	13.....	.50	23.....	.30
17.....	13	Apr. 3, 1964....	2.0	14.....	.37	24.....	.40
18.....	9.4	5.....	25	15.....	.25	25.....	.40
19.....	7.3	6.....	23	16.....	.16	26.....	.40
20.....	6.7	7.....	19	17.....	.14	27.....	.40
21.....	9.4	8.....	14	18.....	.11	28.....	.40
22.....	13	9.....	11	19.....	9.5	29.....	.40
23.....	4.7	10.....	7.0	20.....	9.0	30.....	.40
24.....	1.5	11.....	5.0	21.....	7.5	31.....	.40
25.....	.50	12.....	4.0	22.....	7.5	June 1.....	.40
May 13.....	5.0	13.....	3.0	23.....	7.5	2.....	.70
14.....	4.0	14.....	2.0	24.....	7.5	3.....	.40
15.....	3.0	15.....	1.0	25.....	9.0	4.....	.60
16.....	4.0	16.....	.80	26.....	10	5.....	.40
17.....	6.0	17.....	.60	27.....	10	6.....	.40
18.....	10	18.....	.40	28.....	9.0	7.....	.30
19.....	8.0	19.....	.20	29.....	8.5	8.....	.30
20.....	5.0	20.....	.10	30.....	8.0	9.....	.20
21.....	3.0	May 3.....	.40	May 1.....	7.5	10.....	.20
22.....	4.0	4.....	.50	2.....	7.0	11.....	.20
23.....	1.6	5.....	.60	3.....	6.5	12.....	.10
24.....	1.6	6.....	.50	4.....	6.0	13.....	.10
25.....	1.6	7.....	.40	5.....	6.0	14.....	.10
26.....	1.6	8.....	.20	6.....	6.0	15.....	.10

Month	Cfs-days	Maximum	Minimum	Mean	Runoff in acre-feet
Calendar year 1960.....	283.10	60	0	0.77	562
March 1962.....	4.0	2.0	0	.13	7.9
April.....	222.30	31	0	7.41	441
May.....	73.8	10	0	2.38	146
June.....	25.50	4.1	0	.85	51
Water year 1961-62.....	325.60	31	0	.89	646
Calendar year 1962.....	325.60	31	0	.89	646
April 1964.....	118.10	25	0	3.94	234
May.....	2.70	.60	0	.087	5.4
June.....	23.40	8.0	0	.78	46
Water year 1963-64.....	144.20	25	0	.39	286
Calendar year 1964.....	144.20	25	0	.39	286
April 1965.....	361.0	60	0	12.0	716
May.....	93.60	7.5	.30	3.02	186
June.....	4.50	.70	0	.15	8.9
Water year 1964-65.....	459.10	60	0	1.26	911

Note.--Flow occurred only on days listed above.

5-0564. Big Coulee near Churchs Ferry, N. Dak.  
(Formerly published as Mauvais Coulee near Churchs Ferry)

Location.--Lat 48°10'40", long 99°13'15", in NW $\frac{1}{4}$  NW $\frac{1}{4}$  sec.12, T.154 N., R.67 W., on downstream side of right abutment of bridge on U.S. Highway 281, 1 mile downstream from Little Coulee and 6 miles south of Churchs Ferry.

Drainage area.--2,510 sq mi, approximately, of which about 690 sq mi is probably noncontributing.

Records available.--March 1950 to September 1965.

Gage.--Water-stage recorder. Datum of gage is 1,432.65 ft above mean sea level, datum of 1929. Prior to June 21, 1950, reference marks and June 21, 1950, to July 17, 1956, staff gage at former bridge on U.S. Highway 281, one-eighth of a mile upstream, at datum 0.70 ft higher.

Average discharge.--15 years, 13.3 cfs (9,630 acre-ft per year); median of yearly mean discharges, 0.4 cfs (290 acre-ft per year).

Extremes.--Maximum and minimum discharges for the water years 1961-65 are contained in the following table:

Water year	Maximum			Minimum		
	Date	Discharge (cfs)	Gage height (feet)	Date	Discharge (cfs)	Gage height (feet)
1961	Mar. 21, 1961	a 0.20	1.10	At times	0	-
1962	Apr. 6, 1962	48	2.84	do.	0	-
1963	June 9, 1963	12	1.77	do.	0	-
1964	Apr. 5, 1964	5.8	1.88	do.	C	-
1965	Apr. 14, 1965	17	3.06	do.	C	-

a Maximum daily.

1950-65: Maximum discharge, 620 cfs June 6, 1950 (gage height, 4.4 ft, site and datum then in use); no flow at times in each year.

Remarks.--Records fair. Flow affected by many lakes on the main stem and tributaries. Records of chemical analyses for the water years 1961-65 are published in reports of the Geological Survey.

Revisions.--WSP 1728: Drainage area.

Discharge, in cubic feet per second, water years October 1960 to September 1963

Mar. 20, 1961....	0.10	Apr. 22, 1962....	2.0	June 13, 1962....	0.20	May 14, 1963....	1.3
21.....	.20	23.....	1.4	Mar. 25, 1963....	.10	15.....	1.1
22.....	.10	24.....	.60	26.....	.20	16.....	1.0
Apr. 8.....	.10	25.....	.20	27.....	.10	17.....	.70
9.....	.10	18.....	.50	28.....	.10	18.....	.40
10.....	.10	19.....	1.0	Apr. 6.....	.20	19.....	.30
11.....	.10	20.....	1.1	7.....	1.4	20.....	.20
Mar. 26, 1962....	1.0	21.....	.90	8.....	1.4	21.....	.10
27.....	2.0	22.....	1.4	9.....	.80	22.....	.10
28.....	10	23.....	2.4	10.....	.40	23.....	.10
29.....	5.0	24.....	2.4	11.....	.10	24.....	.10
Apr. 3.....	1.4	25.....	2.4	15.....	.10	25.....	.10
4.....	2.0	26.....	2.0	16.....	.10	June 3.....	2.8
5.....	18	27.....	1.6	17.....	.20	4.....	2.4
6.....	42	28.....	1.3	18.....	.20	5.....	1.3
7.....	23	29.....	1.8	19.....	.20	6.....	.60
8.....	10	30.....	3.0	20.....	.20	7.....	.40
9.....	5.0	31.....	3.1	21.....	.20	8.....	.60
10.....	3.8	June 1.....	3.0	22.....	.20	9.....	12
11.....	2.2	2.....	3.2	23.....	.20	10.....	8.1
12.....	15	3.....	4.0	24.....	.20	11.....	4.8
13.....	24	4.....	4.6	25.....	.20	12.....	3.4
14.....	17	5.....	4.4	26.....	.20	13.....	2.7
15.....	13	6.....	3.8	27.....	.10	14.....	2.0
16.....	10	7.....	3.2	28.....	.10	15.....	1.3
17.....	8.6	8.....	2.6	29.....	.10	16.....	.70
18.....	7.2	9.....	2.0	30.....	.10	17.....	.30
19.....	6.0	10.....	1.6	May 1.....	.10	18.....	.20
20.....	4.9	11.....	1.1	12.....	.20	19.....	.10
21.....	3.0	12.....	.60	13.....	1.1		

Month	Cfs-days	Maximum	Minimum	Mean	Runoff in acre-feet
Calendar year 1960.....	142.40	16	0	0.39	282
March 1961.....	.40	.20	0	.013	.8
April.....	.40	.10	0	.013	.8
Water year 1960-61.....	.80	.20	0	.002	1.6
Calendar year 1961.....	.80	.20	0	.002	1.6
March 1962.....	18.0	10	56	0	36
April.....	220.30	42	0	7.34	437
May.....	24.90	3.1	0	.80	49
June.....	34.30	4.6	0	1.14	68
Water year 1961-62.....	297.50	42	0	.82	590
Calendar year 1962.....	297.50	42	0	.82	590
March 1963.....	.50	.20	0	.016	1.0
April.....	6.90	1.4	0	.23	14
May.....	6.90	1.4	0	.22	14
June.....	43.70	12	0	1.46	87
Water year 1962-63.....	58.00	12	0	.16	115

Note.--Flow occurred only on days listed above.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

CAL YR 1963: TOTAL	58.00	MEAN .16	MAX 12	MIN 0	AC-FT 115
WAT YR 1964: TOTAL	52.20	MEAN .14	MAX 4.0	MIN 0	AC-FT 104

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965												
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	0	0	0	0	0	0	0	.20	.10	0	.20	.20
2	0	0	0	0	0	0	0	.20	.10	0	.20	.70
3	0	0	0	0	0	0	0	.20	.10	0	.20	.90
4	0	0	0	0	0	0	0	.20	0	0	.10	1.3
5	0	0	0	0	0	0	0	.20	0	0	0	1.3
6	0	0	0	0	0	0	0	.20	0	0	0	1.5
7	0	0	0	0	0	0	0	.20	0	0	0	1.5
8	0	0	0	0	0	0	1.0	.20	0	0	0	1.6
9	0	0	0	0	0	0	6.0	.20	0	0	0	1.7
10	0	0	0	0	0	0	8.3	.20	0	0	0	1.7
11	0	0	0	0	0	0	13	.20	0	0	0	1.8
12	0	0	0	0	0	0	9.9	.10	0	0	0	1.9
13	0	0	0	0	0	0	11	.10	0	0	0	2.0
14	0	0	0	0	0	0	17	.10	0	0	0	2.5
15	0	0	0	0	0	0	13	.10	0	0	0	2.8
16	0	0	0	0	0	0	9.4	.10	0	0	0	3.0
17	0	0	0	0	0	0	7.2	.10	0	0	0	3.4
18	0	0	0	0	0	0	5.8	0	0	0	0	3.4
19	0	0	0	0	0	0	4.5	.10	0	0	0	3.4
20	0	0	0	0	0	0	3.6	.10	0	0	0	3.4
21	0	0	0	0	0	0	2.6	.10	0	0	0	3.4
22	0	0	0	0	0	0	2.2	.10	0	.20	0	3.7
23	0	0	0	0	0	0	1.7	0	0	.80	0	4.3
24	0	0	0	0	0	0	1.4	0	0	1.0	0	4.4
25	0	0	0	0	0	0	1.1	0	0	1.0	0	4.6
26	0	0	0	0	0	0	.70	.10	0	.80	0	4.6
27	0	0	0	0	0	0	.50	.10	0	.80	0	4.8
28	0	0	0	0	0	0	.40	.10	0	.70	0	4.9
29	0	0	0	0	0	0	.30	.10	0	.60	0	5.0
30	0	0	0	0	0	0	.20	0	0	.50	0	5.6
31	0	0	0	0	0	0	0	0	0	.40	0	5.6
TOTAL	0	0	0	0	0	0	120.80	3.60	0.30	6.80	0.70	85.50
MEAN	0	0	0	0	0	0	4.03	.12	.010	.22	.023	2.85
MAX	0	0	0	0	0	0	17	.20	.10	1.0	.20	5.6
MIN	0	0	0	0	0	0	0	0	0	0	0	.20
AC-FT	0	0	0	0	0	0	240	7.1	.6	13	1.4	170
CAL YR 1964: TOTAL		52.20		MEAN .14		MAX 4.0		MIN 0		AC-FT 104		
WAT YR 1965: TOTAL		217.70		MEAN .60		MAX 17		MIN 0		AC-FT 432		

5-0565. Devils Lake near Devils Lake, N. Dak.

Location.--Lat 48°04'00", long 98°56'07", in SW $\frac{1}{4}$  sec.18, T.153 N., R.64 W., at Lakewood on east bank of Creel Bay,  $\frac{1}{4}$  miles southwest of city of Devils Lake. Creel Bay, which is half a mile wide, is an arm of Devils Lake and extends 2 miles to the north of the lake.

Drainage area.--3,130 sq mi (revised), approximately, of which about 1,000 sq mi is probably noncontributing.

Records available.--1867, 1879, 1883, 1887, 1890, 1896 (one gage height for each year), 1901-65 (fragmentary).

Gage.--Water-stage recorder. Datum of gage is 1,400.00 ft above mean sea level, datum of 1923; gage readings have been reduced to elevations above mean sea level. 1867 to June 1921, various staffs and reference points near present site at datum 11.85 ft higher. July 1921 to September 1937 staff gages near present site and October 1937 to September 1938 staff gages at south end of Creel Bay, at datum 0.56 ft lower than present datum. Oct. 1, 1938, to April 1943 staff gages at site 5 miles southwest and May 1943 to June 22, 1950, at south end of Creel Bay, at present datum. June 23, 1950, to June 6, 1963, staff gage at present site and datum.

Extremes.--Maximum and minimum elevations, in feet, for the water years 1961-65 are contained in the following table:

Water year	Maximum		Minimum	
	Date	Elevation	Date	Elevation
1961	Oct. 4, 1960.....	1,414.90	Sept. 5, 1961.....	1,413.33
1962	June 20, 1962.....	1,414.30	Dec. 12, 1961.....	1,413.10
1963	June 9, 1963.....	1,413.22	Sept.28, 1963.....	1,411.84
1964	May 6, 1964.....	1,411.87	Sept.20-25, 1964.....	1,410.90
1965	June 4, 1965.....	1,411.60	Oct. 31, 1964.....	1,410.85

1867-1965: Maximum elevation observed, 1,438.40 ft in 1867, present datum; minimum observed, 1,400.87 ft Oct. 24, 1940.

The lake level was about elevation 1,446 ft in about 1830 and lower thereafter, according to the tree growth noted 1885-89. Reference is in Geological Survey monograph, volume XXV, the Glacial History of Lake Agassiz by Warren Upham.

Remarks.--Elevation at gage frequently affected by wind. Records of chemical analyses for the water years 1961-65 are published in reports of the Geological Survey.

Elevation, in feet, water years October 1960 to September 1965

Oct. 4, 1960.....	1,414.90	May 8, 1962.....	1,413.61	May 23, 1963.....	1,413.19
27.....	1,414.76	16.....	1,413.68	28.....	1,413.13
Nov. 12.....	1,414.70	25.....	1,413.98	June 1.....	1,413.11
21.....	1,414.70	June 6.....	1,414.12	7.....	1,413.16
Dec. 7.....	1,414.56	20.....	1,414.30	30.....	1,413.12
Jan. 16, 1961.....	1,414.78	July 2.....	1,414.04	July 31.....	1,412.65
Feb. 14.....	1,414.77	11.....	1,414.09	Aug. 31.....	1,412.17
Mar. 3.....	1,414.82	28.....	1,413.78	Sept.30.....	1,411.85
15.....	1,414.82	Aug. 4.....	1,413.73	Oct. 31.....	1,411.53
Apr. 19.....	1,414.88	10.....	1,413.70	Nov. 30.....	1,411.36
May 1.....	1,414.80	22.....	1,413.74	Dec. 31.....	1,411.51
16.....	1,414.74	Sept. 1.....	1,413.57	Jan. 31, 1964.....	1,411.51
30.....	1,414.53	15.....	1,413.42	Feb. 29.....	1,411.56
June 9.....	1,414.46	30.....	1,413.24	Mar. 31.....	1,411.60
28.....	1,414.16	Oct. 21.....	1,413.14	Apr. 30.....	1,411.60
July 11.....	1,413.99	28.....	1,413.10	May 31.....	1,411.46
28.....	1,413.85	Nov. 2.....	1,413.10	June 30.....	1,411.77
Aug. 8.....	1,413.82	12.....	1,413.12	July 31.....	1,411.30
26.....	1,413.50	17.....	1,413.10	Aug. 31.....	1,411.27
Sept. 5.....	1,413.33	4.....	1,412.84	Sept.30.....	1,411.04
15.....	1,413.45	19.....	1,412.91	Oct. 31.....	1,410.87
Oct. 3.....	1,413.43	Jan. 3, 1963.....	1,412.83	Nov. 30.....	1,410.82
15.....	1,413.25	22.....	1,412.79	Dec. 31.....	1,410.94
Nov. 1.....	1,413.22	Feb. 5.....	1,411.97	Jan. 31, 1965.....	1,410.94
28.....	1,413.16	19.....	1,413.08	Feb. 28.....	1,411.0
Dec. 12.....	1,413.10	Mar. 5.....	1,413.09	Mar. 31.....	1,411.0
Jan. 10, 1962.....	1,413.22	Apr. 3.....	1,413.06	Apr. 30.....	1,411.16
22.....	1,413.25	12.....	1,413.10	May 31.....	1,411.55
Feb. 6.....	1,413.24	23.....	1,413.16	June 30.....	1,411.24
Mar. 21.....	1,413.29	May 4.....	1,413.18	July 31.....	1,411.38
Apr. 26.....	1,413.60	11.....	1,413.19	Aug. 31.....	1,411.09
				Sept.30.....	1,411.27

5-0570. Sheyenne River near Cooperstown, N. Dak.

Location.--Lat 47°26'01", long 98°01'43", in NE 1/4 sec. 27, T.146 N., R.58 W., on right bank 150 ft downstream from county bridge and 5 miles east of Cooperstown.

Drainage area.--6,470 sq mi, approximately, of which about 5,200 sq mi is probably noncontributing (includes about 3,800 sq mi in closed basins).

Records available.--October 1944 to September 1965. Monthly discharge only for some periods, published in WSP 1308.

Gage.--Water-stage recorder. Datum of gage is 1,271.04 ft above mean sea level, datum of 1929 (Corps of Engineers bench mark). Prior to Aug. 3, 1950, wire-weight gage at site 150 ft upstream at same datum.

Average discharge.--21 years, 91.1 cfs (65,950 acre-ft per year); median of yearly mean discharges, 72 cfs (52,100 acre-ft per year).

Extremes.--Maximums and minimums (discharge in cubic feet per second, gage height in feet).

Annual maximum discharge (\*) and peak discharges above base (200 cfs), water years 1961-65

Date	Time	Discharge	Gage height	Date	Time	Discharge	Gage height	Date	Time	Discharge	Gage height
Apr. 1, 1961	0915	-	6.19	June 24, 1962	0230	213	6.11	Sept. 27, 1964	0300	254	6.48
Apr. 3, 1961	1400	* 120	5.13								
Apr. 11, 1962	0830	* 900	12.69	Apr. 6, 1963	0900	* 300	7.25	Apr. 13, 1965	0710	-	16.05
June 1, 1962	0400	351	7.28	Apr. 16, 1964	-	480	-	Apr. 15, 1965	1150	* 2,370	18.03
June 10, 1962	0800	477	8.21	June 23, 1964	-	* 795	10.34	June 8, 1965	1000	267	6.55
								July 25, 1965	0200	383	7.68
								Aug. 5, 1965	0700	455	8.47

a Backwater from ice.

Annual minimum discharge, water years 1961-65

Water year	Date	Discharge	Gage height	Water year	Date	Discharge	Gage height
1961	Aug. 12 to Sept. 12	0	-	1964	Oct. 7, 1963	0	-
1962	Oct. 10, 1961	.40	3.38	1965	Mar. 5, 1965	6.5	-
1963	(a)	0	-				

a Jan. 25 to Mar. 6, Aug. 24, 25, 1963.

1944-65: Maximum discharge, 7,830 cfs Apr. 17, 1950 (gage height, 18.69 ft); no flow at times.

Remarks.--Records good except those for winter periods, which are fair. Records of chemical analyses for the water years 1961-65 are published in reports of the Geological Survey.

Revisions.--WSP 1728: Drainage area.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	.70	8.5	6.0	5.8	.90	1.0	110	54	20	2.9	7.2	0
2	.80	9.4	6.0	5.8	.80	5.0	100	49	16	1.7	3.9	0
3	.70	11	6.0	5.8	.70	30	110	46	15	1.0	2.9	0
4	.80	11	6.0	5.8	.70	12	105	48	14	.80	1.7	0
5	1.0	11	6.5	5.6	.70	10	105	47	14	.80	1.2	0
6	.90	13	6.2	5.2	.60	44	100	47	12	.80	1.0	0
7	.80	12	6.0	5.0	.60	50	100	47	9.4	.80	1.9	0
8	.80	11	5.8	4.6	.60	40	95	44	9.0	.60	.80	0
9	.90	10	5.8	4.4	.60	35	95	44	8.7	.40	.30	0
10	1.0	9.0	5.8	4.4	.60	35	90	41	8.2	.30	.10	0
11	.90	9.0	5.8	4.4	.60	55	85	41	7.8	.30	.10	0
12	1.0	9.0	5.8	4.4	.60	55	85	41	8.4	.40	0	0
13	1.1	9.0	5.8	4.4	.60	50	82	40	7.2	.60	0	1.0
14	1.2	9.0	5.8	4.0	.60	40	79	39	6.1	.90	0	7.0
15	1.8	9.0	6.0	4.0	.60	32	84	37	5.0	1.1	0	3.7
16	4.2	8.5	6.0	3.8	.60	38	64	39	4.3	5.8	0	1.5
17	4.2	8.0	5.8	3.8	.60	50	66	39	3.2	11	0	.70
18	5.4	8.0	5.8	3.8	.60	60	68	37	2.7	10	0	.60
19	3.8	8.5	5.8	3.4	.50	65	68	34	2.3	8.7	0	.60
20	3.3	8.5	5.8	3.0	.50	64	58	32	2.2	8.7	0	.80
21	3.3	8.5	5.8	2.8	.50	68	61	31	2.5	10	0	.40
22	3.3	8.5	5.8	2.6	.50	70	63	30	3.0	10	0	.60
23	3.0	8.0	5.8	2.4	.50	70	62	31	3.2	8.7	0	.40
24	3.0	8.0	6.0	2.2	.50	68	63	30	3.0	6.4	0	.60
25	3.1	8.0	6.0	2.0	.50	72	64	30	2.5	4.6	0	.70
26	2.6	8.0	5.8	2.0	.50	80	64	29	2.0	3.0	0	.70
27	3.4	7.5	5.8	1.8	.60	80	63	28	2.2	2.7	0	.60
28	6.0	7.0	5.8	1.6	.80	75	60	28	1.9	3.4	0	.30
29	6.6	6.5	5.8	1.4	-----	70	62	26	1.7	5.5	0	.40
30	9.1	6.5	5.8	1.2	-----	75	59	25	2.3	3.9	0	.70
31	9.4	-----	5.8	1.0	-----	90	-----	22	-----	3.2	0	-----
TOTAL	88.30	268.9	182.7	112.4	17.00	1,589.0	2,370	1,156	199.8	119.00	21.10	21.10
MEAN	2.85	8.96	5.89	3.63	.61	51.3	79.0	37.3	6.66	3.84	.66	.70
MAX	9.4	13	6.5	5.8	.90	90	110	54	20	11	7.2	7.0
MIN	.70	6.5	5.8	1.0	.50	1.0	58	22	1.7	.30	0	0
AC-FT	175	533	362	223	34	3,150	4,700	2,290	396	236	42	42

CAL YR 1960: TOTAL 29,076.00 MEAN 79.4 MAX 1,340 MIN .70 AC-FT 57,670  
 MAY YR 1961: TOTAL 6,145.30 MEAN 16.8 MAX 110 MIN 0 AC-FT 12,190

5-0570. Sheyenne River near Cooperstown, N. Dak.--Continued

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	1.1	4.8	4.1	5.2	2.8	1.9	220	70	346	87	21	15
2	2.0	3.9	4.1	5.2	2.8	1.9	210	63	305	77	21	15
3	2.3	2.9	4.0	5.0	2.8	1.9	210	57	268	71	21	15
4	1.9	5.0	4.8	5.1	2.8	1.9	300	56	248	68	26	16
5	1.2	2.8	4.0	5.1	2.8	1.7	500	55	227	62	34	15
6	1.0	2.5	4.4	5.0	2.8	1.9	680	49	206	76	26	14
7	1.0	2.2	4.2	4.8	2.8	1.8	750	45	189	113	19	14
8	.80	2.0	3.6	5.0	2.6	1.8	790	44	168	101	18	17
9	.70	2.2	4.2	5.0	2.6	1.8	790	43	166	66	18	20
10	.80	2.3	4.6	5.0	2.4	1.8	820	43	420	57	24	18
11	3.4	2.5	4.4	4.6	2.4	1.8	880	43	264	55	35	18
12	5.3	2.5	4.2	4.2	2.4	1.9	850	41	178	52	36	18
13	7.0	2.2	4.0	4.0	2.4	1.9	680	42	141	50	42	16
14	8.2	2.5	5.0	4.0	2.4	1.9	480	44	120	45	44	14
15	12	2.7	5.0	4.0	2.4	1.8	360	50	106	44	40	13
16	11	2.9	5.0	4.0	2.2	1.8	290	54	104	42	35	12
17	8.4	2.9	4.8	3.8	2.2	1.8	247	87	110	40	32	11
18	6.1	3.0	5.0	3.8	2.2	1.8	218	87	124	40	32	10
19	4.6	3.2	5.4	3.8	2.2	1.8	196	87	140	41	32	8.4
20	3.2	3.4	5.2	3.8	2.2	1.8	178	90	145	39	32	7.0
21	2.5	3.6	5.0	3.6	2.2	1.8	167	106	159	34	29	6.1
22	2.5	4.4	5.0	3.6	2.0	1.8	158	114	177	34	28	7.0
23	2.5	4.4	4.8	3.4	2.0	1.8	146	132	202	32	27	8.7
24	2.5	4.4	5.0	3.6	2.0	2.0	132	175	213	29	26	8.2
25	2.2	4.4	4.8	3.4	2.0	2.2	120	222	211	27	23	7.2
26	1.9	4.4	4.8	3.4	2.0	4.0	108	228	194	26	19	7.2
27	2.0	4.2	5.2	3.2	1.9	15	95	216	188	24	18	7.2
28	3.4	4.2	5.4	3.2	1.9	100	85	199	139	24	16	6.1
29	4.1	4.2	5.4	3.0	-----	180	79	191	118	24	16	6.1
30	5.5	4.0	5.4	3.0	-----	200	76	279	101	22	14	6.1
31	5.8	-----	5.2	3.0	-----	220	-----	341	-----	21	14	-----
TOTAL	116.90	100.6	145.8	126.8	66.2	765.5	10,815	3,353	5,677	1,523	818	356.3
MEAN	3.77	3.35	4.70	4.09	2.36	24.7	361	108	199	49.1	26.4	11.9
MAX	12	5.0	5.4	5.2	2.8	220	880	341	420	113	44	20
MIN	2.0	2.0	3.6	3.0	1.9	1.8	76	41	101	21	14	6.1
AC-FT	232	200	289	252	131	1,520	21,450	6,650	11,260	3,020	1,620	707

CAL YR 1961: TOTAL 5,968.70 MEAN 16.4 MAX 110 MIN 0 AC-FT 11,840

WAT YR 1962: TOTAL 23,864.10 MEAN 65.4 MAX 880 MIN .70 AC-FT 47,330

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	5.7	20	20	7.8	0	0	115	43	34	36	8.2	.80
2	5.2	18	19	7.8	0	0	105	43	33	57	8.5	.60
3	4.9	17	19	7.6	0	0	120	42	33	60	6.6	.50
4	5.4	15	18	7.4	0	0	120	42	33	53	8.5	.30
5	5.2	15	18	7.4	0	0	150	40	31	43	8.9	2.5
6	4.6	17	13	7.2	0	0	250	41	32	37	6.9	11
7	5.2	18	14	7.2	0	.20	220	41	34	32	5.4	12
8	5.4	15	13	7.0	0	.20	181	41	34	27	4.2	11
9	6.0	21	11	6.8	0	.10	140	39	34	23	2.7	8.9
10	6.3	21	11	6.4	0	.20	116	38	34	21	2.0	7.2
11	6.6	22	11	6.2	0	.40	108	38	34	38	2.2	5.7
12	6.3	22	10	6.2	0	.40	101	36	33	83	1.9	3.5
13	7.2	23	10	6.0	0	.40	93	35	33	43	.80	2.7
14	9.6	25	10	5.5	0	.40	84	34	36	35	.60	2.2
15	8.9	26	10	5.0	0	1.0	79	33	38	34	.50	2.0
16	9.9	16	10	4.5	0	.80	74	36	38	24	.50	.90
17	10	24	10	4.0	0	.80	71	38	36	21	.30	.80
18	9.2	24	10	3.5	0	1.5	66	39	34	20	.20	.90
19	6.6	22	10	3.0	0	2.0	64	39	31	21	.20	.80
20	6.9	22	9.0	2.5	0	2.0	61	41	28	19	.20	.80
21	9.6	19	9.0	2.0	0	15	61	46	27	18	.10	.60
22	11	17	12	1.5	0	30	56	46	26	17	.10	.20
23	12	20	10	1.0	0	50	56	43	26	15	.10	.20
24	12	21	10	.50	0	80	58	39	25	14	0	.20
25	12	19	9.5	0	0	95	55	38	23	13	0	.40
26	12	17	9.0	0	0	100	50	38	21	13	.30	.50
27	12	17	8.5	0	0	110	47	38	20	13	.80	.70
28	12	17	8.5	0	0	135	46	36	19	11	5.7	.80
29	13	17	8.0	0	-----	135	46	37	19	11	3.5	.80
30	18	18	8.0	0	-----	130	44	35	21	9.9	1.9	.60
31	21	-----	8.0	0	-----	125	-----	34	-----	8.2	1.1	-----
TOTAL	279.7	585	356.5	124.00	0	1,015.40	2,837	1,209	900	870.1	82.90	80.10
MEAN	9.02	19.5	11.5	4.00	0	32.8	94.6	39.0	30.0	28.1	2.67	2.67
MAX	21	26	20	7.8	0	135	250	46	38	83	8.9	12
MIN	4.6	15	8.0	0	0	0	44	33	19	8.2	0	.20
AC-FT	555	1,160	707	246	0	2,010	5,630	2,400	1,790	1,730	164	159

CAL YR 1962: TOTAL 24,722.0 MEAN 67.7 MAX 880 MIN 1.8 AC-FT 49,040

WAT YR 1963: TOTAL 8,339.70 MEAN 22.8 MAX 250 MIN 0 AC-FT 16,540

5-0570. Shesenne River near Cooperstown, N. Dak.--Continued

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	.50	1.4	4.6	2.5	1.2	1.6	7.0	84	20	281	37	53
2	.60	1.1	5.0	2.5	1.1	1.6	12	80	13	268	34	46
3	.30	.80	5.3	2.5	1.1	1.6	18	77	17	243	30	40
4	.10	1.1	5.4	2.5	1.1	1.7	20	76	15	209	28	38
5	.10	1.4	5.5	2.5	1.1	1.7	23	75	15	177	26	35
6	.10	1.7	5.5	2.5	1.1	1.8	25	79	15	153	22	33
7	0	1.9	5.6	2.4	1.1	1.8	35	78	14	133	20	30
8	.10	2.3	6.0	2.4	1.1	1.8	70	81	15	117	17	29
9	.20	2.3	5.0	2.2	1.1	1.8	95	81	16	108	18	28
10	.50	2.5	4.5	2.2	1.1	1.9	100	76	15	100	17	27
11	.50	2.7	4.0	2.2	1.1	2.0	110	82	14	92	15	24
12	.30	3.0	3.5	2.2	1.1	2.2	120	95	24	83	14	20
13	.30	3.4	3.5	2.0	1.2	2.4	200	96	35	75	13	20
14	.30	3.8	2.8	2.0	1.2	2.2	240	90	44	68	12	17
15	.40	4.2	2.5	2.0	1.2	2.2	380	80	92	61	12	23
16	.50	4.5	2.3	2.0	1.2	2.6	460	69	215	56	11	28
17	.60	5.0	2.0	2.0	1.2	2.2	461	62	300	52	10	28
18	.50	5.2	1.9	1.8	1.2	2.2	469	56	350	47	9.0	25
19	.60	5.5	2.0	1.8	1.3	2.2	358	97	250	43	8.4	22
20	3.4	5.5	2.5	1.8	1.3	2.4	300	54	400	40	9.8	21
21	2.9	4.3	2.5	1.8	1.3	2.4	247	50	550	37	28	19
22	2.2	5.5	2.4	1.6	1.3	2.4	205	49	650	36	28	17
23	1.4	4.6	2.0	1.6	1.4	2.3	167	44	750	49	26	17
24	1.1	4.3	2.2	1.6	1.4	2.0	142	42	700	115	36	19
25	1.0	4.8	2.5	1.6	1.4	2.0	126	38	650	124	49	16
26	.80	5.0	2.7	1.4	1.4	2.0	120	34	550	100	55	117
27	.70	5.3	2.7	1.4	1.4	2.0	141	34	450	76	60	209
28	.90	5.3	2.5	1.4	1.4	2.0	103	32	350	61	62	95
29	1.2	5.5	2.5	1.4	1.4	2.0	97	31	284	52	56	64
30	1.9	5.3	2.5	1.2	-----	2.2	92	28	282	44	50	66
31	1.7	-----	2.5	1.2	-----	5.0	-----	24	-----	41	47	-----
TOTAL	25.70	109.20	106.2	60.2	35.5	66.2	4,833.0	1,934	7,100	3,141	860.2	1,226
MEAN	.83	3.64	3.43	1.94	1.22	2.14	162	62.4	237	101	27.7	40.9
MAX	3.4	5.5	6.0	2.5	1.4	5.0	461	96	750	281	62	209
MIN	0	.80	1.9	1.2	1.1	1.6	7.0	24	14	36	8.4	16
AC-FT	51	217	211	119	70	131	9,630	3,840	14,080	6,230	1,710	2,430

CAL YR 1963: TOTAL 7,359.60 MEAN 20.2 MAX 250 MIN 0 AC-FT 14,600  
 MAY YR 1964: TOTAL 19,517.20 MEAN 53.3 MAX 750 MIN 0 AC-FT 38,710

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	79	26	12	10	8.2	6.8	30	260	124	36	286	41
2	85	26	12	10	8.2	6.8	35	240	129	37	345	37
3	85	26	12	10	8.2	6.6	50	220	125	36	402	35
4	79	28	12	10	8.2	6.6	80	199	124	35	440	64
5	70	40	12	9.8	8.0	6.5	120	179	148	32	454	52
6	64	42	12	9.8	8.0	6.8	170	174	193	30	423	44
7	59	40	11	9.8	8.0	6.8	200	170	240	28	348	44
8	56	40	11	9.6	8.0	6.8	260	170	264	28	264	42
9	53	38	11	9.6	8.0	6.8	570	168	233	27	205	42
10	49	36	11	9.6	7.6	7.0	880	168	187	25	167	43
11	44	34	11	9.4	7.6	7.4	1,450	160	150	24	144	42
12	41	32	11	9.4	7.6	7.4	1,640	154	124	49	125	40
13	39	31	11	9.4	7.6	7.4	1,900	153	106	68	109	37
14	37	30	11	9.2	7.4	7.6	2,190	143	93	35	97	38
15	37	30	11	9.2	7.4	7.6	2,310	137	83	31	90	40
16	37	30	10	9.0	7.4	7.8	2,210	128	74	30	81	42
17	37	20	10	9.0	7.4	7.8	2,070	126	61	31	74	52
18	36	21	10	9.0	7.4	7.8	1,890	124	55	30	68	54
19	34	21	10	8.8	7.4	8.0	1,730	115	95	30	56	56
20	32	21	10	8.8	7.4	8.0	1,550	110	50	43	62	60
21	32	18	10	8.8	7.0	8.0	1,370	106	43	50	56	61
22	30	17	10	8.6	7.0	8.4	1,180	107	40	65	53	61
23	29	16	10	8.6	6.8	9.0	964	107	39	235	50	64
24	28	16	10	8.6	6.8	9.0	696	108	37	332	55	68
25	28	16	10	8.6	6.8	12	508	116	36	359	50	74
26	27	14	10	8.4	6.8	14	412	115	34	234	46	78
27	27	13	10	8.4	6.8	16	380	112	34	157	47	78
28	27	12	10	8.4	6.8	18	340	113	35	150	40	78
29	27	12	10	8.4	-----	20	300	118	37	155	39	80
30	28	12	10	8.2	-----	24	280	121	36	179	42	103
31	27	-----	10	8.2	-----	28	-----	121	-----	222	42	-----
TOTAL	1,362	758	331	282.6	209.8	311.3	27,765	4,541	2,989	2,823	4,755	1,650
MEAN	43.9	25.3	10.7	9.12	7.49	10.0	926	146	99.6	91.1	153	55.0
MAX	85	42	12	10	8.2	28	2,310	260	264	359	454	103
MIN	26	12	10	8.2	6.8	6.5	30	106	34	24	39	35
AC-FT	2,700	1,500	657	561	416	617	55,070	9,010	5,930	5,600	9,430	3,270

CAL YR 1964: TOTAL 21,727.1 MEAN 59.4 MAX 750 MIN 1.1 AC-FT 43,100  
 MAY YR 1965: TOTAL 47,777.7 MEAN 131 MAX 2,310 MIN 6.5 AC-FT 94,770

5-0572. Baldhill Creek near Dazey, N. Dak.

Location.--Lat 47°13'45", long 98°07'28", in NW¼SE¼SW¼ sec.2, T.143 N., R.59 W., on left bank 500 ft upstream from bridge on county highway, 4½ miles northeast of Dazey, and 14 miles upstream from mouth.

Drainage area.--691 sq mi, of which about 340 sq mi is probably noncontributing.

Records available.--March 1956 to September 1965.

Gage.--Water-stage recorder. Prior to Nov. 9, 1956, wire-weight gage 500 ft downstream at same datum.

Average discharge.--9 years, 9.04 cfs (6,540 acre-ft per year).

Extremes.--Maximums and minimums (discharge in cubic feet per second, gage height in feet).

Annual maximum discharge (\*) and peak discharges above base (60 cfs), water years 1961-65

Date	Time	Discharge	Gage height	Date	Time	Discharge	Gage height	Date	Time	Discharge	Gage height
Mar. 2, 1961	1500	* 40	3.60	July 7, 1962	-	88	3.79	June 19, 1964	2300	* 60	3.65
Mar. 28, 1962	0200	* 390	6.84	Apr. 6, 7, 1963	-	* 24	3.47	Apr. 10, 1965	1100	-	a 9.90
Apr. 5, 1962	-	200	-	Apr. 4, 1964	1930	-	a 3.74	Apr. 12, 1965	1220	* 1,780	9.23

a Backwater from ice.

Annual minimum discharge, water years 1961-65

Water year	Date	Discharge	Gage height	Water year	Date	Discharge	Gage height
1961	Many days	0	-	1964	Many days	0.10	-
1962	do.	0	-	1965	Mar. 30, 1965	.20	2.62
1963	do.	0	-				

1962-65: Maximum discharge, 1,780 cfs Apr. 12, 1965 (gage height, 9.23 ft); maximum gage height, 9.90 ft Apr. 10, 1965 (backwater from temporary roadfill); no flow at times.

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

Revisions.--WSP 1728: Drainage area.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	1.6	3.2	.20	.30	0	2.0	6.9	6.0	3.0	0	1.1	.20
2	1.4	2.7	.20	.30	0	20	8.0	5.7	2.7	0	.70	.30
3	1.3	2.5	.20	.30	0	18	8.3	5.5	2.3	0	.40	.20
4	1.3	2.4	.20	.30	0	15	8.6	5.0	2.0	0	.30	.10
5	1.4	2.5	.30	.30	0	9.0	12	4.8	1.8	0	.20	.20
6	1.3	2.3	.20	.30	0	8.0	9.7	6.4	1.5	0	0	.30
7	1.2	1.9	.40	.30	0	7.0	9.4	7.1	1.4	0	0	.30
8	1.3	2.0	.20	.20	0	6.6	9.1	6.4	1.3	0	0	.40
9	1.3	1.6	.20	.20	0	7.1	9.1	5.5	1.3	0	0	.40
10	1.3	1.6	.20	.20	0	7.4	8.8	5.7	1.2	0	0	1.8
11	1.3	1.6	.20	.20	0	7.1	8.3	6.0	1.2	0	0	2.2
12	1.5	1.8	.20	.20	0	6.9	7.4	6.0	1.3	0	0	2.4
13	1.6	1.8	.10	.10	0	7.4	6.9	6.2	1.4	.20	0	3.6
14	1.9	1.8	.20	.10	0	7.7	7.4	6.0	1.4	.90	0	3.2
15	1.9	2.0	.20	.10	0	7.7	6.0	6.0	1.0	.70	0	2.4
16	1.6	2.0	.20	.10	0	7.7	6.4	5.7	.60	.40	0	1.9
17	1.5	1.8	.20	.10	0	8.0	7.4	5.7	.30	.60	1.2	1.6
18	1.8	1.5	.20	.10	0	8.0	6.4	5.7	.20	1.5	13	1.4
19	1.4	1.6	.20	.10	0	8.0	4.6	6.0	.20	1.1	3.8	2.4
20	1.5	1.6	.20	.10	0	7.7	5.3	6.0	.10	1.2	2.0	6.2
21	1.6	1.8	.10	.10	.10	9.1	6.0	6.0	.10	2.7	1.0	5.0
22	2.0	1.3	.10	.10	.20	11	5.5	5.7	.20	3.0	.70	3.8
23	1.9	1.2	.10	.10	.10	13	5.7	5.5	.20	2.8	.60	3.0
24	1.8	1.2	.10	0	0	13	7.7	5.3	.20	2.3	.40	3.0
25	2.0	1.4	.10	0	0	14	8.0	5.0	.20	1.6	.30	2.5
26	2.0	1.2	.20	0	0	15	8.0	4.4	.10	1.3	.30	2.4
27	2.2	1.0	.20	0	.10	14	7.7	4.2	0	1.2	.40	2.2
28	1.9	.40	.20	0	.50	9.7	6.6	4.0	0	1.0	.40	1.5
29	2.0	.30	.20	0	-----	11	6.6	3.4	0	1.5	.40	1.6
30	3.8	.20	.30	0	-----	9.7	6.4	3.0	0	1.6	.40	1.6
31	3.8	-----	.30	0	-----	8.3	3.2	-----	-----	1.4	.30	-----
TOTAL	54.4	50.20	6.10	4.20	1.00	304.1	224.2	167.1	27.20	27.00	27.90	58.10
MEAN	1.75	1.67	.20	.14	.036	9.81	7.47	5.39	.91	.87	.90	1.94
MAX	3.8	3.2	.40	.30	.50	20	12	7.1	3.0	3.0	13	6.2
MIN	1.2	.20	.10	0	0	2.0	4.6	3.0	0	0	0	1.0
AC-FT	108	100	12	8.3	2.0	603	445	331	54	54	55	115

CAL YR 1960: TOTAL 4,289.50 MEAN 11.7 MAX 310 MIN 0 AC-FT 8,510  
 WAT YR 1961: TOTAL 951.50 MEAN 2.61 MAX 20 MIN 0 AC-FT 1,890

5-0572. Baldhill Creek near Dazey, N. Dak.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	1.5	1.4	1.4	0	.10	.10	70	7.1	22	9.0	4.4	1.4
2	1.5	1.2	1.4	.10	.10	.10	75	6.4	20	25	4.0	1.8
3	1.5	1.2	1.3	.20	.10	.10	85	6.2	18	40	3.6	3.0
4	1.5	1.3	1.3	.20	.10	.10	120	6.2	18	25	2.8	3.4
5	1.4	1.1	1.3	.10	.10	.10	140	6.0	18	9.1	2.7	2.8
6	1.3	1.2	1.4	.10	.10	.10	119	5.3	18	40	2.7	2.5
7	1.2	1.3	1.2	.10	.10	.10	82	5.0	23	70	2.4	2.4
8	1.1	1.2	1.4	.10	.10	.10	86	4.8	34	40	2.2	6.6
9	1.1	1.3	1.3	.10	.10	.10	95	4.8	31	18	2.0	5.3
10	1.3	1.4	1.0	.10	.10	.10	86	4.8	27	14	2.4	5.0
11	2.4	1.5	.80	.10	.10	.10	70	4.6	24	12	8.8	4.0
12	3.0	1.6	.50	.10	.10	.10	57	4.6	20	11	8.3	3.4
13	2.5	1.6	.40	.10	.10	.10	44	5.0	17	10	6.0	2.5
14	2.4	1.5	.40	.10	.10	.10	38	5.5	15	8.8	3.8	2.5
15	2.3	1.4	.30	.10	.10	.10	29	6.6	14	8.0	2.5	2.4
16	2.2	1.3	.20	.10	.10	.10	23	7.7	17	7.4	1.8	2.8
17	2.2	1.4	.20	.10	.10	.10	20	8.8	16	6.6	1.5	2.8
18	1.8	1.3	.20	.10	.10	.10	20	9.1	16	7.7	1.2	2.7
19	1.6	1.4	.20	.10	.10	.10	18	11	15	11	1.5	2.5
20	1.4	1.6	.20	.10	.10	.10	17	17	16	9.1	1.6	2.4
21	1.4	1.6	.20	.10	.10	.20	17	20	20	8.0	1.5	2.3
22	1.4	1.6	.20	.10	.10	.30	14	24	21	7.4	1.4	2.5
23	1.4	1.6	.30	.10	.10	.20	12	33	19	6.6	1.3	2.4
24	1.5	1.5	.20	.10	.10	.20	11	34	17	6.4	1.3	2.4
25	1.6	1.6	.10	.10	.10	1.0	11	35	14	5.7	1.2	2.4
26	1.4	1.5	.20	.10	.10	50	9.7	32	12	5.5	1.0	2.3
27	1.4	1.4	.20	.10	.10	120	9.1	28	11	5.3	.90	2.2
28	1.5	1.4	0	.10	.10	290	8.6	25	10	5.0	.80	2.2
29	1.5	1.4	0	.10	.10	120	8.6	25	9.0	5.0	.80	2.3
30	1.4	1.4	0	.10	.10	100	8.3	27	8.0	4.6	.90	2.7
31	1.5	0	0	.10	.10	110	-----	25	-----	4.6	1.1	-----
TOTAL	51.4	42.2	17.80	3.20	2.80	793.90	1,403.3	444.7	540.0	440.8	78.40	85.9
MEAN	1.66	1.41	.57	.10	.10	25.6	46.8	14.3	18.0	14.2	2.53	2.86
MAX	3.0	1.6	1.4	.20	.10	290	140	35	34	10	8.8	6.6
MIN	1.1	1.1	0	0	.10	.10	8.3	4.6	8.0	4.6	.80	1.4
AC-FT	102	84	35	6.4	5.6	1,570	2,780	882	1,070	874	156	170

CAL YR 1961: TOTAL 952.20 MEAN 2.61 MAX 20 MIN 0 AC-FT 1,890

WAT YR 1962: TOTAL 3,904.40 MEAN 10.7 MAX 290 MIN 0 AC-FT 7,740

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	2.3	3.0	4.8	.20	0	0	8.0	5.7	6.6	1.1	.40	.70
2	2.2	2.8	4.8	.20	0	0	9.1	5.7	1.0	1.2	1.1	1.1
3	2.0	2.8	4.6	.20	0	0	16	6.2	5.5	.70	1.5	1.0
4	1.8	2.7	4.0	.20	0	0	20	6.9	7.1	.40	1.3	.90
5	2.2	2.8	3.6	.20	0	0	22	6.6	5.7	.20	1.0	.80
6	2.8	4.0	3.6	.20	0	0	23	6.4	5.5	.20	1.0	.80
7	3.6	4.8	3.4	.20	0	0	22	6.6	5.5	.40	.90	.70
8	3.8	4.4	3.2	.20	0	0	18	6.4	4.8	.40	.90	.70
9	4.0	4.4	3.0	.20	0	0	14	6.0	8.6	.20	.80	.60
10	3.8	4.4	2.8	.10	0	0	11	5.7	7.1	.20	.70	.60
11	3.6	4.4	2.6	.10	0	0	9.7	5.5	5.3	1.1	.70	.60
12	3.4	4.4	2.4	.10	0	0	8.8	5.7	5.0	2.3	1.5	.60
13	3.2	4.4	2.2	.10	0	0	8.3	7.1	5.3	3.6	1.6	.60
14	3.0	4.4	2.2	.10	0	0	7.7	6.6	5.0	4.2	1.5	1.0
15	3.2	4.4	2.0	.10	0	.10	7.4	6.0	4.6	6.0	1.4	1.2
16	3.0	4.2	2.0	.10	0	.20	7.0	5.5	4.0	6.2	1.4	1.4
17	2.7	5.0	2.0	.10	0	.20	6.6	4.8	3.6	6.2	1.3	1.6
18	2.5	4.6	1.8	.10	0	.20	5.7	4.0	3.2	5.0	1.3	1.6
19	2.4	4.6	1.8	.10	0	.20	6.2	3.4	3.2	4.4	1.2	1.4
20	2.4	4.4	1.6	0	0	.20	6.0	4.2	2.5	3.2	1.1	1.3
21	2.3	4.4	1.4	0	0	1.0	5.7	4.8	1.6	2.4	1.0	1.3
22	2.5	4.8	1.2	0	0	5.0	5.7	4.2	1.1	1.6	.90	1.2
23	2.5	5.0	1.0	0	0	6.0	5.7	4.2	1.3	1.2	.60	1.1
24	2.5	5.0	.60	0	0	7.0	6.0	4.0	1.4	1.0	.40	1.7
25	2.3	5.0	.60	0	0	10	6.2	3.0	1.6	.40	.40	1.1
26	2.4	5.0	.40	0	0	8.0	6.4	3.6	1.6	.30	1.0	1.0
27	2.5	4.8	.40	0	0	7.0	7.0	7.7	1.6	.20	1.0	.80
28	2.7	4.8	.40	0	0	7.0	7.0	8.3	1.4	.20	1.2	1.2
29	2.7	4.8	.40	0	-----	7.5	6.9	7.1	1.2	.20	.80	.70
30	2.7	4.8	.20	0	-----	7.5	6.0	6.2	1.1	.20	.70	.70
31	2.8	-----	.20	0	-----	8.0	-----	6.2	-----	.10	.40	-----
TOTAL	85.3	129.3	65.20	2.80	0	75.10	299.1	175.0	117.7	54.80	31.10	30.00
MEAN	2.77	4.31	2.10	.090	0	2.42	9.97	5.65	3.92	1.77	1.00	1.00
MAX	4.0	5.0	4.8	.20	0	10	23	8.3	8.6	6.2	1.6	1.7
MIN	1.8	2.7	.20	0	0	0	5.7	3.0	1.1	.10	.40	.60
AC-FT	170	256	129	5.6	0	149	593	347	233	109	62	60

CAL YR 1962: TOTAL 4,073.30

MEAN 11.2

MAX 290

MIN 0

AC-FT 8,080

WAT YR 1963: TOTAL 1,065.90

MEAN 2.92

MAX 23

MIN 0

AC-FT 2,110

5-0572. Baldhill Creek near Dazey, N. Dak.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964											
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	SEPT.
1	.20	.50	1.6	.20	.40	.20	9.0	6.0	.60	29	2.2
2	.10	.70	1.6	.20	.40	.30	17	6.5	.50	25	2.4
3	.10	.80	1.6	.20	.40	.20	12	9.1	.40	22	2.0
4	.20	.90	1.6	.20	.40	.20	18	14	.30	21	1.7
5	.20	.70	1.6	.20	.40	.10	14	17	.20	21	1.4
6	.20	.80	1.6	.20	.30	.10	11	15	.40	21	1.3
7	.30	.80	1.6	.20	.20	.10	10	12	.60	21	1.2
8	.20	.90	.90	.20	.20	.10	16	10	1.1	20	1.0
9	.40	1.1	.90	.20	.20	.10	21	7.0	9.0	19	1.2
10	.40	1.1	.90	.20	.20	.20	23	5.6	27	19	1.7
11	.60	1.0	.70	.20	.20	.40	16	11	18	18	1.7
12	.60	1.0	.80	.20	.20	.50	9.0	8.0	17	16	1.6
13	.60	1.0	.90	.20	.20	1.5	7.0	4.2	16	17	1.6
14	.70	1.0	.70	.20	.20	1.7	14	4.6	15	14	1.4
15	.80	1.1	.60	.20	.20	2.0	24	5.6	12	11	1.6
16	1.0	1.4	.60	.20	.10	2.0	22	6.5	10	9.6	1.4
17	1.0	1.4	.60	.20	.10	1.4	18	5.6	13	8.1	1.4
18	1.0	1.4	.60	.20	.10	1.3	14	6.5	16	6.0	1.3
19	2.5	1.4	.50	.20	.10	.90	13	5.6	30	4.6	1.1
20	4.8	1.8	.40	.20	.10	.70	12	4.2	48	6.5	1.7
21	4.6	1.5	.30	.20	.10	.60	14	4.2	31	4.6	1.9
22	2.0	1.6	.20	.20	.10	.70	12	4.2	23	5.1	2.1
23	1.2	1.5	.30	.30	.10	.70	11	3.4	22	4.6	1.4
24	1.3	1.4	.20	.30	.10	.50	8.6	2.7	22	4.2	1.1
25	.80	1.5	.20	.30	.10	.30	9.1	2.4	22	3.1	7.0
26	.80	1.6	.20	.30	.10	.30	12	2.0	25	2.7	3.8
27	.80	1.9	.20	.30	.10	.30	13	1.3	35	2.7	3.4
28	.80	2.0	.20	.20	.20	.20	11	1.1	39	2.7	6.0
29	.80	1.9	.20	.20	.20	.20	9.1	1.0	41	2.7	8.6
30	.60	1.8	.10	.20	-----	.20	7.6	.90	34	2.7	9.1
31	.50	-----	.10	.40	-----	.20	-----	.70	-----	2.2	8.1
TOTAL	30.10	37.50	22.50	6.90	5.70	18.20	407.4	185.90	529.10	366.1	141.9
MEAN	.97	1.25	.73	.22	.20	.59	13.6	6.00	17.6	11.8	4.53
MAX	4.8	2.0	1.6	.40	.40	2.0	24	17	48	29	21
MIN	.10	.50	.10	.20	.10	.10	7.0	.70	.20	2.2	1.0
AC-FT	60	74	45	14	11	36	808	369	1,050	726	281

CAL YR 1963: TOTAL 875.70 MEAN 2.40 MAX 23 MIN 0 AC-FT 1,740

WAT YR 1964: TOTAL 1,887.10 MEAN 5.16 MAX 48 MIN .10 AC-FT 3,740

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965											
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	SEPT.
1	6.3	3.8	1.6	.50	.40	.30	2.0	25	13	9.6	1.3
2	6.6	3.3	1.6	.50	.40	.30	2.5	25	16	8.3	1.4
3	5.6	3.4	1.6	.50	.40	.30	17	26	17	4.6	.90
4	5.3	3.3	1.4	.50	.40	.30	47	22	16	3.8	11
5	5.0	3.2	1.4	.50	.40	.40	114	23	15	2.8	9.7
6	4.9	3.1	1.4	.50	.40	.50	32	25	14	2.5	8.6
7	4.9	3.1	1.4	.50	.40	.40	3.0	24	13	2.3	7.6
8	4.5	3.1	1.2	.50	.40	.80	133	23	12	8.5	6.3
9	4.3	3.1	1.2	.50	.40	7.0	300	23	11	8.3	5.7
10	4.3	3.0	1.2	.50	.40	6.0	900	23	10	6.7	4.6
11	4.4	3.2	1.2	.40	.40	5.0	1,200	22	10	5.4	8.9
12	4.7	3.4	1.2	.40	.40	5.0	1,530	21	9.3	6.0	8.3
13	4.9	3.4	1.2	.40	.30	5.5	930	19	8.9	16	7.3
14	4.8	3.4	1.0	.40	.30	4.0	545	20	8.3	25	6.3
15	4.8	3.4	.90	.40	.30	3.5	346	22	7.6	19	5.4
16	4.7	3.0	.90	.40	.30	3.0	232	20	7.0	17	4.9
17	4.6	3.2	.80	.40	.40	3.5	171	19	6.0	13	4.4
18	4.4	3.1	.80	.40	.40	2.0	139	18	5.7	11	3.8
19	4.2	3.1	.70	.40	.40	1.5	121	17	6.0	9.3	3.0
20	4.1	2.8	.60	.40	.50	1.4	109	16	6.3	9.7	2.3
21	4.3	2.4	.60	.40	.40	1.2	90	16	5.7	10	2.3
22	3.5	2.4	.60	.40	.40	1.2	75	13	5.4	12	1.8
23	3.7	2.4	.60	.40	.40	1.0	63	14	5.2	28	1.4
24	3.7	2.4	.70	.40	.40	1.0	55	15	4.4	25	1.6
25	3.8	2.2	.70	.40	.50	.80	48	17	3.5	20	2.8
26	3.5	2.2	.70	.40	.60	.80	42	18	5.2	17	3.0
27	3.6	2.0	.60	.40	.60	.60	37	17	7.9	15	4.6
28	3.4	2.0	.60	.40	.50	.40	33	15	6.7	13	3.3
29	3.4	1.8	.60	.40	-----	.40	31	16	5.4	12	3.0
30	3.4	1.6	.60	.40	-----	.20	27	15	4.1	12	2.5
31	3.4	-----	.50	.40	-----	.50	-----	14	-----	13	2.1
TOTAL	137.0	85.8	30.10	13.40	11.50	68.80	7,448.5	603	265.6	365.8	210.7
MEAN	4.42	2.86	.97	.43	.41	2.22	26.8	19.5	8.85	11.8	6.80
MAX	6.6	3.8	1.6	.50	.40	6.0	1,530	26	17	28	15
MIN	3.4	1.6	.50	.40	.30	.20	2.0	13	3.5	2.3	1.4
AC-FT	272	170	60	27	23	136	14,770	1,200	527	726	418

CAL YR 1964: TOTAL 2,049.90 MEAN 5.60 MAX 48 MIN .10 AC-FT 4,070

WAT YR 1965: TOTAL 9,478.40 MEAN 26.0 MAX 1,530 MIN .20 AC-FT 18,800

5-0575. Lake Ashtabula at Baldhill Dam, N. Dak.

Location.--Lat 47°02'00", long 98°05'00", in NW $\frac{1}{4}$  sec.18, T.141 N., R.58 W., at Baldhill Dam on Sheyenne River, 8 miles northwest of Valley City.

Drainage area.--7,470 sq mi, approximately, of which about 5,560 sq mi is probably noncontributing (includes 3,800 sq mi in closed basins).

Records available.--July 1949 to September 1965.

Gage.--Water-stage recorder. Datum of gage is at mean sea level, datum of 1929.

Extremes.--Maximums and minimums (contents in acre-feet, elevation in feet) for the water years 1961-65 are contained in the following table:

Water year	Maximum			Minimum		
	Date	Contents	Elevation	Date	Contents	Elevation
1961	May 14, 1961	70,040	1,265.90	Feb. 28, 1961	55,550	1,263.21
1962	May 25, 1962	73,678	1,266.54	Mar. 26, 1962	52,160	1,262.48
1963	Oct. 12, 1962	68,640	1,265.65	Mar. 20, 1963	54,750	1,263.05
1964	June 23, 1964	75,160	1,266.80	Mar. 20, 1964	51,350	1,262.30
1965	Apr. 14, 1965	82,100	1,268.00	Apr. 2, 1965	54,360	1,262.97

1949-65: Maximum contents, 91,400 acre-ft May 14, 1950 (elevation, 1,269.46 ft); minimum since reservoir first reached spillway level, 6,660 acre-ft Aug. 11-14, 1950 (elevation, 1,245.13 ft).

Remarks.--Reservoir is formed by an earthfill dam, 1,650 ft long; storage began on July 30, 1949; dam completed September 1949. Usable capacity, 69,100 acre-ft between invert of outlet conduit, elevation, 1,238.0 ft, and normal pool level, elevation, 1,266.0 ft. Dead storage below elevation 1,238.0 ft, 1,500 acre-ft. Maximum pool elevation, 1,273.2 ft, capacity, 116,500 acre-ft. Low flows are controlled by 2 sluice gates 3 ft in diameter. The spillway crest is 120 ft long at elevation 1,252.0 ft, surmounted by 3 tainter gates, each 15 ft high and 40 ft long. The reservoir is operated for flood control and improvement of low-water flow.

Cooperation.--Records furnished by Corps of Engineers.

Revisions (water years).--WSP 1238: 1950(M). WSP 1728: Drainage area.

MONTH-END ELEVATION AND CONTENTS, WATER YEARS OCTOBER 1960 TO SEPTEMBER 1965

Date	Elevation (feet)†	Contents (acre-feet)	Change in contents (acre-feet)	Date	Elevation (feet)†	Contents (acre-feet)	Change in contents (acre-feet)
Oct. 31, 1960.....	1,265.05	65,280	-1,120	Oct. 31, 1963.....	1,263.75	58,250	-1,650
Nov. 30.....	1,264.64	63,020	-2,260	Nov. 30.....	1,263.29	55,950	-2,300
Dec. 31.....	1,264.19	60,545	-2,475	Dec. 31.....	1,262.88	53,560	-1,990
Calendar year 1960	-	-	+1,395	Calendar year 1963	-	-	-9,060
Jan. 31, 1961.....	1,263.64	57,700	-2,845	Jan. 31, 1964.....	1,262.51	52,300	-1,660
Feb. 28.....	1,263.21	55,550	-2,150	Feb. 29.....	1,262.31	51,400	-900
Mar. 31.....	1,264.27	60,985	+5,435	Mar. 31.....	1,262.35	51,580	+180
Apr. 30.....	1,265.46	67,576	+6,591	Apr. 30.....	1,264.88	64,340	+12,760
May 31.....	1,265.46	67,698	+112	May 31.....	1,265.21	66,180	+1,840
June 30.....	1,265.01	65,066	-2,632	June 30.....	1,266.28	72,200	+6,020
July 31.....	1,264.74	63,570	-1,486	July 31.....	1,265.76	69,260	-2,940
Aug. 31.....	1,264.12	60,160	-3,410	Aug. 31.....	1,266.16	71,510	+2,250
Sept. 30.....	1,264.16	60,380	+220	Sept. 30.....	1,266.10	71,170	-340
Water year 1961...	-	-	-6,020	Water year 1964...	-	-	+11,270
Oct. 31.....	1,263.78	58,400	-1,980	Oct. 31.....	1,266.13	71,340	+170
Nov. 30.....	1,263.58	57,400	-1,000	Nov. 30.....	1,265.83	69,650	-1,690
Dec. 31.....	1,263.44	56,700	-700	Dec. 31.....	1,265.44	67,460	-2,190
Calendar year 1961	-	-	-3,845	Calendar year 1964	-	-	+13,500
Jan. 31, 1962.....	1,263.30	56,000	-700	Jan. 31, 1965.....	1,264.98	64,890	-2,570
Feb. 28.....	1,263.19	55,450	-550	Feb. 28.....	1,264.51	62,300	-2,590
Mar. 31.....	1,263.68	57,900	+2,450	Mar. 31.....	1,263.03	54,650	-7,650
Apr. 30.....	1,266.05	70,985	+12,985	Apr. 30.....	1,266.30	72,310	+17,660
May 31.....	1,266.21	71,797	+912	May 31.....	1,265.99	70,540	-1,770
June 30.....	1,265.98	70,488	-1,309	June 30.....	1,266.16	71,510	+970
July 31.....	1,265.97	70,432	-56	July 31.....	1,265.85	69,760	-1,750
Aug. 31.....	1,265.60	68,360	-2,072	Aug. 31.....	1,265.87	69,870	+110
Sept. 30.....	1,265.65	68,640	+280	Sept. 30.....	1,266.18	71,630	+1,760
Water year 1962...	-	-	+8,260	Water year 1965...	-	-	+460
Oct. 31.....	1,265.35	66,960	-1,680	† Elevation at 2400 hours.			
Nov. 30.....	1,265.13	65,730	-1,230				
Dec. 31.....	1,264.64	63,020	-2,710				
Calendar year 1962	-	-	+6,320				
Jan. 31, 1963.....	1,263.98	59,400	-3,620				
Feb. 28.....	1,263.33	56,150	-3,250				
Mar. 31.....	1,263.70	58,000	+1,850				
Apr. 30.....	1,264.63	62,960	+4,960				
May 31.....	1,265.00	65,000	+2,040				
June 30.....	1,265.05	65,280	+280				
July 31.....	1,264.99	64,950	-330				
Aug. 31.....	1,264.55	62,530	-2,420				
Sept. 30.....	1,264.07	59,900	-2,630				
Water year 1963...	-	-	-8,740				

5-0580. Sheyenne River below Baldhill Dam, N. Dak.

Location.--Lat 47°01'50", long 98°05'00", in NW $\frac{1}{4}$  sec.18, T.141 N., R.58 W., on right bank 600 ft downstream from Baldhill Dam, 8 miles northwest of Valley City, and at mile 270.5.

Drainage area.--7,470 sq mi, approximately, of which about 5,560 sq mi is probably noncontributing (includes 3,800 sq mi in closed basins).

Records available.--October 1949 to September 1965. Monthly discharge only for some periods, published in WSP 1308.

Gage.--Water-stage recorder and concrete control. Datum of gage is 1,200.00 ft above mean sea level, datum of 1929.

Average discharge.--16 years, 95.3 cfs (68,990 acre-ft per year), unadjusted; median of yearly mean discharges, 67 cfs (48,500 acre-ft per year), unadjusted.

Extremes.--Maximum and minimum discharges for the water years 1961-65 are contained in the following table:

Water year	Maximum			Minimum		
	Date	Discharge (cfs)	Gage height (feet)	Date	Discharge (cfs)	Gage height (feet)
1961	Nov. 27, 1960	697	27.88	Sept. 30, 1961	0.10	25.14
1962	Apr. 10, 11, 1962	778	27.67	Oct. 1, 1961	.10	25.14
1963	June 27-29, 1964	56	b 26.30	July 30, 1963	.10	25.12
1964	Apr. 14, 1965	679	27.51	Sept. 10, 11, 1964	2.7	25.37
1965		2,990	32.69	Aug. 17, 1965	8.2	25.60

a Nov. 15 to Dec. 1, 1962.

b Maximum gage height for year, 26.31 ft Jan. 10-24, 1963.

1949-65: Maximum discharge, 3,150 cfs May 23, 1950 (gage height, 32.62 ft); no flow at times in 1950, 1952-53.

Maximum discharge known, about 4,600 cfs Apr. 27 or 28, 1948.

Remarks.--Records good. Flow completely regulated by Lake Ashtabula (see station 5-0575). Records prior to 1955 do not include releases at Baldhill Dam to the fish-rearing ponds of the Fish and Wildlife Service. Records of chemical analyses for the water years 1961-65 are published in reports of the Geological Survey.

Revisions.--WSP 1728: Drainage area.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	15	14	66	45	46	33	13	11	15	11	14	12
2	15	14	58	45	46	33	13	11	14	12	14	12
3	15	14	52	45	46	33	13	12	14	13	14	13
4	15	14	48	45	46	33	13	12	14	13	13	14
5	15	14	48	45	46	33	12	12	14	13	12	14
6	16	14	48	45	46	33	12	12	14	13	13	13
7	16	14	48	45	46	33	12	12	14	14	14	13
8	16	14	48	45	46	33	12	12	14	14	14	13
9	16	14	46	45	46	33	12	13	13	15	14	13
10	16	14	46	45	44	29	11	13	14	15	14	10
11	16	14	45	45	38	15	11	13	15	15	15	11
12	16	14	45	45	38	13	11	13	13	16	15	13
13	16	14	45	45	38	13	11	13	13	16	14	12
14	16	14	45	45	37	13	10	13	13	16	14	13
15	16	25	45	45	36	12	10	13	14	16	14	13
16	16	49	45	45	34	12	10	20	16	16	14	14
17	16	49	45	45	34	12	9.5	20	16	13	14	14
18	16	49	45	45	34	12	9.5	16	17	14	14	14
19	5.3	49	45	45	34	12	9.2	15	16	14	14	16
20	.40	49	45	45	34	12	9.8	15	18	15	13	15
21	.20	49	45	45	34	12	9.2	14	15	14	13	16
22	.20	49	45	45	34	12	8.8	14	11	14	13	16
23	1.0	48	45	45	34	12	8.5	15	12	14	13	16
24	12	48	45	45	34	12	7.0	15	12	13	12	17
25	40	46	45	46	34	12	11	12	12	13	13	17
26	25	49	45	46	34	12	12	12	11	13	14	17
27	7.6	170	45	46	33	12	12	12	11	14	14	9.9
28	7.9	49	45	46	33	12	12	13	12	14	15	.20
29	9.2	52	45	46	-----	13	11	14	12	14	14	.20
30	10	55	45	46	-----	13	11	13	10	14	14	.10
31	13	-----	45	46	-----	13	-----	14	-----	14	13	-----
TOTAL	414.80	1,091	1,453	1,402	1,085	587	326.5	419	409	436	425	371.40
MEAN	13.4	36.4	46.9	45.2	38.8	18.9	10.9	13.5	13.6	14.1	13.7	12.4
MAX	40	170	66	46	46	33	13	20	18	16	15	17
MIN	.20	14	45	45	33	12	7.0	11	10	11	12	.10
AC-PT	823	2,160	2,880	2,780	2,150	1,160	648	831	811	865	843	737
(+)	0	0	0	0	0	0	24	381	258	140	204	38
MEAN†	13.4	36.4	46.9	45.2	38.8	18.9	11.3	19.7	18.0	16.3	17.0	13.0
AC-PT‡	823	2,160	2,880	2,780	2,150	1,160	671	1,210	1,070	1,000	1,050	775
CAL YR 1960: TOTAL	33,600.10	MEAN 91.8	MAX 1,560	MIN 20	AC-PT 66,640	MEAN † 93.1	AC-PT ‡ 67,610					
WAT YR 1961: TOTAL	8,419.70	MEAN 23.1	MAX 170	MIN 10	AC-PT 16,700	MEAN † 24.5	AC-PT ‡ 17,730					

† Diversion, in acre-feet, from Lake Ashtabula, furnished by the U.S. Fish and Wildlife Service.

‡ Adjusted for diversion.

5-0580. Sheyenne River below Baldhill Dam, N. Dak.--Continued

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	6-7	14	15	15	14	56	74	101	163	80	27	14
2	11	14	15	15	14	64	73	53	163	80	27	14
3	29	14	15	15	14	68	71	30	163	80	27	13
4	42	14	15	15	14	69	71	31	208	78	26	13
5	21	14	15	15	14	64	71	31	240	78	27	13
6	12	14	15	15	14	62	71	30	240	78	30	14
7	11	14	15	15	14	66	124	30	246	170	30	13
8	10	14	15	15	14	76	321	30	246	283	30	13
9	8-8	14	15	15	14	71	452	31	246	344	30	13
10	12	14	15	15	14	69	640	31	251	338	30	14
11	13	14	15	15	14	68	697	31	256	338	29	14
12	13	15	15	15	14	68	634	31	256	157	29	14
13	12	15	15	15	14	69	634	34	256	46	30	14
14	12	15	15	15	14	68	634	33	256	48	28	14
15	12	15	15	15	14	71	634	49	256	46	28	15
16	12	15	15	15	15	69	634	96	277	46	28	15
17	13	15	15	15	15	69	634	118	307	46	28	15
18	13	15	15	15	15	68	572	118	300	36	28	15
19	13	14	15	15	15	66	356	118	300	31	28	15
20	13	14	15	15	15	66	151	118	300	30	28	16
21	13	14	15	15	15	68	148	118	260	29	28	16
22	14	14	15	15	15	66	148	159	170	30	27	16
23	14	15	15	15	15	69	148	322	170	29	27	16
24	14	15	15	15	15	69	148	444	170	29	28	16
25	14	15	15	15	15	69	148	444	167	30	28	16
26	14	15	15	15	15	69	148	444	170	29	27	16
27	14	15	15	15	15	69	148	436	155	28	23	16
28	14	15	15	15	23	69	148	254	145	28	12	15
29	14	15	15	15	-----	69	148	163	142	27	13	15
30	14	15	15	15	-----	71	132	163	103	28	13	15
31	14	-----	15	14	-----	71	-----	163	-----	30	14	-----
TOTAL	462.5	435	465	464	413	2,106	9,012	4,254	6,582	2,758	808	440
MEAN	14.3	14.5	15.0	15.0	14.8	67.9	300	137	219	89.0	26.1	14.7
MAX	42	15	15	15	23	76	697	444	307	344	30	16
MIN	6-7	14	15	14	14	56	71	30	103	27	12	13
AC-FT	878	863	922	920	819	4,180	17,880	8,440	13,060	5,470	1,600	873
(+)	0	0	0	0	0	0	72	206	200	150	33	12
MEAN#	14.3	14.5	15.0	15.0	14.8	67.9	302	141	223	91.4	26.6	14.9
AC-FT#	878	863	922	920	819	4,180	17,950	8,640	13,250	5,620	1,640	885

CAL YR 1961: TOTAL 6,803.40 MEAN 18.6 MAX 46 MIN .10 AC-FT 13,490 MEAN # 20.1 AC-FT # 14,530  
 WAT YR 1962: TOTAL 28,179.5 MEAN 77.2 MAX 697 MIN 6.7 AC-FT 55,890 MEAN # 78.1 AC-FT # 56,570

† Diversion, in acre-feet, from Lake Ashtabula, furnished by the U.S. Fish and Wildlife Service.

‡ Adjusted for diversion.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	15	22	56	48	49	38	8-8	11	14	11	9-8	10
2	16	22	55	48	49	38	7-9	11	14	12	5-4	10
3	14	22	55	48	49	37	7-9	11	13	13	4-5	10
4	12	22	55	48	49	37	8-2	11	13	13	4-0	10
5	13	22	55	48	49	37	9-5	11	13	11	4-9	10
6	13	22	55	49	49	37	10	11	13	9-2	5-6	10
7	13	22	55	49	49	37	10	11	13	8-8	8-8	10
8	13	22	55	49	49	36	10	11	12	8-2	5-2	10
9	13	22	55	49	49	34	9-5	12	12	8-2	8-7	10
10	14	22	55	49	49	34	9-5	12	12	8-2	9-2	10
11	14	22	55	49	49	34	10	12	12	7-9	8-5	10
12	14	22	53	49	49	34	10	12	12	8-2	7-9	9-8
13	14	22	52	49	49	34	10	12	12	8-2	7-4	9-8
14	14	41	51	49	49	34	10	12	12	8-2	8-5	9-8
15	15	56	49	49	49	34	11	12	12	7-9	8-5	9-8
16	15	56	48	49	49	34	11	13	12	7-9	8-8	9-5
17	15	56	48	49	49	34	9-2	13	12	8-2	9-2	9-2
18	15	56	48	49	49	34	9-8	13	12	8-2	5-2	9-8
19	15	56	48	49	46	38	10	13	12	7-6	9-2	6-8
20	15	56	48	49	41	38	11	13	12	7-4	9-5	7-1
21	15	56	48	49	41	38	11	13	11	7-4	9-5	7-1
22	15	56	48	49	40	37	11	13	11	6-8	9-5	7-1
23	15	56	48	49	40	37	11	13	11	6-8	9-5	6-8
24	20	56	48	49	40	37	11	13	11	6-5	9-5	6-8
25	24	56	48	49	40	36	11	13	11	6-0	9-5	7-1
26	23	56	48	49	40	18	11	13	11	6-2	9-5	7-4
27	22	56	48	49	39	8-2	11	13	11	6-2	9-5	7-4
28	22	56	48	49	39	8-2	11	13	12	5-9	9-8	7-6
29	22	56	48	49	-----	8-2	11	13	11	.20	9-8	7-6
30	22	56	48	49	-----	8-8	11	14	11	1-6	10	7-6
31	22	-----	48	49	-----	8-8	-----	14	-----	10	-----	-----
TOTAL	504	1,223	1,579	1,516	1,288	958.2	303.3	382	360	245.90	249.9	259.8
MEAN	16.3	40.8	50.9	48.8	46.0	30.9	10.1	12.3	12.0	7.93	8.35	8.66
MAX	24	56	56	49	49	38	11	14	14	13	10	10
MIN	12	22	48	48	39	8-2	7-9	11	11	.20	4-0	5-6
AC-FT	1,000	2,430	3,130	3,000	2,550	1,900	602	758	714	488	514	515
(+)	10	0.6	0	0	0	0	152	347	230	138	173	30
MEAN#	16.5	40.8	50.9	48.8	46.0	30.9	12.7	17.9	15.9	10.1	11.2	9.16
AC-FT#	1,010	2,450	3,130	3,000	2,550	1,900	754	1,100	944	626	687	545

CAL YR 1962: TOTAL 30,143 MEAN 82.6 MAX 697 MIN 12 AC-FT 59,790 MEAN # 83.5 AC-FT # 60,470  
 WAT YR 1963: TOTAL 8,876.10 MEAN 24.3 MAX 56 MIN .20 AC-FT 17,610 MEAN # 25.8 AC-FT # 18,690

† Diversion, in acre-feet, from Lake Ashtabula, furnished by the U.S. Fish and Wildlife Service.

‡ Adjusted for diversion.

## RED RIVER OF THE NORTH BASIN

5-0580. Sheyenne River below Baldhill Dam, N. Dak.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964												
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	7.9	8.8	40	27	24	8.2	13	8.5	11	670	11	42
2	7.9	8.8	40	26	24	8.2	12	8.8	11	511	11	41
3	8.2	8.8	40	26	24	8.2	12	9.2	11	281	11	43
4	8.2	8.8	40	26	24	8.2	12	8.8	10	208	11	43
5	8.2	8.5	40	26	24	8.2	11	9.2	6.7	208	11	43
6	8.8	8.2	40	26	24	8.2	11	9.2	6.7	204	11	43
7	8.8	7.9	40	26	24	8.2	11	9.2	5.4	204	11	41
8	9.2	8.2	40	26	22	8.2	12	8.8	5.2	204	11	43
9	9.2	8.2	40	26	22	9.5	12	9.2	4.2	204	11	21
10	9.5	8.2	39	27	22	11	12	8.8	5.6	352	12	2.9
11	9.5	8.2	40	27	22	11	12	9.2	6.7	460	12	16
12	9.8	24	39	27	22	12	12	9.5	5.4	292	11	36
13	9.5	32	39	26	22	12	12	7.9	6.2	93	11	37
14	9.8	32	39	26	22	12	11	8.5	6.7	51	11	42
15	9.8	32	40	26	22	12	9.8	8.5	6.4	51	9.8	55
16	9.8	32	40	26	22	13	8.5	8.8	6.2	34	9.8	58
17	10	32	39	26	22	13	8.5	9.5	6.2	15	9.8	55
18	10	32	39	25	22	13	7.9	9.8	7.0	13	8.5	31
19	10	32	39	25	18	13	7.9	10	72	10	10	19
20	10	34	39	25	9.2	13	7.9	10	172	11	13	19
21	9.5	36	39	25	9.2	13	8.2	10	300	12	13	18
22	7.9	37	39	25	9.2	13	9.5	10	468	12	14	18
23	7.9	37	39	25	8.8	13	9.2	11	643	12	15	18
24	7.9	37	32	24	8.8	13	7.3	11	652	12	15	18
25	8.2	38	27	24	8.8	13	9.2	10	643	12	15	18
26	8.2	39	27	24	8.8	13	8.8	11	634	11	15	18
27	8.5	40	27	24	7.9	13	7.6	10	643	11	16	18
28	8.5	40	27	24	7.9	13	8.2	10	679	11	17	17
29	8.8	40	27	24	8.2	13	8.8	10	670	12	16	17
30	8.8	40	27	24	8.2	13	9.2	10	670	12	27	16
31	8.8	-----	27	24	-----	13	-----	10	-----	12	42	-----
TOTAL	277.1	758.6	1,130	788	514.8	351.1	301.5	294.4	6,373.6	4,225	419.9	906.9
MEAN	8.94	25.3	36.5	25.4	17.8	11.4	10.1	9.50	212	136	13.5	30.2
MAX	10	40	40	27	24	13	13	11	679	670	42	58
MIN	7.9	7.9	27	24	7.9	8.2	7.3	7.9	6.2	10	2.9	2.9
AC-FT	550	1,500	2,240	1,560	1,020	700	598	584	12,640	8,340	833	1,800
(+)	0	0	0	0	0	0	0	0	337	284	210	119
MEAN±	8.94	25.3	36.5	25.4	17.8	11.4	10.0	15.0	217	141	17.0	32.2
AC-FT±	550	1,500	2,240	1,560	1,020	700	598	921	12,900	8,620	1,040	1,920
CAL YR 1963: TOTAL	7,735.80			MEAN 21.2	MAX 49	MIN .20	AC-PT 15,340	MEAN ± 228		AC-PT ± 16,400		
WAT YR 1964: TOTAL	16,322.9			MEAN 44.6	MAX 679	MIN 2.9	AC-PT 32,380	MEAN ± 46.3		AC-PT ± 35,570		

† Diversion, in acre-feet, from Lake Ashtabula, furnished by the U.S. Fish and Wildlife Service.

‡ Adjusted for diversion.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965												
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	15	30	50	56	52	58	122	454	226	18	351	23
2	15	39	50	56	52	56	122	454	163	35	365	13
3	16	53	49	56	52	54	122	454	163	47	351	13
4	15	53	49	57	53	54	122	264	163	45	260	14
5	20	53	49	57	53	52	122	166	166	44	163	16
6	28	53	49	57	53	52	163	166	163	45	156	14
7	29	53	49	57	54	50	218	166	166	45	156	14
8	28	53	48	57	48	50	218	163	122	47	152	15
9	28	52	48	59	47	50	213	170	120	67	199	15
10	28	52	49	59	47	52	302	264	120	89	218	17
11	28	52	49	57	47	52	980	332	120	89	222	17
12	28	52	49	56	47	52	1,680	332	120	90	222	33
13	29	52	49	56	47	50	2,570	293	120	90	222	39
14	28	53	50	56	47	52	2,840	166	120	89	157	41
15	28	53	50	56	48	53	2,980	170	117	87	107	49
16	29	53	50	56	49	49	2,970	166	117	90	71	49
17	29	53	50	56	52	174	2,850	104	117	89	51	77
18	29	53	50	55	53	213	2,740	78	94	89	23	92
19	29	53	50	56	54	260	2,440	78	71	90	19	92
20	29	53	50	55	40	265	2,050	76	54	87	17	94
21	29	53	50	55	45	260	1,810	76	54	142	15	101
22	29	53	52	55	50	265	1,730	75	38	181	15	101
23	29	53	52	55	52	265	1,570	75	19	271	15	99
24	29	53	52	55	52	260	1,280	75	15	467	17	99
25	29	52	52	55	54	260	1,130	127	15	546	16	96
26	29	52	52	55	54	260	804	156	15	566	17	94
27	29	52	52	54	56	254	750	254	16	566	59	140
28	29	52	52	54	58	265	662	332	16	558	90	186
29	29	52	52	53	-----	260	598	332	17	619	90	186
30	29	50	52	53	-----	254	550	338	17	358	63	186
31	29	-----	54	53	-----	200	-----	338	-----	358	39	-----
TOTAL	827	1,540	1,559	1,727	1,416	4,571	36,711	6,694	2,824	5,824	3,898	2,025
MEAN	26.7	51.3	50.3	55.7	50.6	147	1,224	216	94.1	188	126	67.5
MAX	29	53	54	59	58	265	2,980	454	226	556	351	186
MIN	15	30	48	53	40	50	122	75	15	18	13	13
AC-FT	1,640	3,050	3,090	3,430	2,810	9,070	72,820	13,280	5,600	11,550	7,730	4,020
(+)	0	0	0	0	0	0	0	0	312	296	142	106
MEAN±	26.7	51.3	50.3	55.7	50.6	147	1,224	221	99.2	190	129	70.9
AC-FT±	1,640	3,050	3,090	3,420	2,810	9,070	72,820	13,590	5,900	11,690	7,940	4,220
CAL YR 1964: TOTAL	18,083.2			MEAN 49.4	MAX 679	MIN 2.9	AC-PT 35,870	MEAN ± 51.5		AC-PT ± 37,060		
WAT YR 1965: TOTAL	69,616			MEAN 191	MAX 2,980	MIN 13	AC-PT 138,100	MEAN ± 192		AC-PT ± 139,200		

† Diversion, in acre-feet, from Lake Ashtabula, furnished by the U.S. Fish and Wildlife Service.

‡ Adjusted for diversion.

Note.--No gage-height record Dec. 14 to Jan. 3, Feb. 20 to Mar. 7.

5-0585. Sheyenne River at Valley City, N. Dak.

Location.--Lat 46°54'50", long 98°00'30", in SE 1/4 NW 1/4 sec. 28, T.140 N., R.58 W., on left bank 100 ft downstream from College Dam in Valley City, 13 miles downstream from Baldhill Dam, and at mile 253.0.

Drainage area.--7,810 sq mi, approximately, of which about 5,700 sq mi is probably noncontributing (includes 3,800 sq mi in closed basins).

Records available.--March to August 1919, March to June 1938, August 1938 to September 1965. Records for July 1938, published in WSP 855, have been found to be unreliable and should not be used.

Gage.--Water-stage recorder and concrete control. Datum of gage is 1,199.27 ft (revised) above mean sea level, datum of 1929 (levels by Corps of Engineers). March to August 1919, staff gage at site half a mile upstream at different datum. March to Oct. 13, 1938, staff gage at present site and datum.

Average discharge.--27 years (1938-65), 105 cfs (76,020 acre-ft per year), unadjusted; median of yearly mean discharges, 90 cfs (65,200 acre-ft per year), unadjusted.

Extremes.--Maximum and minimum discharges for the water years 1961-65 are contained in the following table:

Water year	Maximum			Minimum		
	Date	Discharge (cfs)	Gage height (feet)	Date	Discharge (cfs)	Gage height (feet)
1961	Mar. 2, 1961	251	4.01	Oct. 25, 1960	1.9	2.58
1962	July 7, 1962	1,270	9.71	Oct. 22, 1961	3.2	2.65
1963	July 26, 1963	78	a 3.39	Aug. 2, 1963	b 0	2.37
1964	June 28, 29, 1964	643	6.56	Oct. 3, 1963	3.0	c 2.70
1965	Apr. 16, 17, 1965	3,080	14.93	Sept. 3, 4, 1965	1.1	2.51

a Maximum gage height for year, 4.07 ft Apr. 3, backwater from snow.

b No flow for part of day.

c Occurred Feb. 27, 28, 1964

1919, 1938-65: Maximum discharge, 4,580 cfs Apr. 28, 1948 (gage height, 17.51 ft); no flow for several periods in 1938-41, part of Aug. 2, 1963.

Remarks.--Records good. Flow regulated by Lake Ashtabula (see station 5-0575).

Revisions (water years).--WSP 1388: 1939(M). WSP 1728: Drainage area. See also Records available.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961											
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	SEPT.
1	13	10	49	45	44	54	15	15	11	11	17
2	13	11	51	44	44	127	16	12	11	8.4	16
3	13	12	49	44	44	115	16	12	10	6.9	12
4	14	13	48	44	44	62	22	11	11	8.9	11
5	14	14	48	45	44	58	20	12	14	9.4	11
6	13	13	42	44	44	45	16	20	12	8.4	16
7	13	12	45	45	42	42	14	18	11	8.9	10
8	14	14	45	44	44	36	14	15	8.4	12	11
9	14	12	42	44	44	35	14	11	8.9	13	12
10	14	13	45	44	44	35	14	12	10	14	13
11	14	12	44	42	39	30	14	12	20	12	13
12	14	11	42	44	34	21	12	11	39	12	12
13	14	12	44	44	33	18	12	13	28	12	14
14	14	12	44	44	33	18	12	13	18	14	15
15	14	12	44	44	33	16	11	14	16	13	13
16	13	21	44	42	32	15	8.9	13	12	14	12
17	12	42	45	44	30	15	8.4	18	13	14	12
18	14	45	45	44	30	17	7.4	19	15	13	12
19	13	46	44	42	30	17	11	15	16	10	7.4
20	12	45	44	39	30	16	13	13	15	20	6.5
21	9.4	46	44	45	30	15	13	13	16	41	6.9
22	7.9	46	44	44	33	14	12	12	18	25	10
23	4.6	44	45	42	32	14	14	12	14	19	12
24	2.5	46	45	41	26	14	20	12	13	17	12
25	2.0	45	45	42	33	18	14	11	13	17	12
26	15	45	45	44	30	20	14	10	16	18	11
27	30	28	45	42	33	19	13	11	13	17	12
28	15	58	45	42	42	15	12	11	9.4	17	13
29	12	42	45	44	-----	14	13	10	8.4	26	12
30	13	51	45	42	-----	14	14	11	10	20	12
31	10	-----	45	42	-----	15	-----	13	-----	18	11
TOTAL	390.4	833	1,397	1,342	1,021	964	409.7	405	430.1	469.9	362.2
MEAN	12.6	27.8	45.1	43.3	36.5	31.1	13.7	13.1	14.3	15.2	11.7
MAX	30	58	51	45	44	127	22	20	39	41	17
MIN	2.0	10	42	39	26	14	7.4	10	8.4	6.9	6.5
AC-FT	774	1,650	2,770	2,660	2,030	1,910	813	803	853	932	718

CAL YR 1960: TOTAL 36,331.6 MEAN 99.3 MAX 1,550 MIN 2.0 AC-FT 72,060  
 WAT YR 1961: TOTAL 8,500.3 MEAN 23.3 MAX 127 MIN 2.0 AC-FT 16,860

## RED RIVER OF THE NORTH BASIN

5-0585. Sheyenne River at Valley City, N. Dak.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	3.3	14	14	14	14	17	102	107	178	107	35	18
2	3.4	18	14	14	14	30	112	88	174	96	35	17
3	6.9	7.9	14	14	14	56	164	41	178	334	34	28
4	18	14	14	14	14	64	194	32	189	264	34	18
5	33	14	13	14	14	69	174	34	252	107	35	16
6	30	14	14	13	13	66	153	28	258	248	34	13
7	22	14	12	13	13	64	107	28	266	877	30	14
8	17	13	12	14	13	71	198	30	268	532	28	28
9	12	13	14	13	13	74	436	33	273	414	26	42
10	14	13	13	12	13	74	510	34	276	402	54	32
11	26	14	13	13	14	71	729	33	278	394	169	24
12	22	14	13	14	14	66	643	35	280	280	48	21
13	19	14	14	14	14	64	640	37	285	204	35	21
14	18	14	14	14	14	69	645	39	292	69	33	20
15	17	14	14	14	14	69	640	42	299	66	33	18
16	17	14	14	14	14	69	640	69	334	58	30	22
17	18	13	14	14	14	66	640	144	320	54	30	19
18	14	14	14	14	14	69	620	135	320	75	30	18
19	13	14	14	13	14	69	480	130	320	230	30	19
20	13	14	14	14	14	69	200	124	320	71	30	20
21	14	14	14	14	14	74	150	130	315	48	32	21
22	13	14	14	14	14	86	146	159	234	51	34	17
23	14	14	14	14	14	86	146	268	201	44	34	18
24	14	14	14	14	14	91	146	454	202	41	30	20
25	15	14	13	14	14	91	148	460	201	37	30	19
26	12	13	14	14	14	250	148	460	192	30	30	20
27	14	12	13	14	14	650	146	458	188	30	30	18
28	15	14	12	14	14	750	141	402	153	34	32	18
29	15	14	12	14	14	190	148	202	153	34	23	18
30	14	13	13	14	14	130	146	186	157	35	18	21
31	15	13	13	14	14	138	180	180	180	35	18	21
TOTAL	491.6	409.9	418	427	387	3,802	9,492	4,602	7,356	5,323	1,124	618
MEAN	15.9	13.7	13.5	13.8	13.8	123	316	148	245	172	36.3	20.6
MAX	33	18	14	14	14	750	729	460	334	877	169	42
MIN	3.3	7.9	12	12	13	17	102	28	153	35	18	13
AC-FT	975	813	829	847	768	7,540	18,830	9,130	14,590	10,560	2,230	1,230

CAL YR 1961: TOTAL 7,199.4 MEAN 19.7 MAX 127 MIN 3.3 AC-FT 14,280  
WAT YR 1962: TOTAL 36,450.5 MEAN 94.4 MAX 877 MIN 3.3 AC-FT 68,330

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	18	28	54	49	53	42	13	11	17	15	10	11
2	18	26	54	48	53	42	12	17	20	12	5.0	16
3	17	25	54	49	51	42	20	14	28	13	11	12
4	21	26	54	49	51	42	12	12	31	13	9.0	9.4
5	18	23	42	49	49	41	18	14	19	14	7.2	9.4
6	14	30	60	49	53	42	26	14	18	14	30	11
7	15	28	54	51	51	42	24	14	22	14	20	10
8	15	26	48	51	51	41	21	14	21	11	20	11
9	15	25	48	51	49	41	17	15	18	8.9	10	8.4
10	15	24	56	45	48	41	14	14	19	8.9	4.1	10
11	16	24	49	51	49	41	18	13	18	15	16	14
12	14	24	49	49	51	41	23	14	18	11	13	13
13	16	23	53	49	51	40	18	16	15	9.4	7.4	11
14	17	23	53	49	51	39	14	11	14	8.4	6.5	12
15	18	42	53	49	51	41	11	9.4	16	7.9	7.9	16
16	17	54	53	49	51	40	16	11	16	7.4	10	17
17	16	53	53	51	51	36	11	12	18	7.4	9.4	15
18	18	54	53	51	51	44	5.3	11	22	6.8	9.4	15
19	18	54	51	51	51	48	6.1	12	23	20	11	13
20	18	54	49	51	44	42	7.4	18	22	13	7.4	11
21	18	54	49	51	46	40	7.4	17	18	11	8.4	10
22	19	51	49	51	45	42	8.9	14	18	8.4	9.4	10
23	18	54	46	54	42	42	6.9	11	19	6.9	7.9	10
24	18	54	49	53	44	42	6.9	11	17	4.9	8.4	11
25	21	54	48	51	44	39	8.4	11	18	4.0	10	10
26	25	54	46	51	44	35	6.1	12	17	17	13	6.9
27	28	54	51	54	42	22	6.5	20	14	11	11	5.7
28	25	56	49	51	42	17	14	12	14	7.4	13	6.9
29	25	54	48	51	18	18	10	15	15	7.4	11	5.7
30	25	54	48	51	14	11	11	16	16	4.6	10	6.1
31	24	48	51	51	14	14	14	14	14	3.3	8.9	6.1
TOTAL	580	1,205	1,571	1,557	1,364	1,153	400.9	409.4	563	316.0	246.20	328.5
MEAN	18.7	40.2	50.7	50.2	48.7	37.2	13.4	13.2	18.8	10.2	7.94	11.0
MAX	28	56	60	54	53	48	26	20	31	20	16	17
MIN	14	23	42	45	42	14	5.3	9.4	14	3.3	10	5.7
AC-FT	1,150	2,390	3,120	3,090	2,710	2,290	795	812	1,120	627	488	652

CAL YR 1962: TOTAL 36,487 MEAN 100 MAX 877 MIN 12 AC-FT 72,370  
WAT YR 1963: TOTAL 9,694.00 MEAN 26.6 MAX 60 MIN 10 AC-FT 19,230

## 5-0585, Sheyenne River at Valley City, N. Dak.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964											
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	SEPT.
1	7.9	7.9	37	26	23	11	15	12	12	617	42
2	6.9	7.4	39	26	23	10	61	14	11	575	39
3	3.7	7.9	39	26	23	6.5	60	17	11	362	40
4	4.6	7.9	39	25	23	6.5	36	24	10	202	35
5	5.3	8.9	39	25	23	9.4	34	19	11	186	36
6	6.1	9.4	39	25	23	10	26	14	12	186	40
7	6.1	8.9	41	24	22	9.4	14	13	11	183	39
8	6.1	10	30	24	22	10	14	11	11	181	37
9	6.5	10	39	22	20	9.4	10	11	11	180	40
10	7.4	10	40	24	20	10	23	11	11	203	26
11	6.1	8.9	36	24	20	9.4	26	12	10	382	45
12	6.1	9.4	36	23	19	12	24	12	12	515	12
13	6.9	14	36	23	20	14	46	10	41	154	6.5
14	7.4	28	35	23	20	14	30	11	23	58	9.4
15	6.9	32	35	24	20	10	25	8.4	14	39	11
16	6.9	32	35	23	19	9.4	20	11	8.9	37	11
17	6.1	30	36	23	19	8.9	18	10	12	28	9.4
18	6.5	30	35	23	19	11	18	12	16	16	9.4
19	7.9	32	35	23	18	10	17	8.9	18	12	6.5
20	8.9	32	35	23	13	11	17	10	57	11	15
21	8.4	32	34	24	7.4	14	42	11	285	14	64
22	7.9	30	34	23	5.3	13	30	9.6	377	16	32
23	6.9	35	34	23	4.9	12	21	9.4	579	13	19
24	6.9	34	35	22	4.9	6.1	41	8.9	626	16	19
25	6.1	34	30	23	4.9	7.9	28	10	621	14	19
26	6.1	35	26	22	4.9	7.4	16	14	615	13	15
27	6.1	35	26	23	4.6	7.9	17	13	610	16	23
28	6.1	35	26	22	4.9	11	16	12	637	18	22
29	5.7	35	25	22	6.9	12	12	9.4	639	14	24
30	7.4	39	24	22	-----	9.4	10	9.4	632	14	30
31	8.4	-----	24	23	-----	7.9	-----	10	-----	15	30
TOTAL	206.3	680.6	1,054	728	457.7	310.5	764.9	368.0	6,005.9	4,290	508.5
MEAN	6.65	22.7	34.0	23.5	15.8	10.0	25.5	11.9	200	138	16.4
MAX	8.9	39	41	26	23	14	63	24	639	617	64
MIN	3.7	7.4	24	22	4.6	6.1	8.9	8.4	8.9	6.1	7.4
AC-FT	409	1,350	2,090	1,440	908	616	1,520	730	11,910	8,510	1,010

CAL YR 1963: TOTAL 8,278.90 MEAN 22.7 MAX 54 MIN .10 AC-FT 16,420  
WAT YR 1964: TOTAL 16,218.2 MEAN 44.3 MAX 639 MIN 3.7 AC-FT 32,170

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965											
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	SEPT.
1	17	31	51	51	51	42	174	456	287	24	332
2	17	31	51	51	49	44	132	452	185	23	356
3	17	99	51	49	51	49	46	494	180	31	352
4	16	35	49	49	51	51	402	358	156	44	321
5	16	42	49	54	51	49	279	168	171	42	164
6	23	78	49	54	49	49	215	186	171	49	199
7	54	52	49	54	49	68	278	183	168	41	178
8	47	47	51	49	51	81	312	178	64	64	173
9	28	150	49	51	49	68	414	190	115	56	212
10	23	33	49	56	49	56	1,680	228	123	85	239
11	23	86	51	54	49	51	2,030	316	125	104	267
12	23	47	51	54	49	51	1,850	312	123	167	256
13	22	47	49	54	49	51	2,500	312	123	196	232
14	23	49	46	56	49	46	2,890	198	127	121	167
15	26	51	49	54	44	46	3,030	214	121	100	138
16	26	50	51	56	46	46	3,070	135	119	98	136
17	28	6.1	49	56	46	121	3,050	162	121	96	66
18	34	12	49	56	46	215	2,920	98	117	76	3.0
19	46	42	49	56	49	260	2,800	87	92	94	91
20	42	46	49	56	46	270	2,340	89	83	96	7.9
21	42	49	49	56	34	280	1,970	89	64	117	3.0
22	38	54	51	56	56	275	1,730	87	56	205	2.7
23	31	54	54	54	54	280	1,650	92	34	346	2.7
24	31	51	54	56	51	280	1,340	98	23	410	151
25	31	51	54	56	46	275	1,220	117	18	641	37
26	31	49	54	56	46	272	964	162	38	618	3.4
27	31	56	54	54	46	270	717	217	110	624	42
28	31	51	54	51	44	270	725	345	61	613	63
29	31	51	51	-----	-----	275	609	346	30	551	134
30	31	51	54	-----	-----	262	552	338	20	368	102
31	31	-----	54	54	-----	205	-----	332	-----	358	71
TOTAL	910	1,522.1	1,567	1,672	1,346	4,635	42,337	6,993	3,264	6,458	4,501.7
MEAN	29.4	50.7	50.5	53.9	48.1	150	1,411	226	109	208	145
MAX	54	150	54	56	56	280	3,070	456	287	641	356
MIN	16	6.1	46	49	34	62	132	87	18	23	2.7
AC-FT	1,800	3,020	3,110	3,320	2,670	9,190	83,970	13,870	6,470	12,810	8,930

CAL YR 1964: TOTAL 18,276.4 MEAN 49.9 MAX 639 MIN 4.6 AC-FT 36,250  
WAT YR 1965: TOTAL 77,554.1 MEAN 212 MAX 3,070 MIN 1.5 AC-FT 153,800



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DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963													
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	
1	34	43	74	52	45	43	78	39	38	29	22	21	
2	33	42	72	54	46	45	76	33	42	36	21	20	25
3	31	43	74	55	49	45	52	46	29	17	14	24	
4	31	42	74	55	48	46	38	39	33	16	11	21	
5	33	45	55	56	46	48	49	34	36	16	11	18	
6	31	48	48	58	48	50	74	36	41	17	11	16	
7	31	46	66	60	48	54	148	41	89	18	11	16	
8	31	46	64	58	48	54	190	36	163	18	10	18	
9	33	46	62	61	48	55	143	33	85	17	6.7	16	
10	33	50	58	56	52	56	99	34	66	25	7.7	14	
11	31	50	50	54	52	56	78	31	55	28	11	11	
12	30	46	46	50	54	58	67	34	48	21	12	8.9	
13	30	46	50	49	54	58	69	36	42	18	8.3	8.3	
14	30	45	52	49	54	58	69	35	38	15	7.2	8.3	
15	33	43	54	49	55	64	66	34	35	13	5.2	8.9	
16	27	43	58	48	55	64	67	33	31	13	5.7	6.7	
17	28	43	62	48	54	62	56	35	28	16	5.7	7.7	
18	29	45	67	46	54	66	55	30	25	17	13	8.3	
19	30	64	70	45	54	72	50	27	23	19	12	8.3	
20	30	70	69	45	56	70	48	25	22	17	8.9	8.3	
21	30	69	66	45	61	75	41	24	21	15	8.3	7.7	
22	30	52	62	45	64	78	35	25	23	14	18	8.9	
23	30	70	58	43	62	80	33	25	25	15	20	11	
24	31	66	52	43	56	92	31	27	27	22	20	12	
25	29	64	49	43	52	94	30	29	27	19	17	11	
26	30	69	43	44	49	90	31	30	23	17	15	10	
27	31	77	46	44	46	94	31	49	22	15	15	8.3	
28	30	75	50	44	45	94	38	56	25	13	18	8.3	
29	31	75	50	46	-----	102	41	41	48	10	17	7.2	
30	34	74	50	48	-----	43	35	41	45	12	18	6.7	
31	42	-----	52	43	-----	90	-----	41	-----	16	25	-----	
TOTAL	969	1,637	1,803	1,536	1,455	2,110	1,914	1,082	1,246	539	405.7	364.8	
MEAN	31.3	54.6	58.2	49.5	52.0	68.1	63.8	34.9	41.5	17.4	13.1	12.2	
MAX	42	77	74	61	64	102	100	56	164	29	25	25	
MIN	27	42	43	43	45	43	30	24	21	10	5.2	6	
AC-FT	1,920	3,250	3,580	3,050	2,890	4,190	3,800	2,150	2,470	1,070	803	724	
CAL YR 1962	TOTAL 66,216			MEAN 181	MAX 2,180	MIN 10	AC-FT 131,300						
WAT YR 1963	TOTAL 15,060.5			MEAN 41.3	MAX 190	MIN 5.2	AC-FT 29,870						

## 5-0587. Sheyenne River at Lisbon, N. Dak.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964												
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	6.7	13	46	28	27	17	35	38	16	630	29	33
2	7.2	12	43	27	27	17	58	35	15	634	19	29
3	7.2	13	46	27	28	16	67	41	14	628	15	31
4	7.2	13	45	29	28	16	61	43	13	622	15	33
5	6.2	14	46	30	29	16	92	45	11	517	11	42
6	6.2	14	46	33	30	16	95	85	11	362	10	41
7	6.2	16	49	33	31	15	133	66	11	229	11	41
8	7.2	17	43	34	31	15	108	55	29	204	11	42
9	10	18	38	31	30	15	88	45	30	195	10	45
10	14	18	34	28	30	18	85	39	23	202	8.5	42
11	11	19	36	28	30	18	80	35	23	195	5.7	41
12	10	18	35	27	30	21	92	34	23	216	4.0	38
13	10	18	36	23	30	24	104	31	18	350	4.8	39
14	11	18	36	20	29	24	110	30	18	437	5.2	33
15	11	18	35	19	29	25	115	30	24	295	7.2	34
16	11	18	31	19	28	25	127	30	62	146	7.7	28
17	12	17	29	21	27	28	104	27	62	92	7.2	31
18	12	24	29	23	27	29	85	30	83	66	6.2	52
19	14	38	30	23	27	28	67	24	56	52	4.8	31
20	16	41	30	23	25	25	54	23	55	45	14	21
21	18	34	30	27	25	22	66	23	48	33	52	17
22	16	28	31	27	27	19	61	14	108	23	41	30
23	16	35	31	25	27	20	67	6.2	158	19	60	45
24	15	38	34	25	23	19	80	10	340	15	90	35
25	14	38	34	25	21	18	77	16	508	13	61	30
26	16	41	34	24	18	18	62	16	592	12	36	30
27	15	41	34	24	17	18	54	15	602	14	28	25
28	14	48	38	25	14	18	56	15	604	14	21	27
29	14	48	36	24	15	18	52	14	606	14	27	24
30	14	48	35	24	-----	17	42	14	622	14	45	21
31	14	34	25	25	-----	18	-----	14	-----	17	42	-----
TOTAL	362.1	776	1,134	801	760	613	2,367	942.2	4,776	6,305	709.3	1,011
MEAN	11.7	25.9	36.6	25.8	26.2	19.8	78.9	30.4	159	203	22.9	33.7
MAX	18	48	49	34	31	29	133	85	622	634	90	52
MIN	6.2	12	29	19	14	15	35	6.2	11	12	4.0	17
AC-FT	718	1,540	2,250	1,590	1,510	1,220	4,690	1,870	9,470	12,510	1,410	2,010
CAL YR 1963: TOTAL 12,923.6 MEAN 35.4 MAX 190 MIN 5.2 AC-FT 25,630												
MAT YR 1964: TOTAL 20,556.6 MEAN 56.2 MAX 634 MIN 4.0 AC-FT 40,770												

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965												
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	23	31	1.3	49	40	48	260	739	389	125	466	110
2	20	62	41	45	40	48	270	686	393	85	404	108
3	20	78	80	48	40	48	470	590	366	67	378	92
4	16	64	69	49	40	48	630	562	252	58	371	88
5	17	54	62	55	40	49	686	556	214	56	380	56
6	16	54	60	55	40	55	875	512	197	49	371	49
7	18	60	50	55	40	61	898	192	192	50	249	48
8	15	56	49	55	40	67	646	283	188	61	180	27
9	17	55	49	53	40	73	673	260	180	67	178	18
10	18	58	49	50	40	72	796	242	160	67	165	17
11	38	56	49	49	40	82	1,140	242	123	77	174	17
12	42	64	50	48	40	92	1,570	252	129	88	226	17
13	34	74	52	47	40	90	2,240	348	135	115	255	21
14	28	67	54	46	40	90	3,280	373	135	183	260	41
15	24	64	55	45	41	83	3,160	382	135	314	244	49
16	24	61	60	45	42	70	2,740	317	135	204	204	66
17	24	58	58	45	43	69	2,770	247	133	148	143	77
18	23	56	2.0	45	43	80	2,870	214	125	127	135	72
19	23	55	7.0	45	44	67	2,900	188	127	115	127	72
20	27	52	36	45	44	64	2,900	167	127	104	94	70
21	24	42	58	45	44	70	2,850	135	115	94	61	77
22	29	33	55	45	44	82	2,660	123	97	97	61	82
23	36	27	55	45	44	97	2,270	127	87	108	67	85
24	38	35	55	45	44	239	1,970	129	75	178	46	87
25	38	46	56	45	45	300	1,830	141	69	402	41	94
26	35	52	56	45	46	300	1,560	143	62	431	41	88
27	31	54	58	44	47	300	1,350	148	67	568	127	83
28	29	55	69	43	48	301	1,120	154	66	624	102	80
29	31	56	64	42	-----	291	844	195	207	632	67	85
30	31	37	60	41	-----	283	796	340	216	630	58	129
31	31	-----	55	40	-----	283	-----	398	-----	606	60	-----
TOTAL	820	1,616	1,574.3	1,454	1,179	3,902	49,024	9,515	4,896	6,530	5,735	2,005
MEAN	26.5	52.9	50.8	46.9	42.1	126	1,634	307	163	211	185	66.8
MAX	42	78	80	55	48	301	3,280	739	393	632	466	129
MIN	15	27	1.3	40	40	48	260	123	62	49	41	17
AC-FT	1,630	3,210	3,120	2,880	2,340	7,740	97,240	18,870	9,710	12,950	11,380	3,980
CAL YR 1964: TOTAL 22,294.8 MEAN 60.9 MAX 634 MIN 1.3 AC-FT 44,220												
MAT YR 1965: TOTAL 88,250.3 MEAN 242 MAX 3,280 MIN 1.3 AC-FT 175,000												

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961												
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	29	57	50	55	55	75	113	78	48	50	47	19
2	29	50	60	55	55	80	97	77	48	40	41	18
3	28	47	65	50	50	90	93	70	47	36	37	16
4	26	45	60	65	55	90	92	68	44	39	36	16
5	26	44	65	75	50	85	90	65	46	35	32	16
6	26	54	60	75	55	85	86	83	48	32	29	16
7	25	51	60	75	65	105	67	93	45	28	25	16
8	25	51	65	60	65	100	82	95	44	24	23	16
9	30	44	70	55	65	130	82	86	46	25	22	17
10	28	25	65	55	65	210	90	83	45	22	24	22
11	25	40	55	70	75	300	78	77	41	21	25	22
12	26	50	45	75	70	310	78	71	41	21	24	23
13	26	50	70	75	75	202	78	90	40	24	21	29
14	27	50	70	80	75	184	76	85	45	24	21	29
15	28	60	65	80	70	160	76	104	45	23	20	31
16	28	45	55	70	70	143	70	100	46	21	18	38
17	48	40	50	80	60	129	68	90	54	21	18	46
18	44	45	55	75	50	141	65	77	54	21	28	40
19	41	50	45	50	50	139	67	74	50	24	29	39
20	39	55	35	45	55	133	67	70	54	26	26	44
21	39	55	50	50	60	141	60	65	57	29	22	40
22	40	55	60	45	60	141	60	61	65	28	22	40
23	40	40	60	50	60	150	72	60	56	29	22	40
24	41	40	60	45	55	150	86	57	34	34	22	38
25	42	45	60	45	55	169	92	57	40	33	20	36
26	41	65	60	60	60	182	85	57	38	33	22	36
27	41	50	60	65	65	176	74	57	38	30	23	37
28	41	40	60	60	70	124	74	56	35	37	21	45
29	30	60	60	60	60	54	95	54	35	23	47	40
30	46	40	60	60	60	113	74	53	50	40	21	42
31	56	---	60	60	---	126	---	51	---	48	21	---
TOTAL	1,075	1,413	1,815	1,920	1,715	2,449	2,368	2,264	1,452	931	782	914
MEAN	34.7	47.1	58.5	61.9	61.1	78.9	73.9	73.9	48.4	30.0	25.2	30.5
MAX	56	65	70	80	75	310	113	104	95	50	47	47
MIN	25	25	35	45	50	75	60	51	35	21	18	16
AC-FT	2,130	2,800	3,600	3,810	3,400	8,820	4,700	4,490	2,880	1,850	1,550	1,810
CAL YR 1960:	TOTAL 57,471			MEAN 157	MAX 1,800	MIN 20	AC-FT 114,000					
WAT YR 1961:	TOTAL 21,098			MEAN 57.8	MAX 310	MIN 16	AC-FT 81,850					



5-0590. Sheyenne River near Kindred, N. Dak.--Continued

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	31	46	60	36	26	54	50	127	38	560	56	51
2	31	46	56	36	26	56	78	121	42	580	53	48
3	29	46	61	36	28	52	90	115	45	585	53	54
4	29	46	64	36	30	44	75	121	45	580	53	57
5	29	46	64	34	34	46	75	103	45	580	54	52
6	29	46	64	34	36	50	110	108	42	500	51	50
7	29	46	67	32	36	50	130	108	40	380	46	52
8	28	45	60	30	36	50	130	115	42	360	41	53
9	28	45	50	30	40	54	140	125	40	330	39	57
10	28	45	50	30	46	54	190	138	40	320	38	57
11	28	45	50	34	54	53	260	123	43	340	36	57
12	28	45	48	36	56	57	272	113	46	380	35	57
13	28	45	48	38	52	63	232	104	52	350	34	57
14	29	45	48	34	52	64	217	95	60	320	30	56
15	31	46	48	28	51	60	265	90	62	300	30	56
16	37	46	48	28	52	56	272	86	62	345	29	56
17	36	46	48	28	54	52	222	83	70	300	30	56
18	36	46	46	28	52	50	186	80	90	250	29	56
19	36	46	46	30	48	52	178	76	150	200	29	54
20	39	44	40	30	48	50	170	71	250	150	29	53
21	46	34	35	30	46	48	161	67	200	132	46	50
22	47	24	35	28	46	50	198	65	160	111	52	57
23	47	33	33	28	44	50	193	63	140	100	67	64
24	48	39	30	28	42	46	180	61	119	88	68	61
25	53	48	30	26	42	46	161	60	145	77	60	57
26	53	56	30	26	42	48	142	56	200	65	63	56
27	50	60	30	26	42	48	147	51	250	60	80	54
28	47	61	30	26	42	46	156	46	300	60	97	61
29	47	60	28	26	50	46	149	42	400	59	77	60
30	46	46	34	26	-----	46	136	40	525	56	64	57
31	47	-----	36	26	-----	46	-----	38	-----	53	64	-----
TOTAL	1,150	1,386	1,417	944	1,253	1,587	4,965	2,690	3,743	8,571	1,533	1,666
MEAN	37.1	46.2	45.7	30.5	43.2	51.2	166	86.8	125	276	49.5	55.5
MAX	53	71	67	38	56	64	272	138	525	585	97	106
MIN	28	24	28	26	26	44	50	38	38	53	29	48
AC-FT	2,280	2,750	2,810	1,870	2,490	3,150	9,850	5,340	7,420	17,000	3,040	3,300
CAL YR 1963: TOTAL	29,610			MEAN 81.1		MAX 400		MIN 24		AC-FT 58,730		
WAT YR 1964: TOTAL	30,905			MEAN 84.4		MAX 585		MIN 24		AC-FT 61,300		

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	56	65	93	50	62	62	160	1,160	297	130	572	97
2	56	65	92	60		62	150	1,010	402	210	581	83
3	51	64	97	60		60	150	916	496	267	550	76
4	48	64	95	65		60	160	829	539	206	464	85
5	47	64	70	65		60	170	757	506	154	425	106
6	48	76	52	65	62	65	200	702	460	132	427	106
7	48	93	42	65		65	400	666	388	119	425	100
8	48	90	46	65		65	550	650	348	132	409	93
9	47	54	54	65		65	650	544	319	132	388	80
10	47	80	63	60		75	900	448	302	125	314	74
11	46	86	65	62	70	1,050	418	295	121	262	72	
12	46	86	63		70	1,000	398	282	142	232	72	
13	45	86	64		70	1,100	374	268	140	204	70	
14	45	85	60		70	1,350	364	240	136	206	70	
15	45	85	60		75	1,800	395	232	136	242	68	
16	51	88	60	60	62	85	2,350	473	232	145	268	63
17	60	93	60			80	2,600	496	224	209	272	65
18	60	92	60			70	2,740	480	211	285	262	72
19	59	61	60			60	2,720	398	209	240	222	86
20	56	47	60			60	2,650	350	206	193	183	111
21	53	63	55	60	62	70	2,610	316	196	173	161	113
22	53	77	55			80	2,620	292	196	158	147	115
23	53	80	50			95	2,640	270	193	161	127	115
24	53	82	45			95	2,630	250	183	142	106	117
25	53	80	45			90	2,570	275	166	154	93	125
26	53	70	40	60	62	90	2,380	258	154	163	102	134
27	59	70	40			95	2,900	248	206	95	132	95
28	65	67	40			100	1,840	245	142	336	80	142
29	67	76	45			100	1,620	245	138	393	74	161
30	67	88	45			100	1,400	248	132	485	86	176
31	67	-----	45	60	62	120	-----	252	-----	542	119	-----
TOTAL	1,652	2,306	1,821	1,880	1,736	2,384	45,250	14,727	8,105	6,267	8,098	2,979
MEAN	53.3	76.9	58.7	60.6	62.0	76.9	1,508	475	270	202	261	99.3
MAX	67	93	97	65	-----	120	2,740	1,160	539	542	581	176
MIN	45	47	40	50	-----	60	150	245	132	119	74	63
AC-FT	3,280	4,570	3,610	3,730	3,440	4,730	89,750	29,210	16,080	12,430	16,060	5,910
CAL YR 1964: TOTAL	32,731			MEAN 89.4		MAX 585		MIN 26		AC-FT 64,920		
WAT YR 1965: TOTAL	97,205			MEAN 266		MAX 2,740		MIN 40		AC-FT 192,800		

5-0595. Sheyenne River at West Fargo, N. Dak.

Location.--Lat 46°53'20", long 96°54'55", in sec.31, T.140 N., R.49 W., on left bank 80 ft downstream from county highway bridge, 1 mile north of West Fargo, 3 miles upstream from Maple River, and at mile 24.5.

Drainage area.--8,870 sq mi, approximately, of which about 5,780 sq mi is probably noncontributing (includes 3,800 sq mi in closed basins).

Records available.--March to November 1902 (gage heights only), April 1903 to October 1905, March to August 1919, September 1929 to September 1965. Published as "at or near Haggart" 1902-7, 1919. Records for March to November 1902 and November 1905 to June 1907, published in WSP 100, 171, 207, and 245, have been found to be unreliable and should not be used. Monthly discharge only for some periods, published in WSP 1308.

Gage.--Water-stage recorder. Datum of gage is 877.19 ft above mean sea level, datum of 1929. March 1902 to April 1906 and March to August 1919, staff gage at private bridge three-quarters of a mile upstream at different datum. September 1929 to July 22, 1930, wire-weight gage at present site and datum. July 22, 1930, to June 27, 1933, chain gage at present site and datum.

Average discharge.--38 years (1903-5, 1929-65) 148 cfs (107,150 acre-ft per year); median of yearly mean discharges, 130 cfs (94,100 acre-ft per year).

Extremes.--Maximum and minimum discharges for the water years 1961-65 are contained in the following table:

Water year	Maximum			Minimum		
	Date	Discharge (cfs)	Gage height (feet)	Date	Discharge (cfs)	Gage height (feet)
1961	Mar. 14, 1961	255	a 8.08	Sept. 5, 1961	12	2.60
1962	July 13, 1962	2,420	b 18.77	(c)	20	d 3.02
1963	Apr. 8, 1963	490	8.63	Sept. 21-23, 30	26	e 3.06
1964	July 6, 1964	542	8.99	Oct. 1-7, 11, 1963	26	f 3.18
1965	Apr. 24, 25, 1965	2,530	(g)	Dec. 27, 1964	19	h 3.65

a Backwater from ice.

b Maximum gage height for year, 19.02 ft July 12, 1962, backwater from Maple River.

c Dec. 28, 1961, to Jan. 1, 1962.

d Occurred Nov. 4, 1961.

e Occurred Aug. 21, 1963.

f Occurred Oct. 11, 1963.

g Maximum gage height for year, 20.78 ft Apr. 19, 1965, backwater from Maple River.

h Occurred Oct. 17, 1964.

1902-5, 1919, 1929-65: Maximum discharge, 2,810 cfs, May 22, 1950; maximum gage height, 20.78 ft Apr. 19, 1965 (backwater from Maple River); minimum discharge, 2.0 cfs Dec. 14, 1936, corrected (gage height, 1.90 ft).

Remarks.--Records good except those for winter periods, which are fair. Flow regulated to a large degree by Lake Ashtabula (see station 5-0575).

Revisions (water years).--WSP 1388: 1904(M). WSP 1728: Drainage area. See also Records available.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	33	48	40	64	56	72	140	80	53	74	39	16
2	31	51	35	66	54	78	140	82	51	59	42	16
3	48	50	70	55	80	135	85	51	49	42	15	
4	30	47	60	72	56	81	130	82	50	41	39	14
5	30	44	65	75	55	82	125	75	49	34	34	13
6	29	41	62	75	52	105	120	80	49	34	33	15
7	28	39	60	75	50	115	130	78	48	35	29	20
8	26	43	58	74	50	105	105	87	51	31	25	16
9	26	38	58	74	61	90	95	96	51	37	24	14
10	26	45	60	74	61	100	92	100	49	37	21	28
11	25	38	60	73	62	125	90	96	47	27	21	24
12	26	35	64	73	63	160	87	91	47	27	21	23
13	29	40	64	73	64	230	85	96	45	37	21	28
14	29	40	62	73	64	250	88	99	42	27	21	29
15	30	40	61	73	65	220	85	124	42	27	20	28
16	28	45	60	74	66	200	83	125	42	27	18	28
17	29	50	61	72	74	190	82	123	42	27	19	29
18	29	48	64	71	68	180	77	112	44	25	21	38
19	37	35	64	72	70	170	75	98	50	22	21	46
20	44	48	64	72	74	160	74	85	48	23	25	49
21	40	40	65	70	75	160	72	77	45	23	24	48
22	37	55	64	68	75	160	69	71	55	24	22	48
23	36	60	63	65	72	160	72	67	60	25	19	45
24	35	55	62	65	65	160	78	65	61	24	17	42
25	35	42	60	65	62	160	79	62	53	23	16	42
26	35	45	61	60	63	170	94	60	46	24	16	40
27	37	60	64	60	66	175	96	59	40	37	16	39
28	36	65	60	65	70	180	91	59	39	27	16	37
29	60	60	60	55	60	170	81	58	39	31	19	37
30	47	50	60	70	-----	160	79	57	40	34	18	40
31	44	-----	62	55	-----	145	-----	56	-----	34	16	-----
TOTAL	1,017	1,395	1,853	2,143	1,774	4,593	2,849	2,583	1,429	1,007	735	907
MEAN	32.8	46.5	59.8	69.1	63.4	148	95.0	83.3	47.6	32.5	23.7	30.2
MAX	47	65	65	75	75	250	140	125	61	75	42	49
MIN	25	35	35	55	52	72	69	56	39	22	16	13
AC-FT	2,020	2,770	3,680	4,250	3,920	9,110	5,650	5,120	2,830	2,007	1,460	1,800

CAL YR 1960: TOTAL 58,004

MEAN 158

MAX 1,690

MIN 22

AC-FT 115,000

WAT YR 1961: TOTAL 22,285

MEAN 61.1

MAX 250

MIN 13

AC-FT 44,200

## 5-0595. Sheyenne River at West Fargo, N. Dak.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	45	33	32	20	30	44	580	286	604	257	398	116
2	46	33	32	22	30	44	1,000	280	593	255	362	114
3	42	29	32	22	30	44	1,160	272	554	303	333	114
4	39	25	34	22	30	44	1,270	258	464	403	310	108
5	36	25	36	22	30	44	1,300	251	397	524	285	108
6	34	32	36	24	30	44	1,200	245	356	618	261	105
7	30	25	36	26	30	45	1,050	232	340	880	241	99
8	26	32	34	26	28	46	1,000	210	346	1,270	230	98
9	29	28	32	26	28	47	910	191	342	1,540	222	96
10	33	30	30	26	28	48	870	170	370	1,710	210	95
11	46	30	28	26	30	50	833	152	460	2,060	224	95
12	44	32	26	26	32	50	707	148	486	2,300	398	106
13	42	40	25	26	34	50	660	134	436	2,410	568	114
14	55	35	24	26	35	50	696	126	418	2,220	464	114
15	51	30	23	26	36	48	709	126	391	1,780	436	107
16	50	32	22	25	37	45	840	134	398	1,200	452	107
17	81	36	21	24	38	44	957	154	390	919	436	130
18	80	40	20	23	39	45	815	193	436	788	349	140
19	66	36	20	22	40	48	768	235	471	679	290	118
20	55	30	20	22	40	48	765	234	475	868	250	105
21	49	30	20	22	40	50	741	286	475	1,110	224	97
22	47	32	20	22	40	50	729	292	447	1,120	207	90
23	48	35	20	22	40	50	729	511	429	1,410	196	88
24	46	38	20	22	41	50	677	622	416	1,570	181	87
25	45	38	20	23	42	50	556	598	397	1,620	164	90
26	42	38	20	24	43	50	421	559	381	1,260	154	96
27	39	38	20	25	44	50	346	553	376	837	149	95
28	37	36	20	26	44	50	314	582	357	645	139	90
29	36	34	20	28	-----	100	301	600	305	535	130	89
30	34	32	20	30	-----	250	291	611	267	480	126	90
31	34	-----	20	30	-----	350	-----	619	-----	441	122	-----
TOTAL	1,387	984	783	756	989	2,028	23,195	9,866	12,577	34,012	8,491	3,100
MEAN	44.7	32.8	25.3	24.4	35.3	65.4	773	318	419	1,097	274	103
MAX	81	40	36	30	44	350	1,300	622	604	2,410	548	140
MIN	26	25	20	24	28	44	291	126	267	255	122	87
AC-FT	2,750	1,950	1,550	1,500	1,960	4,020	46,010	19,560	24,950	67,460	15,840	6,150
CAL YR 1961: TOTAL	21,174				58.0	250	13		42,080			
MEAN	68.0				269	2410	20		194,700			
MAX	81				44	350	1300		622			
MIN	26				28	44	291		126			
AC-FT	42,080				19,560		24,950		67,460			

CAL YR 1961: TOTAL 21,174  
 MEAN 68.0  
 MAX 81  
 MIN 26  
 AC-FT 42,080

MEAN 68.0  
 MAX 250  
 MIN 13

MEAN 68.0  
 MAX 2410  
 MIN 20

AC-FT 42,080  
 AC-FT 194,700

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	92	73	118	85	50	70	268	120	160	104	48	49
2	91	72	113	85	50	60	278	125	165	91	46	50
3	90	72	113	90	50	75	378	124	157	75	42	49
4	85	73	112	95	50	70	330	120	141	71	42	54
5	87	80	101	95	55	70	237	114	130	83	43	53
6	87	87	95	100	55	65	230	111	125	82	44	54
7	88	90	90	100	60	65	342	108	126	72	43	55
8	90	89	110	100	60	65	471	110	149	64	47	53
9	87	93	100	100	60	65	468	112	170	65	53	51
10	85	95	100	100	60	65	421	112	167	62	44	48
11	86	97	100	100	60	70	319	112	168	57	45	43
12	85	100	100	90	60	70	317	116	206	57	45	41
13	85	99	95	70	60	70	287	120	216	56	43	38
14	84	95	95	60	60	70	250	121	191	55	41	36
15	82	92	90	50	60	75	217	129	164	53	40	35
16	81	92	80	50	60	80	198	138	143	54	40	35
17	81	91	85	50	60	80	179	159	126	60	38	34
18	79	86	90	50	65	80	173	134	116	57	38	34
19	76	80	90	50	65	80	166	134	103	57	38	31
20	75	82	100	50	65	80	158	125	97	55	39	28
21	76	83	100	50	65	80	154	122	92	53	38	26
22	77	82	100	50	65	85	146	116	86	53	42	26
23	73	74	100	50	65	90	138	112	81	56	45	26
24	72	118	100	50	70	100	133	108	78	54	57	27
25	71	93	95	50	70	120	126	104	74	52	57	28
26	71	72	95	50	70	140	122	101	70	49	58	26
27	70	92	95	50	70	200	118	119	67	46	56	26
28	69	107	90	50	65	250	114	124	66	45	57	27
29	69	122	85	50	-----	280	111	168	67	43	63	27
30	69	137	85	50	-----	300	113	165	89	43	64	26
31	72	-----	85	50	-----	278	-----	170	-----	47	55	-----
TOTAL	2,485	2,718	3,007	2,120	1,705	3,348	6,960	3,853	3,790	1,871	1,452	1,136
MEAN	80.2	90.6	97.0	68.4	60.9	108	232	124	126	60.4	46.8	37.9
MAX	92	137	118	100	70	300	471	170	216	104	64	55
MIN	69	72	80	50	50	60	111	101	66	43	38	26
AC-FT	4,930	5,390	5,960	4,200	3,380	6,640	13,800	7,640	7,520	3,710	2,880	2,250
CAL YR 1962: TOTAL	103,222				283	2,410	20		204,700			
MEAN	34.445				94.4	471	26		68,320			
MAX	92				70	300	170		216			
MIN	69				50	60	111		66			
AC-FT	204,700				13,800	7,640	7,520		3,710			

CAL YR 1962: TOTAL 103,222  
 MEAN 34.445  
 MAX 92  
 MIN 69  
 AC-FT 204,700

MEAN 34.445  
 MAX 2,410  
 MIN 20

MEAN 34.445  
 MAX 471  
 MIN 26

AC-FT 204,700  
 AC-FT 68,320

5-0595. Sheyenne River at West Fargo, N. Dak.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	26	42	60	32	40	55	55	152	44	434	66	70
2	26	42	60	30	40	55	60	139	46	460	65	60
3	26	42	60	30	40	55	55	135	46	475	64	55
4	26	42	60	30	40	55	65	132	48	457	63	52
5	26	42	65	30	40	55	103	128	45	511	63	59
6	26	42	65	30	40	55	146	126	47	520	63	62
7	26	42	60	30	45	55	129	120	45	530	62	60
8	27	42	55	30	45	55	152	118	48	532	55	59
9	27	42	50	30	40	55	185	121	49	503	55	50
10	27	42	45	30	55	55	200	125	41	421	51	61
11	26	43	45	30	55	55	197	134	46	332	48	65
12	29	43	45	30	55	55	224	138	56	295	46	66
13	29	44	45	30	55	60	304	125	58	254	43	63
14	29	45	45	30	55	60	315	114	56	239	42	62
15	31	45	45	30	55	60	341	104	69	229	41	63
16	32	48	45	30	55	60	396	98	66	227	36	56
17	34	49	45	30	55	55	370	95	63	206	34	54
18	41	49	45	30	55	55	284	90	108	324	35	52
19	42	48	45	30	55	55	225	86	96	305	36	51
20	41	53	40	30	55	55	199	83	91	237	36	52
21	42	36	40	30	50	55	226	77	139	178	52	50
22	43	35	40	30	50	55	218	74	221	145	46	50
23	48	45	40	30	50	55	236	69	231	124	50	51
24	48	45	40	30	50	55	226	67	186	109	60	60
25	47	45	40	30	50	55	200	62	150	101	73	64
26	47	45	35	35	50	55	184	60	128	92	68	58
27	51	50	35	35	50	55	166	59	131	84	64	53
28	51	60	35	40	50	55	156	56	136	77	68	51
29	48	65	35	40	50	55	160	50	278	74	89	54
30	45	60	35	40	-----	55	161	44	376	93	79	62
31	43	-----	35	40	-----	55	-----	41	-----	69	79	-----
TOTAL	1,109	1,373	1,435	982	1,435	1,725	5,938	3,022	3,204	8,716	1,746	1,736
MEAN	35.8	45.8	46.3	31.7	49.5	55.6	198	97.5	107	281	56.3	57.9
MAX	51	65	65	40	55	60	396	152	376	532	93	70
MIN	26	35	35	30	40	40	55	61	41	69	34	50
AC-FT	2,200	2,720	2,850	1,950	2,850	3,420	11,780	5,990	6,360	17,290	3,460	3,460
CAL YR 1963: TOTAL	30,152			MEAN 82.6		MAX 471		MIN 26		AC-FT 59,810		
WAT YR 1964: TOTAL	32,421			MEAN 89.6		MAX 532		MIN 26		AC-FT 64,310		

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	58	66	74	52	65	70	90	1,670	303	139	489	103
2	54	66	80	55	65	65	90	1,390	327	135	523	122
3	54	63	84	58	65	65	150	1,140	400	145	534	110
4	53	62	82	60	65	65	320	1,020	478	224	520	94
5	49	62	80	70	65	65	340	916	526	222	458	94
6	48	60	74	70	65	70	340	819	532	177	428	86
7	48	60	60	70	65	70	360	757	492	148	415	108
8	47	77	46	70	65	70	370	709	433	140	406	116
9	47	89	40	70	65	70	400	677	369	141	391	110
10	48	88	46	70	70	70	580	609	335	140	369	102
11	48	85	52	70	65	65	780	513	308	137	323	93
12	48	83	54	65	65	70	980	475	292	135	270	85
13	47	87	54	65	65	70	1,100	447	288	137	242	83
14	48	87	62	65	65	70	1,270	424	269	140	223	82
15	49	86	62	65	70	70	1,260	422	244	141	210	74
16	47	87	62	65	70	70	1,460	428	229	140	225	74
17	46	86	60	65	65	70	1,600	490	223	139	250	74
18	48	86	62	65	70	65	1,950	524	219	154	268	68
19	59	89	60	65	65	60	2,200	523	214	227	265	67
20	60	93	60	65	70	60	2,450	480	209	244	243	75
21	56	86	62	65	70	60	2,470	420	205	214	209	92
22	53	78	62	65	70	70	2,500	386	201	182	179	109
23	50	74	60	65	70	80	2,520	353	194	179	164	114
24	48	74	56	65	70	100	2,530	341	188	161	165	115
25	48	89	52	65	65	105	2,530	328	184	155	149	115
26	48	90	48	65	70	100	2,520	315	175	146	123	117
27	50	89	50	65	70	100	2,500	320	156	172	112	125
28	53	78	48	65	65	105	2,410	307	157	167	119	132
29	56	70	48	65	-----	95	2,230	300	150	269	115	140
30	63	70	50	65	-----	85	1,970	296	143	343	96	153
31	66	-----	50	65	-----	85	-----	290	-----	422	91	-----
TOTAL	1,597	2,359	1,838	2,010	1,865	2,335	42,270	18,089	8,459	5,599	8,574	3,022
MEAN	51.5	78.6	59.3	64.8	66.6	75.3	1,409	584	282	181	277	101
MAX	66	93	84	70	70	105	2,530	1,670	532	422	534	153
MIN	46	60	40	52	65	60	90	290	143	135	91	67
AC-FT	3,170	4,680	3,650	3,990	3,700	4,630	83,840	35,880	16,780	11,110	17,010	5,990
CAL YR 1964: TOTAL	34,298			MEAN 93.7		MAX 532		MIN 30		AC-FT 68,030		
WAT YR 1965: TOTAL	98,017			MEAN 269		MAX 2,530		MIN 40		AC-FT 194,400		

S-0596. Maple River near Hope, N. Dak.

Location.--Lat 47°19', long 97°47', in NW $\frac{1}{4}$ NW $\frac{1}{4}$  sec.4, T.144 N., R.56 W., 100 ft downstream from box culvert on State Highway 38, about 150 yards east of the intersection of State Highways 32 and 38, and 3 miles west of Hope.

Drainage area.--22.4 sq mi.

Records available.--October 1964 to September 1965.

Gage.--Water-stage recorder.

Extremes.--Maximum discharge during water year 1965, 575 cfs Apr. 10 (gage height, 4.43 ft); no flow for long periods.

1964-65: Maximum discharge, 575 cfs Apr. 10, 1965 (gage height, 4.43 ft); no flow for long periods in each year.

Remarks.--Records good.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	0	0	0	0	0	0	15	.26	.75	.85	.51	0
2	0	0	0	0	0	0	20	.28	.90	.28	.32	0
3	0	0	0	0	0	0	30	.28	1.0	.19	.26	0
4	0	0	0	0	0	0	50	.24	.95	.17	.22	.06
5	0	0	0	0	0	0	65	.32	.80	.15	.17	.02
6	0	0	0	0	0	1.0	30	.55	1.5	.08	.17	.02
7	0	0	0	0	0	5.0	30	1.2	1.2	.03	.15	.02
8	0	0	0	0	0	20	35	1.1	1.0	.06	.06	.01
9	0	0	0	0	0	15	35	1.1	.75	.08	.05	0
10	0	0	0	0	0	10	275	1.1	.51	.05	.01	.06
11	0	0	0	0	0	5.0	345	.80	.32	.01	.01	.34
12	0	0	0	0	0	2.0	195	.63	.24	.42	.01	.37
13	0	0	0	0	0	1.0	62	.47	.15	5.9	0	.32
14	0	0	0	0	0	.50	20	.43	.08	55	0	.30
15	0	0	0	0	0	2.0	12	.59	.05	31	0	.32
16	0	0	0	0	0	.20	6.8	.51	.01	19	0	.47
17	0	0	0	0	0	.10	5.1	.43	0	11	0	.90
18	0	0	0	0	0	.10	3.8	.40	0	5.5	0	.95
19	0	0	0	0	0	.10	3.0	.34	0	3.0	0	1.4
20	0	0	0	0	0	.10	2.3	.28	0	2.7	0	1.7
21	0	0	0	0	0	.10	2.2	.24	0	2.8	0	1.8
22	0	0	0	0	0	.10	1.8	.17	0	17	0	1.8
23	0	0	0	0	0	.10	1.4	.17	0	37	0	1.8
24	0	0	0	0	0	.10	1.1	.30	0	20	0	1.5
25	0	0	0	0	0	.10	.75	.51	0	32	0	1.2
26	0	0	0	0	0	.10	.63	.47	.07	18	0	.95
27	0	0	0	0	0	.10	.55	.71	4.9	10	0	.75
28	0	0	0	0	0	.10	.43	1.3	10	5.1	0	.75
29	0	0	0	0	-----	.10	.32	1.4	6.4	2.8	0	1.4
30	0	0	0	0	-----	5.0	.26	1.1	1.8	1.8	0	2.3
31	0	-----	0	0	-----	10	-----	.95	-----	1.1	0	-----
TOTAL	0	0	0	0	0	76.20	1,258.44	18.63	33.38	283.07	1.94	21.41
MEAN	0	0	0	0	0	2.46	41.9	.60	1.11	9.13	.06	.71
MAX	0	0	0	0	0	20	345	1.4	10	55	.51	2.3
MIN	0	0	0	0	0	0	.26	.17	0	.01	0	0
AC-FT	0	0	0	0	0	151	2,500	.37	66	501	3.8	.42

CAL YR 1964: TOTAL  
WAT YR 1965: TOTAL 1,693.07

MEAN  
MEAN 4.63

MAX  
MAX 345

MIN  
MIN 0

AC-FT  
AC-FT 3,360

5-0597. Maple River near Enderlin, N. Dak.

Location.--Lat 46°37'10", long 97°34'20", on west line of sec.2, T.136 N., R.55 W., on right bank 25 ft downstream from county highway bridge, 1 mile downstream from South Branch, and 1 1/4 miles east of Enderlin.

Drainage area.--843 sq mi, of which about 47 sq mi is probably noncontributing.

Records available.--May 1956 to September 1965.

Gage.--Water-stage recorder. Prior to Sept. 20, 1956, wire-weight gage at site 25 ft upstream.

Average discharge.--9 years, 25.1 cfs (18,170 acre-ft per year).

Extremes.--Maximums and minimums (discharge in cubic feet per second, gage height in feet).

Annual maximum discharge (\*) and peak discharges above base (100 cfs, revised), water years 1961-65

Date	Time	Discharge	Gage height	Date	Time	Discharge	Gage height	Date	Time	Discharge	Gage height
Dec. 1, 1961	1500	-	a 4.44	July 4, 1962	0445	1,300	8.88	May 6, 1964	0530	* 126	4.65
Mar. 4, 1961	2300	* 39	a 3.78	July 6, 1962	0830	1,220	8.71	June 9, 1964	0730	* 209	5.32
Mar. 28, 1962	-	950	-	July 19, 1962	2030	1,220	8.71	Apr. 12, 1965	0730	* 3,390	11.05
Apr. 5, 1962	0830	1,050	8.33	Aug. 11, 1962	1800	* 1,650	9.54	June 27, 1965	2400	215	5.44
May 17, 1962	0800	170	5.02	Apr. 6, 1963	2400	* 280	5.85	July 23, 1965	1730	127	4.69
May 23, 1963	0900	236	5.51	Apr. 9, 1963	2400	164	4.85	Aug. 2, 1965	0430	126	4.68
June 16, 1962	1650	266	5.71	June 28, 1963	1700	109	4.35				

a Backwater from ice or snow.

Annual minimum discharge, water years 1961-65

Water year	Date	Discharge	Gage height	Water year	Date	Discharge	Gage height
1961	June 21, 1961	0.70	a 2.10	1964	Dec. 7-9, 1963	0.10	c 2.08
1962	Nov. 3, 1961	1.2	2.08	1965	Mar. 1, 1965	1.6	2.06
1963	Sept. 29, 30, 1963	1.8	b 2.21				

a Occurred July 16, 1961

b Occurred Aug. 4, 1963.

c Occurred Sept. 5, 1964.

1956-65: Maximum discharge, 3,390 cfs Apr. 12, 1965 (gage height, 11.05 ft); minimum, 0.10 cfs Dec. 7-9, 1963; minimum gage height, 1.90 ft Oct. 5, 1956.

Remarks.--Records fair.

Revisions.--WSP 1728: Drainage area.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	1.5	1.7	1.6	1.3	1.3	1.8	4.5	5.1	2.2	1.3	1.3	1.2
2	1.5	1.4	1.4	1.3	1.3	5.0	4.3	4.7	3.2	1.2	1.4	1.3
3	1.5	1.5	1.3	1.3	1.3	15	4.3	4.3	1.8	1.2	1.3	1.3
4	1.5	1.5	1.3	1.3	1.3	30	5.7	3.8	1.8	1.3	1.3	1.3
5	1.5	1.5	1.3	1.3	1.3	25	5.8	3.6	1.7	1.3	1.3	1.3
6	1.5	1.6	1.3	1.4	1.4	20	5.1	5.7	1.6	1.4	1.3	1.3
7	1.6	1.5	1.3	1.4	1.4	16	5.6	5.6	1.5	1.5	1.2	1.4
8	1.6	1.5	1.3	1.4	1.4	13	6.2	6.0	1.4	1.5	1.3	1.3
9	1.6	1.5	1.3	1.4	1.4	10	5.8	6.2	1.5	1.4	1.4	1.5
10	1.6	1.5	1.3	1.4	1.4	9.2	5.1	6.6	1.4	1.4	1.3	2.4
11	1.5	1.6	1.3	1.4	1.4	7.8	5.1	6.8	1.3	1.3	1.3	1.3
12	1.5	1.5	1.3	1.4	1.4	9.3	5.0	6.3	1.3	1.4	1.4	1.3
13	1.4	1.5	1.3	1.4	1.4	18	4.7	5.8	1.4	1.3	1.3	1.4
14	1.5	1.5	1.3	1.4	1.4	16	5.0	5.7	1.4	1.3	1.2	1.3
15	1.4	1.5	1.5	1.4	1.4	13	4.9	5.8	1.3	1.3	1.3	1.2
16	1.5	1.5	1.4	1.4	1.5	11	4.2	5.4	1.2	1.3	1.2	1.2
17	1.5	1.5	1.3	1.4	1.5	11	4.5	5.7	1.2	1.3	2.0	1.2
18	1.5	1.5	1.3	1.4	1.5	10	4.5	6.0	1.1	1.5	1.7	1.2
19	1.6	1.5	1.3	1.4	1.5	9.0	4.3	5.7	1.2	1.6	1.3	1.5
20	1.7	1.5	1.3	1.4	1.5	8.4	4.6	5.4	1.1	1.8	1.3	1.7
21	1.7	1.5	1.3	1.4	1.6	8.1	4.2	4.9	1.0	1.6	1.3	1.6
22	1.7	1.5	1.3	1.4	1.7	7.6	4.5	4.0	1.2	1.7	1.3	1.6
23	1.7	1.5	1.3	1.4	1.6	7.0	5.3	4.0	1.3	1.7	1.3	1.6
24	1.7	1.5	1.3	1.4	1.4	6.4	6.3	3.8	1.2	1.6	1.3	1.6
25	1.8	1.5	1.3	1.4	1.4	5.8	6.6	3.6	1.1	1.8	1.3	1.6
26	1.8	1.6	1.3	1.4	1.5	6.6	7.2	3.3	1.1	1.6	1.3	1.7
27	1.8	1.6	1.3	1.3	1.6	7.2	7.5	3.1	1.0	1.4	1.3	1.6
28	1.7	1.0	1.3	1.3	1.7	5.4	7.2	2.8	1.3	1.3	1.3	1.6
29	1.7	1.2	1.3	1.3	-----	4.9	6.4	2.6	1.3	1.4	1.3	1.6
30	1.7	1.4	1.3	1.3	-----	5.4	5.6	2.4	1.3	1.5	1.3	1.6
31	1.5	-----	1.3	1.3	-----	4.9	-----	2.2	-----	1.4	1.2	-----
TOTAL	49.3	44.6	41.0	42.4	40.5	327.8	159.8	146.9	42.4	44.5	41.3	43.7
MEAN	1.59	1.49	1.32	1.37	1.45	10.6	5.33	4.74	1.41	1.44	1.33	1.46
MAX	1.8	1.7	1.6	1.4	1.7	30	7.5	6.8	3.2	1.8	2.0	2.4
MIN	1.4	1.0	1.3	1.3	1.3	1.8	4.2	2.2	1.0	1.2	1.2	1.2
AC-FT	98	88	81	84	80	650	317	291	84	88	82	87

CAL YR 1960: TOTAL 8,283.7 MEAN 22.6 MAX 605 MIN 1.0 AC-FT 16,430<sup>1</sup>

WAT YR 1961: TOTAL 1,024.2 MEAN 2.81 MAX 30 MIN 1.0 AC-FT 2,030

5-0597. Maple River near Enderlin, N. Dak.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	A'G.	SEPT.
1	1.6	1.7	1.7	1.5	1.8	1.6	270	20	40	10	75	16
2	1.0	1.9	1.7	1.5	1.8	1.6	480	17	36	12	68	14
3	1.6	1.9	1.7	1.5	1.8	1.6	545	15	32	287	62	15
4	1.6	1.7	1.7	1.6	2.2	1.6	618	15	31	950	51	15
5	1.6	1.7	1.7	1.6	1.8	1.6	923	16	31	436	45	15
6	1.6	1.7	2.2	1.5	1.5	1.6	723	14	27	901	42	15
7	1.6	1.7	2.4	1.5	1.5	1.6	557	12	26	1,080	36	13
8	1.6	1.7	2.6	2.0	1.5	1.6	472	12	26	771	32	22
9	1.6	1.7	2.4	1.9	1.5	1.6	332	12	25	660	29	53
10	1.8	1.7	1.7	1.8	1.5	1.6	301	11	38	646	35	65
11	4.5	1.7	1.6	1.8	1.5	1.6	286	11	60	512	1,220	51
12	2.0	1.7	1.6	1.8	1.5	1.6	275	11	36	402	755	42
13	1.9	1.7	1.6	1.8	1.5	2.0	274	12	23	318	495	30
14	1.9	1.7	1.6	1.9	1.5	4.3	134	58	97	262	360	22
15	2.8	1.7	1.6	1.8	1.6	1.6	216	24	15	256	309	19
16	3.5	1.7	1.6	1.8	2.1	1.0	194	42	124	242	240	33
17	3.0	1.8	1.6	1.8	1.5	5.4	178	120	219	212	176	36
18	2.4	1.7	1.6	1.8	1.5	3.2	160	81	129	193	130	29
19	2.2	1.7	1.6	1.8	1.5	4.3	134	58	97	940	100	25
20	2.2	1.7	1.6	1.8	1.5	2.0	108	44	77	950	80	20
21	2.2	1.7	1.6	1.8	1.5	1.1	89	42	62	569	66	17
22	2.1	1.8	1.6	1.8	1.5	2.4	70	85	48	504	59	15
23	2.0	2.0	1.6	1.8	1.5	2.0	58	197	38	319	50	15
24	2.0	1.9	1.6	1.8	1.5	1.9	46	132	27	262	40	15
25	2.1	1.7	1.6	1.8	1.5	2.0	36	95	21	206	33	15
26	2.2	1.6	1.6	1.8	1.5	1.3	31	83	16	174	27	15
27	2.1	1.7	1.6	1.8	1.5	350	27	76	13	146	25	14
28	1.9	1.7	1.6	1.8	1.6	650	24	72	12	121	20	13
29	1.9	1.7	1.6	1.8	-----	250	23	67	11	110	18	12
30	1.7	1.7	1.6	1.8	-----	160	22	61	8.6	98	17	12
31	1.7	-----	1.5	1.8	-----	280	-----	49	-----	84	18	-----
TOTAL	64.5	52.0	53.3	54.3	44.7	1,846.8	7,720	1,520	1,365.6	12,523	4,713	693
MEAN	2.08	1.73	1.72	1.75	1.60	59.6	257	49.0	45.5	404	152	23.1
MAX	4.5	2.0	2.6	2.0	2.2	650	923	197	219	1,080	1,220	65
MIN	1.6	1.6	1.5	1.5	1.5	1.6	22	11	8.6	10	17	12
AC-FT	128	103	106	108	89	3,660	15,310	3,010	2,710	24,840	9,350	1,370
CAL YR 1961: TOTAL	1,059.1		MEAN 2.90		MAX 30		MIN 1.0		AC-FT 2,100			
WAT YR 1962: TOTAL	30,650.2		MEAN 84.0		MAX 1,220		MIN 1.5		AC-FT 60,790			

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	A'G.	SEPT.
1	14	9.6	9.4	3.0	2.0	3.2	5.4	25	9.2	5.0	2.6	2.4
2	14	10	9.2	3.0	2.2	3.4	7.0	22	9.2	4.2	2.8	2.8
3	13	10	9.2	3.2	2.4	3.6	10	20	8.6	3.7	2.4	2.8
4	12	10	9.4	3.4	2.6	3.8	10	18	8.6	3.6	2.2	2.8
5	12	9.4	9.9	3.2	2.8	4.0	8.1	16	8.3	3.4	2.2	2.8
6	15	9.9	8.1	3.0	3.0	4.4	100	14	9.4	3.6	2.4	2.8
7	15	12	7.7	3.0	3.4	4.0	23	12	26	3.5	2.2	2.8
8	14	11	6.0	3.0	3.0	3.6	152	12	64	3.4	2.4	2.8
9	13	12	5.4	3.2	3.2	3.4	116	13	31	3.3	2.2	2.4
10	13	12	4.8	3.2	3.0	3.2	122	13	30	3.2	2.4	2.2
11	12	13	4.4	3.0	3.0	3.0	92	13	23	3.0	2.8	2.2
12	12	13	4.0	3.0	3.0	2.8	80	15	18	3.3	2.8	2.2
13	12	12	3.8	2.8	2.8	2.6	72	13	14	3.2	3.0	2.2
14	12	11	3.6	2.8	2.8	2.4	64	11	13	3.0	3.0	2.4
15	11	11	3.6	2.8	2.8	2.6	57	11	11	2.8	2.8	2.4
16	11	11	3.6	2.6	3.0	2.6	50	11	9.0	2.6	2.4	2.2
17	10	9.9	3.6	2.6	3.2	2.6	43	11	7.3	2.6	2.2	2.2
18	9.9	9.9	3.6	2.6	3.4	2.4	36	10	6.6	2.6	2.2	2.2
19	9.6	9.6	3.6	2.4	3.6	2.6	28	9.9	6.5	2.8	2.2	2.2
20	9.6	10	3.6	2.4	3.6	2.6	23	9.4	6.3	3.2	2.2	2.2
21	10	9.9	3.6	2.4	3.4	5.2	19	9.0	6.1	3.2	2.4	2.2
22	11	8.3	3.8	2.4	3.4	7.3	77	8.8	6.0	3.0	3.2	2.2
23	10	9.4	3.6	2.2	3.4	8.6	15	8.6	6.0	2.6	2.6	2.1
24	10	8.8	3.4	2.2	3.4	9.5	15	8.1	5.8	2.6	2.6	2.0
25	9.9	8.6	3.4	2.2	3.4	11	16	7.7	5.2	2.4	2.8	2.0
26	9.6	8.6	3.4	2.2	3.4	12	18	7.5	5.2	2.4	3.0	2.0
27	9.6	8.8	3.2	2.0	3.2	9.0	22	13	5.0	2.4	3.0	1.9
28	9.4	9.2	3.2	2.0	3.2	7.5	24	14	5.4	2.4	4.0	1.9
29	9.4	9.4	3.0	2.0	-----	8.1	26	12	28	2.2	3.0	1.9
30	9.2	9.4	3.0	2.0	-----	7.3	21	9.9	7.5	2.2	2.4	1.9
31	9.2	-----	3.0	2.0	-----	6.5	-----	9.2	-----	2.2	2.4	-----
TOTAL	351.4	306.7	153.1	81.8	85.8	154.8	1,504.5	387.1	448.0	93.6	81.0	69.1
MEAN	11.3	10.2	4.94	2.64	3.06	4.99	50.2	12.5	14.9	3.02	2.61	2.30
MAX	15	13	9.9	3.4	3.6	12	239	25	64	5.0	4.0	2.8
MIN	9.2	8.3	3.0	2.0	2.0	2.4	5.4	7.5	5.0	2.2	2.2	1.9
AC-FT	697	608	304	162	170	307	2,980	768	889	186	161	137
CAL YR 1962: TOTAL	31,291.6		MEAN 85.7		MAX 1,220		MIN 1.5		AC-FT 62,070			
WAT YR 1963: TOTAL	3,716.9		MEAN 10.2		MAX 239		MIN 1.9		AC-FT 7,370			

5-0597. Maple River near Enderlin, N. Dak.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	2.0	2.4	2.2	2.2	2.1	2.2	5.0	24	2.4	4.5	7.5	3.0
2	2.1	2.4	2.2	2.2	2.1	2.3	7.5	23	2.4	3.9	7.5	2.8
3	2.2	2.4	2.2	2.2	2.1	2.4	10	24	2.4	3.2	6.9	2.4
4	2.4	2.4	2.2	2.2	2.1	2.4	14	26	2.4	3.0	5.6	2.2
5	2.2	2.4	2.2	2.2	2.1	2.4	16	26	2.4	3.2	4.2	2.2
6	2.2	2.4	2.2	2.2	2.1	2.4	19	75	2.4	4.2	3.7	3.0
7	2.2	2.4	1.0	2.2	2.2	2.4	22	33	2.2	19	3.2	2.2
8	2.2	2.4	1.0	2.2	2.2	2.4	19	23	6.8	27	3.0	3.0
9	2.2	2.4	1.0	2.2	2.2	2.5	21	19	124	28	2.6	3.7
10	2.2	2.4	1.50	2.2	2.2	2.5	22	16	42	32	2.6	3.2
11	2.1	2.4	1.90	2.2	2.0	2.6	24	16	20	33	2.6	2.0
12	2.1	2.4	1.3	2.2	2.0	2.7	20	15	13	28	2.4	2.4
13	2.1	2.4	1.7	2.2	2.0	2.7	28	13	9.1	26	2.2	2.6
14	1.8	2.4	2.1	2.2	2.0	3.7	26	12	7.2	24	2.2	2.6
15	2.0	2.4	2.5	2.2	2.0	4.5	32	11	5.6	22	2.0	2.6
16	2.1	2.4	2.6	2.2	2.0	6.5	26	11	4.7	20	2.0	3.4
17	2.0	2.4	2.7	2.2	2.0	5.5	21	11	6.9	18	2.0	3.9
18	2.1	2.2	2.3	2.2	2.0	5.5	22	10	13	17	1.9	4.5
19	2.0	2.2	2.3	2.2	2.0	4.5	19	8.5	25	15	2.0	3.0
20	2.1	2.2	2.2	2.2	2.0	4.2	18	7.2	23	14	2.6	5.3
21	2.1	2.2	2.2	2.2	2.0	3.9	38	6.6	21	13	10	5.6
22	2.0	2.2	2.1	2.1	2.0	3.7	52	5.6	26	13	9.8	5.8
23	2.0	2.2	2.1	2.1	2.0	3.5	44	4.5	23	12	8.8	4.7
24	2.2	2.2	2.1	2.2	2.0	10	33	3.9	19	12	5.8	3.7
25	2.2	2.2	2.1	2.2	2.0	5.6	27	3.2	15	10	4.7	4.2
26	2.2	2.2	2.1	2.1	2.0	5.0	33	3.0	12	9.8	5.0	5.0
27	2.2	2.2	2.1	2.1	2.0	4.3	37	2.6	9.4	9.8	4.6	4.7
28	2.2	2.2	2.1	2.1	2.1	3.8	51	2.6	7.2	13	4.2	4.2
29	2.4	2.2	2.2	2.1	2.1	3.6	29	2.4	5.8	9.1	3.7	3.7
30	2.4	2.2	2.2	2.1	-----	3.4	25	2.2	5.3	6.6	3.4	3.7
31	2.4	-----	2.2	2.1	-----	3.4	-----	2.0	-----	6.6	2.8	-----
TOTAL	66.8	69.4	58.30	67.4	59.6	106.60	742.5	442.3	480.6	459.9	131.5	108.5
MEAN	2.15	2.31	1.88	2.17	2.06	3.44	24.8	14.3	15.4	14.8	4.24	3.62
MAX	2.4	2.4	2.7	2.2	2.2	6.5	52	75	124	33	10	5.8
MIN	1.8	2.2	1.0	2.1	2.0	1.0	5.0	2.0	2.2	3.0	1.9	2.2
AC-FT	133	138	116	134	118	211	1,470	877	914	912	261	215

CAL YR 1963: TOTAL 3,100.20

MEAN 8.49

MAX 239

MIN .10

AC-FT 6,150

WAT YR 1964: TOTAL 2,773.40

MEAN 7.58

MAX 124

MIN .10

AC-FT 5,500

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	3.9	4.2	2.6	3.4	2.0	2.6	3.4	95	29	31	123	18
2	3.7	4.2	2.6	3.4	2.0	2.0	5.5	80	51	25	122	17
3	3.7	4.2	2.6	3.4	2.1	2.2	5.5	69	43	20	114	15
4	3.2	4.2	2.4	3.4	2.0	2.0	150	57	32	16	102	14
5	3.0	3.9	2.4	3.4	2.0	1.9	160	49	29	13	94	13
6	3.2	3.4	2.2	3.4	2.0	2.0	138	44	31	12	91	14
7	3.4	3.2	2.2	3.4	2.2	2.4	64	40	30	10	82	12
8	3.4	3.2	2.2	3.7	2.6	2.2	316	36	29	14	73	12
9	4.2	3.2	2.2	3.7	4.7	3.4	432	36	26	37	66	12
10	3.0	7.6	2.4	3.7	6.7	5.7	1,020	37	24	31	58	11
11	3.4	3.9	2.4	3.7	4.7	6.5	2,550	36	21	33	50	11
12	4.5	3.0	2.4	3.4	4.2	7.0	3,150	33	19	33	44	15
13	4.2	3.0	2.4	2.8	4.2	6.0	2,660	31	19	26	38	16
14	4.5	3.4	2.4	2.6	3.9	5.5	2,160	31	17	24	34	27
15	3.9	3.4	2.8	2.4	4.5	5.2	1,830	38	15	24	29	37
16	2.8	3.2	3.0	2.4	2.8	3.9	1,470	38	14	20	26	24
17	2.8	3.7	3.0	2.4	2.0	13	1,200	36	12	16	24	25
18	2.8	3.7	2.8	2.4	1.9	12	965	33	11	13	22	22
19	2.8	3.7	2.8	2.4	1.9	3.4	794	30	10	12	20	19
20	3.0	3.4	2.8	2.4	3.0	2.6	654	27	9.3	10	18	18
21	2.8	3.2	2.6	2.4	3.7	2.4	536	27	8.6	9.9	16	17
22	2.8	3.2	2.6	2.2	2.2	2.4	445	25	7.8	9.1	15	16
23	2.8	3.2	2.6	2.2	1.9	2.2	367	26	7.5	66	14	16
24	2.8	3.0	3.2	2.2	1.9	2.2	305	28	7.3	77	26	15
25	2.8	2.8	3.4	2.0	1.9	2.2	252	34	7.0	53	41	15
26	2.8	2.8	3.4	2.0	1.9	2.4	215	35	6.5	41	30	14
27	2.8	2.8	3.4	2.2	1.9	2.4	191	34	51	56	32	14
28	2.8	2.8	3.4	2.0	1.9	2.4	163	29	127	53	30	14
29	3.4	2.8	3.4	2.0	-----	2.4	137	30	53	47	27	16
30	4.5	2.6	3.4	2.0	-----	2.4	117	30	42	88	23	20
31	4.5	-----	3.4	2.0	-----	2.6	-----	30	-----	116	20	-----
TOTAL	104.2	104.9	85.4	85.3	78.8	117.3	22,499.9	1,204	789.0	1,036.0	1,504	509
MEAN	3.36	3.50	2.75	2.75	2.81	3.78	750	38.8	26.3	33.4	48.5	17.0
MAX	4.5	7.6	3.4	3.7	6.7	13	3,150	95	127	116	123	37
MIN	2.8	2.6	2.2	2.0	1.9	1.9	3.4	25	6.5	9.1	14	11
AC-FT	207	208	169	169	156	233	44,630	2,390	1,560	2,050	2,980	1,010

CAL YR 1964: TOTAL 2,873.40

MEAN 7.85

MAX 124

MIN .10

AC-FT 5,700

WAT YR 1965: TOTAL 28,117.8

MEAN 7.0

MAX 3,150

MIN 1.9

AC-FT 55,770

CAL YR 1960:	TOTAL	13,747.30	MEAN	37.6	MAX	1,120	MIN	0	AC-FT	27,270
WAT YR 1961:	TOTAL	2,181.50	MEAN	5.98	MAX	46	MIN	0	AC-FT	4,330

## 5-0600. Maple River near Mapleton, N. Dak.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	4.5	5.4	3.7	1.0	.20	.10	340	69	133	44	181	38
2	3.7	4.9	3.3	1.2	.10	.10	820	64	117	52	161	34
3	3.3	4.0	3.3	1.2	.10	.10	1,130	54	102	70	139	34
4	2.7	3.0	4.0	1.4	.20	0	1,800	50	85	581	124	33
5	2.4	3.0	3.3	1.2	.30	0	2,700	44	82	1,490	111	30
6	1.9	3.0	3.7	.70	.20	0	2,440	38	75	1,690	99	28
7	1.4	2.7	3.0	.70	.10	0	1,910	36	72	1,790	88	24
8	1.2	2.4	2.7	.90	.10	0	1,410	33	101	2,090	80	26
9	1.2	2.4	3.0	.30	.10	0	1,220	33	289	2,110	75	43
10	1.4	2.4	2.4	.10	.10	0	1,030	32	264	1,850	69	141
11	4.5	2.7	2.1	.10	.10	0	680	28	231	1,480	128	157
12	39	3.0	1.9	.10	.10	.40	600	26	157	1,040	604	155
13	60	3.0	1.6	.10	.10	.10	549	26	102	810	919	147
14	100	2.7	1.6	.20	.10	0	557	34	75	670	1,110	122
15	108	3.0	1.6	.20	.10	0	477	32	74	529	995	101
16	76	3.0	1.4	.20	.20	0	414	44	145	421	765	88
17	58	3.0	1.4	.20	.20	0	362	88	498	348	553	75
18	44	3.0	1.4	.20	.20	0	344	135	602	311	438	70
19	35	3.0	1.6	.20	.20	0	324	205	432	340	344	70
20	28	3.3	1.4	.20	.20	0	286	314	327	474	256	69
21	23	3.3	1.4	.20	.30	.10	248	256	261	610	196	64
22	19	3.7	1.4	.20	.30	.10	229	266	192	808	157	60
23	16	3.7	1.6	.20	.20	.10	196	905	149	862	128	57
24	14	4.0	1.4	.20	.20	.20	159	1,250	122	763	110	52
25	12	4.0	1.6	.30	.20	.20	129	925	101	585	95	48
26	10	4.0	1.6	.40	.20	.30	106	589	87	446	82	44
27	9.6	4.0	1.6	.30	.20	.30	97	327	74	354	70	43
28	8.9	4.0	1.4	.40	.20	.40	92	219	63	286	63	42
29	7.1	4.0	1.6	.40	-----	.40	80	174	52	248	52	39
30	6.5	3.7	1.0	.40	-----	.40	74	155	44	224	48	39
31	5.4	-----	1.0	.30	-----	25	-----	141	-----	212	43	-----
TOTAL	707.7	101.3	63.6	13.70	4.80	28.30	20,803	6,592	5,111	23,588	8,283	1,973
MEAN	22.8	3.38	2.05	.44	.17	.91	693	213	170	761	267	65.8
MAX	108	5.4	4.0	1.4	.30	25	2,700	1,250	602	2,110	1,110	157
MIN	1.2	2.4	1.0	.10	.10	0	74	26	44	64	43	24
AC-FT	1,400	201	126	27	9.5	56	41,260	13,080	10,140	46,790	16,430	3,910
CAL YR 1961: TOTAL	3,054.10			MEAN 8.37		MAX 108	MIN 0	AC-FT 6,060				
WAT YR 1962: TOTAL	67,269.40			MEAN 184		MAX 2,700	MIN 0	AC-FT 133,400				

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	39	23	24	4.5	0	0	55	50	41	13	5.8	14
2	38	22	23	4.0	0	0	53	47	41	13	5.8	16
3	36	23	23	3.5	0	0	40	45	39	27	5.5	14
4	35	19	22	3.0	0	0	28	43	38	32	5.5	13
5	34	22	16	2.5	0	0	45	44	35	28	5.2	12
6	33	26	20	2.0	0	0	90	42	30	23	4.6	10
7	33	25	18	1.5	0	0	623	39	35	19	4.2	9.2
8	35	25	18	1.0	0	0	757	36	47	17	4.4	8.2
9	34	28	16	.60	0	0	565	32	50	17	4.4	7.3
10	34	34	14	.40	0	0	424	30	52	18	4.2	6.8
11	36	39	13	.20	0	0	281	33	57	19	4.4	5.8
12	40	39	11	.20	0	0	236	32	68	15	5.5	4.9
13	39	38	10	.10	0	0	236	35	63	12	4.4	4.4
14	36	35	9.7	.10	0	0	189	31	54	9.2	4.2	4.6
15	35	33	9.0	.10	0	.20	153	32	48	9.0	4.4	4.2
16	34	28	9.4	0	0	.50	147	31	43	8.5	4.2	3.4
17	29	26	9.7	0	0	1.0	115	30	40	8.2	4.0	3.1
18	28	36	9.7	0	0	1.1	95	28	35	8.2	3.8	3.0
19	28	33	10	0	0	3.0	85	28	31	8.7	3.6	2.8
20	28	35	10	0	0	5.0	77	28	28	8.7	3.2	2.8
21	28	25	10	0	0	8.0	74	24	25	8.7	3.1	2.6
22	22	42	10	0	0	13	63	25	24	8.7	5.8	2.5
23	26	30	9.0	0	0	15	58	25	21	8.7	6.4	2.6
24	24	22	8.5	0	0	20	51	24	18	8.2	6.1	2.5
25	23	22	8.0	0	0	30	44	22	17	6.8	6.1	2.4
26	23	23	7.5	0	0	40	42	20	14	6.8	11	2.1
27	22	23	7.0	0	0	48	41	21	13	6.4	15	1.8
28	22	24	6.5	0	0	80	41	31	13	6.1	19	1.2
29	22	26	6.0	0	-----	83	38	41	13	6.1	14	1.0
30	22	25	5.5	0	-----	71	45	39	13	6.1	14	.80
31	22	-----	5.0	0	-----	64	-----	42	-----	5.8	15	-----
TOTAL	944	851	378.5	23.70	0	479.80	4,791	1,030	1,046	391.9	206.8	169.00
MEAN	30.5	28.4	12.2	.76	0	15.5	160	33.2	34.9	12.6	6.67	5.63
MAX	40	42	24	4.5	0	83	757	50	68	32	19	16
MIN	22	19	5.0	0	0	0	28	20	13	5.8	3.1	.80
AC-FT	1,870	1,690	751	47	0	952	9,500	2,040	2,070	777	410	335
CAL YR 1962: TOTAL	68,570.30			MEAN 188		MAX 2,700	MIN 0	AC-FT 136,000				
WAT YR 1963: TOTAL	10,311.70			MEAN 28.3		MAX 757	MIN 0	AC-FT 20,450				

## 5-0600. Maple River near Mapleton, N. Dak.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

OAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	2.2	5.0	4.5				5.0	61	7.6	30	11	9.6
2	1.9	5.0	4.5				5.1	59	6.8	27	11	8.1
3	1.7	5.0	4.0				14	56	5.6	23	12	7.2
4	1.4	5.0	4.0				22	55	5.3	20	11	6.0
5	1.2	5.0	3.5				58	50	5.0	17	11	4.7
6	.90	5.0	3.5				.10	97	52	5.0	17	9.1
7	.70	5.0	3.0					100	53	5.0	16	6.4
8	1.2	5.3	2.5					113	88	5.0	14	5.0
9	1.4	5.6	.50					144	82	11	14	6.0
10	1.2	5.6	.40					176	80	52	13	6.4
11	1.0	5.3	.30					180	69	58	11	4.7
12	1.0	5.0	.20					169	58	72	11	3.5
13	1.4	3.5	.20				5.0	107	50	99	12	3.5
14	1.7	4.4	.20				6.8	105	42	88	18	3.5
15	2.2	5.0					7.2	238	36	68	22	3.8
16	2.7	6.8		.10	.10			286	35	52	26	2.9
17	3.2	6.8				11	17	199	31	47	26	2.7
18	3.2	6.0				17	14	144	29	47	25	2.4
19	3.5	5.6				14	14	106	26	109	22	2.2
20	3.8	6.0				13	82	26	142	21	2.2	2.7
21	4.4	4.1				12	85	24	97	19	8.6	2.7
22	5.3	5.3				12	147	20	75	18	8.1	2.9
23	5.6	5.0	.10			11	146	18	71	16	8.1	3.2
24	5.6	5.3				9.6	119	18	64	15	10	2.9
25	6.0	4.7				6.8	103	17	55	13	14	3.2
26	6.0	4.4				9.1	90	14	52	12	18	3.8
27	6.0	4.7				7.6	82	12	49	11	21	4.4
28	5.3	5.0				6.8	72	12	47	10	19	5.0
29	5.3	4.7				5.6	64	11	42	10	16	5.1
30	5.3	4.5				5.0	63	9.6	35	11	14	5.4
31	5.3					4.4		8.1		11	11	
TOTAL	97.60	153.6	33.00	3.10	2.90	182.10	3,324.1	1,211.7	1,477.3	531	268.1	120.1
MEAN	3.15	5.12	1.06	.10	.10	5.87	111	39.1	49.2	17.1	8.65	4.00
MAX	6.0	6.8	4.5			17	286	88	142	30	21	9.6
MIN	.70	3.5					5.0	8.1	5.0	10	2.2	2.4
AC-FT	194	305	65	6.2	5.8	361	6,590	2,400	2,930	1,050	532	238
CAL YR 1963:	TOTAL 8,422.40			MEAN 23.1		MAX 757		MIN 0		AC-FT 16,710		
WAT YR 1964:	TOTAL 7,404.60			MEAN 20.2		MAX 286		MIN .10		AC-FT 14,690		

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	6.3	5.5	2.4	1.2	1.0	.60	.50	219	59	40	70	38
2	5.2	6.3	2.1	1.3	.80	.60	.60	196	60	63	63	37
3	4.5	7.1	2.0	1.3	.70	.50	.70	174	60	66	68	34
4	3.6	7.1	1.7	1.4	.70	.30	.70	155	60	58	82	31
5	3.6	7.1	1.6	1.4	.60	.10	.80	136	58	51	87	23
6	4.5	6.3	1.5	1.5	.60	.10	1.0	127	68	46	92	20
7	4.5	6.3	1.5	1.4	.60	.20	4.0	114	73	42	94	19
8	3.0	6.3	1.6	1.5	.50	.20	270	106	64	41	91	17
9	2.8	5.5	1.7	1.5	.50	.20	785	97	57	45	88	15
10	3.0	6.3	1.8	1.5	.60	.20	2,100	98	53	66	86	12
11	2.8	8.7	2.1	1.4	.60	.20	2,800	88	50	73	82	13
12	2.6	8.7	2.1	1.4	.50	.30	3,180	81	48	65	75	19
13	2.8	8.7	2.1	1.4	.50	.30	2,960	78	44	59	70	21
14	3.3	8.7	2.0	1.4	.50	.30	2,810	74	44	63	65	33
15	3.0	13	1.6	1.3	.50	.40	2,680	73	41	65	59	41
16	2.8	13	1.7	1.3	.50	.40	2,620	77	38	64	54	48
17	3.3	10	1.3	1.0	.50	.40	2,460	75	35	59	49	63
18	3.8	7.1	1.1	1.0	.50	.20	2,220	75	34	52	44	69
19	3.8	7.9	1.0	1.0	.50	.10	1,890	72	32	44	42	75
20	4.2	5.5	.80	1.0	.50	.20	1,610	70	29	39	41	77
21	4.5	3.6	.70	1.0	.50	.20	1,300	64	27	38	36	73
22	4.5	3.0	.60	1.0	.50	.30	1,020	60	25	36	32	66
23	5.2	3.6	.70	1.0	.50	.20	809	60	23	73	29	60
24	4.8	6.3	.70	1.0	.50	.30	685	61	22	86	33	52
25	4.5	7.9	.70	1.0	.50	.30	570	64	21	83	35	44
26	4.2	5.5	.80	1.0	.50	.30	458	64	20	90	33	40
27	4.2	4.2	.80	1.0	.50	.20	387	64	28	113	34	37
28	4.2	4.2	.90	1.0	.50	.30	319	64	31	113	39	38
29	4.5	3.6	1.0	1.0		.40	270	61	34	103	46	37
30	4.8	3.0	1.0	1.0		.40	244	59	33	90	45	50
31	5.2		1.1	1.0		.40		59		78	40	
TOTAL	124.0	200.6	42.70	37.2	15.70	9.30	34,555.30	2,866	1,271	2,002	1,804	1,202
MEAN	4.00	6.69	1.38	1.20	.56	.30	1,149	92.5	42.4	64.6	58.2	40.1
MAX	6.3	13	2.4	1.5	1.0	.60	3,180	219	73	113	94	77
MIN	2.6	3.0	.60	1.0	.50	.10	.50	59	20	36	29	12
AC-FT	246	398	85	74	31	18	68,340	5,680	2,520	3,970	3,580	2,380
CAL YR 1964:	TOTAL 7,487.70			MEAN 20.5		MAX 286		MIN .10		AC-FT 14,850		
WAT YR 1965:	TOTAL 44,029.80			MEAN 121		MAX 3,180		MIN .10		AC-FT 87,330		

## RED RIVER OF THE NORTH BASIN

5-0605. Rush River at Amenla, N. Dak.

Location.--Lat 47°01', long 97°13', in sec.24, T.141 N., R.52 W., on left bank on downstream side of bridge on State Highway 18, 0.6 miles north of Amenla.

Drainage area.--116 sq mi.

Records available.--July 1946 to September 1965.

Gage.--Water-stage recorder. Datum of gage is about 935 ft above mean sea level, datum of 1929 (from railroad profile). Prior to Oct. 7, 1947, staff gage at site a quarter of a mile upstream at datum 8.00 ft higher. Oct. 7, 1947, to Sept. 30, 1956, wire-weight gage at site 360 ft upstream at datum 8.00 ft higher and Oct. 1, 1956 to June 10, 1961, at datum 5.00 ft higher.

Average discharge.--19 years, 7.18 cfs (5,200 acre-ft per year); median of yearly mean discharges, 3.8 cfs (2,800 acre-ft per year).

Extremes.--Maximums and minimums (discharge in cubic feet per second, gage height in feet).

Annual maximum discharge (*) and peak discharges above base (27 cfs), water year 1961-65											
Date	Time	Discharge	Gage height	Date	Time	Discharge	Gage height	Date	Time	Discharge	Gage height
Mar. 4, 1961	0400	-	a 7.15	July 4, 1962	1100	214	7.80	Apr. 22, 1964	2300	40	4.65
Mar. 6, 1961		* 25	a 6.06	July 20, 1962	0300	78	6.25	May 7, 1964	0800	28	4.43
								June 23, 1964	1800	46	5.51
Oct. 12, 1961	1800	68	5.53	Apr. 7, 1963	-	* 68	5.3				
Mar. 31, 1962	0100	-	a 11.8					Apr. 11, 1965	1000	* 900	a 11.6
Apr. 5, 1962	0800	* 450	a 10.30	Apr. 5, 1964	-	* 100	a 6.7	May 7, 1965	1300	96	5.35
May 24, 1962	1000	91	5.88	Apr. 16, 1964	0202	60	a 5.05	July 16, 1965	1200	46	5.74
a Backwater from Ice.											

a Backwater from ice.

No flow for some periods in each year.

1946-65: Maximum discharge, 1,230 cfs Apr. 14, 1947; maximum gage height, 11.8 ft Mar. 31, 1962 (backwater from ice); no flow for some periods in each year.

Remarks.--Records fair.

Revisions.--WSP 1728: Drainage area.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	0	0	0	0	0	0	3.6	1.7	.40	0	0	0
2	0	0	0	0	0	0	2.9	1.6	.20	0	0	0
3	0	0	0	0	0	5.0	2.6	1.5	0	0	0	0
4	0	0	0	0	0	15	2.5	1.4	0	0	0	0
5	0	0	0	0	0	20	3.1	1.5	0	0	0	0
6	0	0	0	0	0	20	3.1	2.9	0	0	0	0
7	0	0	0	0	0	20	3.6	3.7	0	0	0	0
8	0	0	0	0	0	15	4.0	4.4	0	0	0	0
9	0	0	0	0	0	12	3.9	6.2	0	0	0	0
10	0	0	0	0	0	11	3.4	5.4	0	0	0	0
11	0	0	0	0	0	10	3.1	4.4	0	0	0	0
12	0	0	0	0	0	6.7	2.8	3.8	0	0	0	0
13	0	0	0	0	0	5.0	2.7	3.5	0	0	0	0
14	0	0	0	0	0	4.8	2.6	2.8	0	0	0	0
15	0	0	0	0	0	4.4	2.5	2.8	0	0	0	0
16	0	0	0	0	0	3.3	2.3	2.6	1.1	0	0	0
17	0	0	0	0	0	3.2	2.0	2.2	1.4	0	0	0
18	0	0	0	0	0	4.4	2.2	2.0	.80	0	0	0
19	0	0	0	0	0	3.9	2.1	1.9	.40	0	0	0
20	0	0	0	0	0	3.2	2.0	1.7	.20	0	0	0
21	0	0	0	0	0	3.4	1.9	1.5	0	0	0	0
22	0	0	0	0	0	3.6	1.8	1.4	.10	0	0	0
23	0	0	0	0	0	3.4	1.9	1.0	0	0	0	0
24	0	0	0	0	0	3.2	2.8	.80	0	0	0	0
25	0	0	0	0	0	4.0	3.1	.70	0	0	0	0
26	0	0	0	0	0	4.8	4.6	.60	0	0	0	0
27	0	0	0	0	0	10	5.7	.50	0	0	0	0
28	0	0	0	0	0	8.0	4.4	.70	0	0	0	0
29	0	0	0	0	-----	15	3.0	.50	0	0	0	0
30	0	0	0	0	-----	7.0	2.1	.40	0	0	0	0
31	0	-----	-----	0	-----	4.4	-----	.40	-----	0	-----	-----
TOTAL	0	0	0	0	0	233.7	88.3	66.50	4.60	0	0	0
MEAN	0	0	0	0	0	7.54	2.94	2.15	.15	0	0	0
MAX	0	0	0	0	0	20	5.7	6.2	1.4	0	0	0
MIN	0	0	0	0	0	0	1.8	.40	0	0	0	0
AC-FT	0	0	0	0	0	464	175	132	9.1	0	0	0

CAL YR 1960: TOTAL 2,786.40 MEAN 7.61 MAX 354 MIN 0 AC-FT 5,530  
 WAT YR 1961: TOTAL 393.10 MEAN 1.08 MAX 20 MIN 0 AC-FT 780

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963												
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	.30	1.0	3.0	0	0	0	3.6	3.8	3.6	.10	0	0
2	.30	1.5	3.4	0	0	0	3.4	3.2	.20	.20	0	0
3	.30	1.5	3.8	0	0	0	3.0	2.7	3.2	.20	0	0
4	.40	1.5	3.4	0	0	0	3.0	2.6	3.0	.10	0	0
5	.30	1.5	3.0	0	0	0	5.0	2.6	2.9	.10	0	0
6	.30	2.0	3.0	0	0	0	20	2.4	3.0	0	0	0
7	.30	2.5	3.0	0	0	0	50	2.5	3.6	0	0	0
8	.30	2.6	3.0	0	0	0	30	2.6	3.8	0	0	0
9	.30	2.7	2.7	0	0	0	25	2.6	8.1	0	0	0
10	.30	2.6	2.0	0	0	0	20	2.8	12	0	0	0
11	.30	2.6	1.8	0	0	0	16	2.9	8.6	0	0	0
12	.30	2.9	1.6	0	0	0	14	3.0	7.7	0	0	0
13	.50	3.2	1.4	0	0	0	13	3.4	7.5	0	0	0
14	.50	3.6	1.0	0	0	0	11	3.4	6.5	0	0	0
15	.50	3.8	.80	0	0	0	9.0	3.8	6.8	0	0	0
16	.40	3.8	.60	0	0	0	8.0	4.0	6.5	0	0	0
17	.40	3.6	.40	0	0	0	7.5	4.0	4.7	0	0	0
18	.40	3.4	.20	0	0	.10	7.2	3.8	3.4	0	0	0
19	.40	3.0	.10	0	0	.20	7.5	3.8	2.8	0	0	0
20	.40	2.9	.10	0	0	.50	7.2	3.8	2.5	0	0	0
21	.40	2.8	.10	0	0	1.0	6.5	3.8	2.1	0	0	0
22	.60	2.9	.10	0	0	2.0	5.8	3.8	2.0	0	0	0
23	.80	2.9	0	0	0	5.0	4.8	3.8	2.5	0	0	0
24	1.0	2.9	0	0	0	10	4.2	3.6	1.7	0	0	0
25	1.0	2.7	0	0	0	10	3.8	3.6	1.4	0	0	0
26	.80	2.6	0	0	0	8.7	3.6	3.6	1.0	0	0	0
27	.80	2.5	0	0	0	11	3.6	4.0	.80	0	0	0
28	.80	2.5	0	0	0	8.6	3.8	4.0	.70	0	0	0
29	.80	2.3	0	0	0	8.1	3.8	4.0	.40	0	0	0
30	.80	2.6	0	0	0	5.6	3.8	4.0	.20	0	0	0
31	.80	-----	0	0	0	3.6	-----	4.0	-----	0	0	0
TOTAL	15.80	78.9	38.50	0	0	74.40	307.2	106.1	116.20	0.70	0	0
MEAN	.51	2.63	1.24	0	0	2.40	10.2	3.42	3.87	.023	0	0
MAX	1.0	3.8	3.8	0	0	11	50	4.0	12	.20	0	0
MIN	.30	1.0	0	0	0	0	3.0	2.4	.20	0	0	0
AC-FT	31	157	76	0	0	148	609	210	230	1.4	0	0
CAL YR 1962: TOTAL	5,370.30			MEAN 14.7	MAX 400	MIN 0		AC-FT 10,650				
WAT YR 1963: TOTAL	737.80			MEAN 2.02	MAX 50	MIN 0		AC-FT 1,460				

## 5-0605. Rush River at Amenia, N. Dak.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1964

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	0	0	0	0	0	0	0	8.1	.20	1.7	0	.20
2	0	0	0	0	0	0	.10	7.2	.10	1.3	0	.10
3	0	0	0	0	0	0	10	6.8	.10	1.4	0	.10
4	0	0	0	0	0	0	75	6.5	.10	1.2	0	.10
5	0	0	0	0	0	0	60	7.2	.10	.70	0	.10
6	0	0	0	0	0	0	20	14	.20	1.0	0	.10
7	0	0	0	0	0	0	18	24	.80	.80	0	.10
8	0	0	0	0	0	0	9.0	15	.50	.70	0	.10
9	0	0	0	0	0	0	9.4	9.4	8.2	.90	0	.10
10	0	0	0	0	0	0	10	7.0	10	.80	0	.10
11	0	0	0	0	0	0	29	5.8	22	.90	0	.10
12	0	0	0	0	0	0	23	5.4	23	.20	0	.10
13	0	0	0	0	0	0	31	4.4	17	.80	0	.10
14	0	0	0	0	0	0	18	4.0	15	.50	0	.10
15	0	0	0	0	0	0	25	3.6	12	.20	0	.10
16	0	0	0	0	0	0	44	3.8	9.0	.10	0	.10
17	0	0	0	0	0	0	42	2.8	7.3	.10	0	.10
18	0	0	0	0	0	0	31	2.6	5.9	0	0	.10
19	0	0	0	0	0	0	17	2.4	6.5	0	0	.10
20	0	0	0	0	0	0	13	2.2	7.9	0	0	.10
21	0	0	0	0	0	0	16	2.2	10	0	0	.10
22	0	0	0	0	0	0	10	1.9	22	0	.10	.10
23	0	0	0	0	0	0	38	1.4	32	0	.10	.10
24	0	0	0	0	0	0	25	1.4	40	0	.10	.10
25	0	0	0	0	0	0	18	.80	23	0	.10	.10
26	0	0	0	0	0	0	14	.30	14	0	.10	.10
27	0	0	0	0	0	0	9.9	.20	8.1	0	.10	.10
28	0	0	0	0	0	0	9.9	.20	5.3	0	.10	.10
29	0	0	0	0	0	0	10	.20	3.2	0	.10	.10
30	0	0	0	0	0	0	9.7	.20	2.3	0	.10	.10
31	0	0	0	0	0	0	0	.20	0	0	.10	.10
TOTAL	0	0	0	0	0	0	654.00	151.20	305.20	13.30	1.00	3.10
MEAN	0	0	0	0	0	0	21.8	4.88	10.2	.43	.032	.10
MAX	0	0	0	0	0	0	75	24	40	1.7	.10	.20
MIN	0	0	0	0	0	0	0	.20	.10	0	0	.10
AC-FT	0	0	0	0	0	0	1,300	300	605	26	2.0	6.2
CAL YR 1964: TOTAL	604.60								1,200			
WAT YR 1964: TOTAL	1,127.80								AC-FT 2,240			

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	.10	.80	.30	0	0	0	.50	6.8	11	9.6	.60	0
2	.10	.80	.30	0	0	0	.60	7.6	12	8.6	.60	0
3	.10	.80	.30	0	0	0	.70	7.6	12	5.6	.50	0
4	.10	.80	.30	0	0	0	.80	7.7	11	3.6	.30	0
5	.10	.80	.20	0	0	0	50	9.2	10	2.4	.30	0
6	.10	.60	.20	0	0	0	100	13	10	2.0	.20	0
7	.10	.60	.20	0	0	0	150	60	8.4	1.5	.20	0
8	.10	.60	.20	0	0	0	300	39	9.4	1.3	.20	0
9	.10	.60	.20	0	0	0	280	23	11	1.1	.10	0
10	.10	.80	.20	0	0	0	300	18	7.6	1.0	.10	0
11	.10	1.0	.20	0	0	0	600	21	4.7	.90	.10	0
12	.10	.90	.10	0	0	0	400	20	3.4	.90	0	0
13	.10	.90	.10	0	0	0	290	15	2.6	1.1	0	0
14	0	.90	.10	0	0	0	195	13	2.1	1.2	0	0
15	0	.90	.10	0	0	0	152	16	1.7	13	0	0
16	0	.80	0	0	0	0	104	17	1.2	40	0	.10
17	0	.80	0	0	0	0	79	25	.60	27	0	.30
18	0	.70	0	0	0	0	56	19	.70	14	0	.60
19	0	.70	0	0	0	0	40	14	.70	7.0	0	1.3
20	0	.60	0	0	0	0	30	12	.70	3.7	0	1.7
21	0	.50	0	0	0	0	23	10	.30	3.0	0	1.7
22	0	.50	0	0	0	0	21	8.0	.20	3.4	0	1.7
23	0	.50	0	0	0	0	18	7.7	.20	4.0	0	1.3
24	0	.50	0	0	0	0	17	6.8	.40	6.2	0	1.1
25	0	.50	0	0	0	0	13	9.6	.60	7.4	0	1.0
26	0	.40	0	0	0	0	11	12	.60	5.6	0	1.0
27	0	.40	0	0	0	0	10	12	.70	3.7	0	1.2
28	.20	.40	0	0	0	0	9.2	11	1.2	2.4	0	1.3
29	.60	.40	0	0	0	0	8.2	9.6	2.6	1.6	0	1.5
30	.80	.30	0	0	0	0	7.9	9.4	7.1	.90	0	1.9
31	.80	0	0	0	0	0	0	9.8	0	.70	0	0
TOTAL	3.70	19.80	3.00	0	0	0	3,266.90	469.8	134.70	185.30	3.20	17.70
MEAN	.12	.66	.097	0	0	0	109	15.2	4.49	5.98	.10	.59
MAX	.80	1.0	.30	0	0	0	600	60	12	40	.60	1.9
MIN	0	.30	0	0	0	0	.50	6.8	.20	.70	0	0
AC-FT	7.3	39	6.0	0	0	0	6,480	932	267	368	6.4	35
CAL YR 1964: TOTAL	1,154.30								AC-FT 2,290			
WAT YR 1965: TOTAL	4,104.10								AC-FT 8,140			

5-0610. Buffalo River near Hawley, Minn.

Location.--Lat 46°51'00", long 96°19'45", near center of SE $\frac{1}{4}$  sec.14, T.139 N., R.45 W., near left downstream end of bridge on farm lane, 2 miles southwest of Hawley.

Drainage area.--323 sq mi.

Records available.--March 1945 to September 1965.

Gage.--Water-stage recorder. Datum of gage is 1,111.91 ft above mean sea level, datum o<sup>n</sup> 1929. Prior to Jan. 29, 1953, chain gage at bridge 1,800 ft upstream at datum 3.17 ft lower.

Average discharge.--20 years, 71.7 cfs (51,910 acre-ft per year).

Extremes.--Maximum and minimum discharges for the water years 1961-65 are contained in the following table:

Water year	Maximum			Minimum		
	Date	Discharge (cfs)	Gage height (feet)	Date	Discharge (cfs)	Gage height (feet)
1961	May 16, 1961	246	a 5.28	Sept. 5, 1961	7.9	2.55
1962	June 10, 1962	1,430	9.11	Jan. 26 to Feb. 5	b 9.6	-
1963	Aug. 12, 1963	253	c 5.48	Jan. 20, 1963	b 9.0	-
1964	Apr. 19, 1964	1,000	8.46	Aug. 19, 20, 1964	b 13	-
1965	Apr. 11, 1965	1,250	d 6.87	Dec. 17-27, 1964	b 13	-

a Maximum gage height for year, 5.60 ft Mar. 4, 1961, backwater from ice.

b Minimum daily.

c Maximum gage height for year, 5.83 ft Feb. 1, backwater from ice.

d Maximum gage height for year, 9.36 ft Apr. 9, 1965, backwater from ice.

1945-65: Maximum discharge, 1,590 cfs Aug. 5, 1955 (gage height, 9.31 ft); minimum observed, 6.8 cfs July 28, 1945; minimum gage height, 2.55 ft Sept. 5, 1961.

Maximum stage known, about 11.8 ft, present datum, in spring of 1921, from information by local resident.

Remarks.--Records good except those for winter periods, which are fair. Records of chemical analyses for the water year 1965 are published in reports of the Geological Survey.

Revisions (water years).--WSP 1308: 1945-46(M), 1948(M).

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	22	34	12	14	14	30	56	97	61	22	17	8.3
2	22	31	14	14	14	50	43	87	58	21	15	8.3
3	22	28	16	14	14	80	52	80	55	20	14	8.5
4	21	26	20	14	14	110	53	74	51	20	13	8.5
5	21	25	24	14	15	130	56	68	47	21	12	9.0
6	20	25	24	14	15	120	49	74	44	18	12	10
7	20	25	24	14	15	70	52	86	42	17	11	10
8	19	25	24	14	15	50	49	101	39	16	10	9.7
9	19	24	22	14	15	74	53	94	39	15	10	10
10	20	22	22	14	15	66	57	88	41	15	10	14
11	20	20	20	15	15	69	60	89	39	15	10	15
12	20	20	20	15	16	66	51	94	40	16	9.7	17
13	20	20	18	15	16	57	47	123	39	20	9.3	20
14	21	22	18	15	15	54	50	162	36	18	9.3	21
15	21	24	18	14	16	55	42	194	34	18	8.8	21
16	21	22	18	14	16	53	34	238	30	20	8.5	18
17	21	20	16	14	15	47	36	232	29	19	8.8	16
18	20	18	16	14	16	47	49	219	27	17	10	15
19	20	20	16	14	16	47	92	214	26	16	10	14
20	20	22	14	14	17	48	145	204	25	16	11	15
21	20	24	14	14	17	57	154	184	24	16	12	15
22	20	22	14	14	17	61	153	161	25	16	12	16
23	20	20	14	14	18	62	145	142	26	17	11	18
24	20	20	13	14	18	59	143	128	26	18	11	17
25	20	22	13	14	18	74	144	113	24	16	10	16
26	20	24	13	13	20	94	141	101	22	15	10	15
27	21	20	13	13	25	104	134	91	21	15	9.7	15
28	23	16	13	13	25	79	126	83	21	14	9.7	16
29	22	14	14	13	-----	71	117	75	20	17	9.5	17
30	26	12	15	13	-----	73	107	69	23	18	8.5	15
31	31	-----	15	14	-----	74	-----	64	-----	18	8.5	-----
TOTAL	653	667	527	433	462	2,131	2,490	3,829	1,034	540	331.3	428.3
MEAN	21.1	22.2	17.0	14.0	16.5	68.7	83.0	124	34.5	17.4	10.7	14.3
MAX	31	34	24	15	25	130	154	238	61	22	17	21
MIN	19	12	12	13	14	30	34	64	20	14	8.5	8.3
AC-FT	1,300	1,320	1,050	859	916	4,230	4,940	7,590	2,050	1,070	657	850

CAL YR 1960: TOTAL 26,900 MEAN 73.5 MAX 633 MIN 12 AC-FT 53,360

WAT YR 1961: TOTAL 13,525.6 MEAN 37.1 MAX 238 MIN 8.3 AC-FT 26,830

## 5-0610. Buffalo River near Hawley, Minn.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	16	18	15	11	9.6	12	70	153	486	132	78	28
2	15	18	15	11	9.6	12	85	138	425	143	73	23
3	15	17	14	11	9.6	12	100	123	390	160	69	34
4	14	16	14	10	9.6	12	140	113	338	139	74	38
5	14	15	16	10	9.6	12	261	102	308	208	68	36
6	14	15	16	10	10	12	332	94	283	202	65	32
7	15	15	15	10	10	12	358	87	276	247	61	30
8	14	15	15	10	10	13	308	91	425	332	59	36
9	14	16	14	10	10	13	184	79	1,120	398	55	44
10	16	15	14	10	10	13	129	76	1,390	372	52	57
11	18	15	14	10	10	14	141	75	1,340	322	75	66
12	18	16	13	10	11	14	133	73	1,170	294	120	64
13	19	16	13	10	12	14	190	70	985	251	136	56
14	19	18	13	10	12	14	205	68	821	204	104	48
15	18	19	13	10	13	14	176	77	687	172	83	44
16	18	17	13	9.8	13	14	171	92	781	155	71	44
17	17	15	12	9.8	13	14	175	184	660	140	63	44
18	17	17	12	9.8	13	14	177	334	588	126	57	42
19	17	18	12	9.8	13	14	181	404	526	127	52	38
20	16	17	12	9.8	13	15	182	378	462	120	49	36
21	16	15	12	9.7	12	15	217	353	612	113	45	34
22	16	15	12	9.7	12	16	256	329	366	109	46	34
23	16	14	12	9.7	12	17	269	370	319	118	46	36
24	18	15	12	9.7	12	17	226	530	282	114	44	38
25	18	14	12	9.7	12	18	190	639	243	104	41	40
26	18	15	12	9.6	12	20	166	648	211	94	36	40
27	20	16	12	9.6	12	25	160	645	182	87	34	38
28	20	15	12	9.6	12	35	170	571	161	83	32	38
29	19	15	12	9.6	-----	45	168	522	145	83	31	36
30	19	15	12	9.6	-----	60	163	682	132	85	31	37
31	19	-----	11	9.6	-----	60	-----	484	-----	85	29	-----
TOTAL	521	479	406	308.1	317.0	582	5,683	8,374	15,904	5,369	1,879	1,216
MEAN	16.8	16.0	13.1	9.94	11.3	18.8	189	270	530	173	60.6	40.5
MAX	20	19	16	11	13	60	358	648	1,390	398	136	66
MIN	13	14	11	9.6	9.6	12	70	68	132	83	29	28
AC-FT	1,030	950	805	611	629	1,150	11,270	16,610	31,550	10,650	3,730	2,410

CAL YR 1961: TOTAL 13,084.6 MEAN 35.8 MAX 238 MIN 8.3 AC-FT 25,950  
WAT YR 1962: TOTAL 41,038.1 MEAN 112 MAX 1,390 MIN 9.6 AC-FT 81,400

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	41	29	36	18	9.8	12	85	58	130	31	14	122
2	41	30	35	18	9.6	12	80	56	158	31	24	118
3	31	31	35	18	9.4	10	100	53	138	31	24	125
4	37	31	35	18	9.4	12	180	50	163	28	22	123
5	36	29	36	18	9.4	13	195	49	146	26	19	113
6	36	30	32	19	9.4	14	155	47	134	26	18	104
7	36	30	26	19	9.4	15	145	50	125	25	17	95
8	38	29	24	20	9.6	16	135	45	123	25	17	85
9	40	29	22	18	9.4	16	120	44	117	24	26	78
10	39	32	21	19	9.4	16	110	45	137	23	35	69
11	38	33	21	19	9.4	17	103	44	146	22	44	63
12	36	34	20	18	9.4	17	103	45	136	22	187	56
13	35	34	20	17	9.4	17	93	44	121	23	120	51
14	36	32	20	17	9.4	18	84	45	108	25	85	46
15	36	32	22	15	9.4	18	79	43	96	22	66	43
16	35	30	24	14	9.4	19	80	41	86	21	53	41
17	34	30	20	14	10	19	87	42	77	22	48	38
18	32	28	20	12	10	20	85	41	70	22	45	37
19	30	29	20	11	10	20	78	39	64	23	41	37
20	30	34	19	10	10	20	74	38	58	20	37	36
21	30	33	19	9.0	10	24	70	39	51	18	32	35
22	31	34	17	9.4	10	30	65	41	45	17	43	33
23	32	31	20	9.4	11	80	61	41	41	15	60	32
24	33	30	20	9.4	11	100	58	38	37	14	58	33
25	31	29	19	9.4	11	120	56	37	34	14	50	33
26	30	31	19	9.4	11	150	56	37	35	14	48	32
27	31	30	19	9.4	11	140	56	92	39	16	53	30
28	30	35	19	9.4	12	160	58	125	35	18	148	32
29	30	36	19	9.6	-----	160	62	116	31	18	166	35
30	30	36	18	9.6	-----	105	63	99	29	135	135	32
31	29	-----	18	9.8	-----	90	-----	91	-----	15	131	-----
TOTAL	1,062	941	715	435.8	278.2	1,482	2,776	1,675	2,758	668	1,866	1,807
MEAN	34.3	31.4	23.1	14.1	9.94	47.8	92.5	54.0	91.9	21.5	60.2	60.2
MAX	41	36	36	20	12	160	195	125	186	31	187	125
MIN	29	28	17	9.0	9.4	12	56	37	29	14	14	30
AC-FT	2,110	1,870	1,420	864	552	2,940	5,510	3,320	5,470	1,320	3,700	3,580

CAL YR 1962: TOTAL 42,350.1 MEAN 116 MAX 1,390 MIN 9.6 AC-FT 84,000  
WAT YR 1963: TOTAL 16,464.0 MEAN 45.1 MAX 195 MIN 9.0 AC-FT 32,660

## 5-0610. Buffalo River near Hawley, Minn.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	31	22	20	15	16	22	30	315	74	48	19	22
2	30	22	19	15	16	22	50	294	70	45	19	22
3	29	22	19	15	16	23	55	277	65	43	18	21
4	28	22	18	15	16	23	80	281	61	39	17	18
5	28	22	17	15	16	22	110	274	58	37	16	17
6	23	22	16	15	16	22	120	264	58	41	16	18
7	27	22	16	15	16	22	160	288	63	45	15	18
8	26	22	16	15	17	23	220	301	65	43	15	20
9	26	22	16	15	17	23	270	303	78	41	16	20
10	26	22	15	16	17	24	350	313	87	38	16	19
11	26	23	14	16	17	25	380	310	76	37	16	19
12	26	22	14	16	17	35	360	292	68	37	16	20
13	26	22	14	16	17	45	360	273	62	36	15	20
14	25	21	14	16	17	25	395	252	56	33	15	18
15	25	21	14	16	17	22	290	231	53	31	15	18
16	25	20	14	16	18	20	506	213	50	29	15	19
17	25	20	14	16	18	25	833	199	49	27	14	20
18	24	20	14	16	18	24	848	183	58	26	14	20
19	25	19	14	16	18	24	958	181	78	24	13	20
20	25	19	14	16	19	23	882	176	101	26	13	21
21	26	19	15	16	19	22	803	166	106	27	17	22
22	26	18	15	16	19	20	788	156	107	26	18	23
23	29	19	15	16	19	20	740	145	103	24	20	30
24	18	15	16	19	20	20	663	134	99	22	21	45
25	27	17	15	16	19	22	602	123	95	22	21	47
26	28	16	15	16	19	23	543	111	88	21	20	48
27	26	16	15	16	19	22	477	100	76	19	19	45
28	24	16	15	16	20	22	428	92	65	19	18	39
29	27	17	15	16	21	26	382	86	58	19	18	36
30	23	18	15	16	-----	25	342	82	53	20	19	34
31	23	-----	15	16	-----	25	-----	78	-----	19	19	-----
TOTAL	817	601	477	487	513	741	13,025	6,493	2,180	964	523	759
MEAN	26.4	20.0	15.4	15.7	17.7	23.9	434	209	72.7	31.1	16.9	25.1
MAX	31	23	20	16	21	45	958	315	107	48	21	48
MIN	23	16	14	15	16	20	30	78	49	19	13	17
AC-FT	1,620	1,190	966	966	1,020	1,470	25,830	12,880	4,320	1,910	1,040	1,510

CAL YR 1963: TOTAL 15,641.0

MEAN 42.9

MAX 195

MIN 9.0

AC-FT 31,020

WAT YR 1964: TOTAL 27,580

MEAN 75.4

MAX 958

MIN 13

AC-FT 54,700

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	33	26	14	15	16	16	19	196	124	75	29	26
2	32	28	14	15	16	16	24	190	122	70	27	25
3	31	28	15	16	16	16	34	135	64	27	22	22
4	30	26	14	16	16	16	58	174	137	59	26	22
5	31	26	14	16	17	16	96	166	145	56	28	21
6	31	26	14	16	17	17	160	169	177	53	37	21
7	31	25	15	16	18	17	300	165	213	51	43	21
8	30	24	15	16	18	17	540	160	202	53	46	21
9	30	24	15	16	18	18	750	162	200	56	39	20
10	29	25	15	16	17	18	920	174	198	53	36	19
11	28	31	15	16	17	18	1,210	168	195	48	33	20
12	29	33	15	15	17	18	1,210	153	190	49	29	24
13	28	34	15	15	17	19	1,190	143	180	52	27	29
14	28	33	15	15	16	19	1,140	135	165	59	25	36
15	27	31	14	15	16	19	1,110	150	151	56	25	39
16	27	29	14	15	16	19	1,040	177	136	53	23	43
17	26	28	13	16	16	19	950	175	124	48	22	45
18	26	23	13	16	16	19	833	171	115	44	20	45
19	26	20	13	16	16	19	740	160	106	41	20	43
20	26	18	13	17	16	18	657	144	100	41	19	39
21	26	18	13	17	16	18	599	132	100	41	17	38
22	26	18	13	18	15	18	550	122	101	42	18	41
23	26	17	13	18	15	17	498	118	102	43	17	48
24	25	17	13	18	14	17	453	122	96	37	18	55
25	25	17	13	18	14	17	406	124	86	35	21	56
26	25	16	13	18	14	17	359	126	81	33	25	53
27	25	16	13	17	15	17	318	131	86	31	27	49
28	24	15	14	17	15	17	284	132	91	28	25	48
29	25	15	14	16	-----	17	252	130	82	28	25	52
30	24	14	14	16	-----	18	216	126	77	29	26	62
31	24	-----	15	16	-----	19	-----	127	-----	29	28	-----
TOTAL	854	701	432	502	450	546	16,936	4,708	4,017	1,457	828	1,083
MEAN	27.5	23.4	13.9	16.2	16.1	17.6	565	152	134	47.0	26.7	36.1
MAX	33	34	15	18	18	19	1,210	196	213	75	46	62
MIN	24	14	13	15	14	16	19	118	77	28	17	19
AC-FT	1,690	1,390	857	996	893	1,080	33,590	9,340	7,970	2,890	1,640	2,150

CAL YR 1964: TOTAL 27,672

MEAN 75.6

MAX 958

MIN 13

AC-FT 54,890

WAT YR 1965: TOTAL 32,514

MEAN 89.1

MAX 1,210

MIN 13

AC-FT 64,490

## 5-0612. Whisky Creek at Barnesville, Minn.

Location.--Lat 46°39'33", long 96°23'54" in NE1/4 sec.29, T.137 N., R.45 W., on right bank 18 ft upstream from culvert on State Highway 34, 0.7 mile upstream from Blue Eagle Lake, and 1.0 mile northeast of Barnesville.

Drainage area.--62.5 sq mi, of which 25.3 sq mi contributes directly to surface runoff.

Records available.--Annual maximums, water years 1961-64. October 1964 to September 1965.

Gage.--Water-stage recorder and crest-stage gage. Altitude of gage is 1,030 ft (from topographic map). Prior to Oct. 6, 1964, crest-stage gage at present site and datum.

Extremes.--Maximum discharges for water years 1961-65 and minimum discharge for water year 1965 are contained in the following table:

Water year	Maximum			Minimum		
	Date	Discharge (cfs)	Gage height (feet)	Date	Discharge (cfs)	Gage height (feet)
1961	Mar. 13, 1961	40	a 5.75	-	-	-
1962	June 8, 1962	292	b 6.52	-	-	-
1963	June 1, 1963	236	6.07	-	-	-
1964	Apr. 15, 1964	117	4.83	-	-	-
1965	Apr. 9, 1965	175	c 5.45	Aug. 24, 1965	0.10	2.24

a Backwater from ice.

b Maximum gage height for year, 8.29 ft Mar. 28, 1962, backwater from ice.

c Maximum gage height for year, 7.67 ft Apr. 6, 1965 (from high watermark), backwater from ice.

1961-65: Maximum discharge, 292 cfs June 8, 1962 (gage height, 6.52 ft); maximum gage height, 8.29 ft Mar. 28, 1962 (backwater from ice).

1965: Minimum discharge, 0.10 cfs Aug. 24, 1965 (gage height, 2.24 ft).

Remarks.--Records fair except those for periods of no gage-height record which are poor.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	2.5	4.6	1.0	.80	1.2	1.7	2.7	5.6	17	3.0	1.0	2.0
2	2.4	4.6	.90	.80	1.2	1.7	3.0	5.3	22	2.8	1.2	1.5
3	2.4	4.2	.90	.90	1.2	1.8	5.3	5.1	24	1.8	1.4	1.1
4	2.3	4.0	.90	.90	1.2	1.8	20	5.0	24	1.5	1.2	.90
5	2.3	4.0	.90	.90	1.3	1.9	73	5.0	21	1.1	1.1	.80
6	2.3	4.0	.90	.90	1.4	1.9	115	5.0	51	1.1	1.0	.90
7	2.3	3.8	.90	.90	1.4	2.0	155	5.0	64	1.5	1.1	.90
8	2.3	3.8	.90	.90	1.4	2.0	165	5.1	52	3.0	1.0	.80
9	2.4	4.2	.90	1.0	1.4	2.0	170	5.2	27	5.4	.90	.80
10	2.4	4.2	.90	1.0	1.4	2.0	150	5.3	15	4.5	1.2	.80
11	2.5	9.6	.90	1.0	1.4	2.1	130	5.4	11	4.0	.50	1.2
12	2.5	9.1	.90	1.0	1.4	2.1	100	5.4	9.1	5.7	.40	6.6
13	2.8	11	.90	1.1	1.4	2.1	80	5.4	9.4	10	.30	8.8
14	2.8	8.4	.90	1.1	1.4	2.1	70	5.2	11	7.2	.20	10
15	3.1	7.7	.80	1.1	1.4	2.1	60	5.1	7.8	5.1	.20	12
16	3.1	5.6	.80	1.1	1.4	2.1	50	5.0	5.7	6.0	.30	12
17	2.9	5.0	.80	1.1	1.4	2.1	40	5.2	4.5	4.5	.20	16
18	2.7	4.3	.80	1.1	1.5	2.0	36	5.6	3.3	3.3	.30	14
19	2.7	3.6	.80	1.1	1.5	2.0	32	6.2	2.6	2.0	.20	11
20	2.7	2.7	.80	1.1	1.5	2.0	28	7.8	2.4	1.5	.20	8.1
21	2.7	2.2	.80	1.1	1.5	2.0	24	10	2.4	5.7	.20	7.2
22	2.5	1.5	.80	1.1	1.5	2.0	13	12	1.8	9.7	.20	11
23	2.5	1.2	.80	1.1	1.5	2.0	13	14	1.6	8.8	.20	13
24	2.5	1.1	.80	1.1	1.6	2.0	14	16	1.2	5.7	.20	13
25	2.5	1.1	.80	1.1	1.6	2.0	15	18	1.6	3.8	.80	10
26	2.5	1.1	.80	1.2	1.6	2.1	15	16	2.0	2.2	1.1	7.8
27	2.7	1.0	.80	1.2	1.7	2.1	15	14	9.4	1.5	1.2	6.0
28	2.7	1.0	.80	1.2	1.7	2.2	10	12	8.5	1.2	1.0	5.4
29	3.1	1.0	.80	1.2	-----	2.3	6.7	10	5.4	1.1	1.2	8.5
30	4.0	1.0	.80	1.2	-----	2.4	6.0	8.8	3.8	1.0	1.8	19
31	4.4	-----	.80	1.2	-----	2.5	-----	13	-----	1.0	1.8	-----
TOTAL	83.5	120.6	26.30	32.50	40.1	63.1	1,616.7	251.7	421.5	116.7	23.60	211.10
MEAN	2.69	4.02	.85	1.05	1.43	2.04	53.9	8.12	14.1	3.76	.76	7.04
MAX	4.4	11	1.0	1.2	1.7	2.5	170	18	64	10	1.8	19
MIN	2.3	1.0	.80	.80	1.2	1.7	2.7	5.0	1.2	1.0	.20	.80
CFSM	.04	.06	.01	.02	.02	.03	.86	.13	.22	.06	.01	.11
IN	.05	.07	.02	.02	.02	.04	.96	.15	.25	.07	.01	.13
AC-FT	166	239	52	64	80	125	3,210	499	836	231	47	619
CAL YR 1964: TOTAL				MEAN	MAX	MIN	CFSM	IN	AC-FT			
WAT YR 1965: TOTAL	3,007.40			MEAN 8.24	MAX 170	MIN .20	CFSM .13	IN 1.79	AC-FT 5,970			

Note.--No gage-height record Jan. 29 to Feb. 28, Apr. 2-6, 8-14.

5-0615. South Branch Buffalo River at Sabin, Minn.

Location.--Lat 46°46'20", long 96°37'40", in SW $\frac{1}{4}$ SW $\frac{1}{4}$  sec.9, T.138 N., R.47 W., near center of span on downstream side of highway bridge, 0.3 mile downstream from Stony Creek (revised) and 1 mile east of Sabin.

Drainage area.--522 sq mi.

Records available.--March 1945 to September 1965.

Gage.--Wire-weight gage read once or twice daily. Datum of gage is 902.39 ft above mean sea level, datum of 1929 (levels by Soil Conservation Service). Prior to Aug. 17, 1948, at site 1 mile downstream at different datum. Aug. 17, 1948, to July 26, 1965, chain gage at present site and datum.

Average discharge.--20 years, 55.6 cfs (40,250 acre-ft per year).

Extremes.--Maximum and minimum discharges for the water years 1961-65 are contained in the following table:

Water year	Maximum			Minimum		
	Date	Discharge (cfs)	Gage height (feet)	Date	Discharge (cfs)	Gage height (feet)
1961	May 18, 1961	248	9.09	Long periods	0	-
1962	June 9, 1962	6,340	17.04	do.	0	-
1963	June 4, 1963	1,420	13.20	do.	0	-
1964	Apr. 17, 1964	796	11.72	do.	0	-
1965	Apr. 11, 1965	4,130	15.96	do.	0	-

a Maximum gage height for year, 16.29 ft Apr. 8, 1965, from floodmark, backwater from ice.

1945-65: Maximum discharge, 6,340 cfs June 9, 1962 (gage height, 17.04 ft); no flow for many days in most years.

Remarks.--Records fair. Records of chemical analyses for the water year 1965 are published in reports of the Geological Survey.

Revisions (water year).--WSP 1308: 1949(M).

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	1.3	9.8	.20	0	0	30	68	86	14	2.9	3.6	.50
2	.80	9.7	0	0	0	40	61	67	12	2.8	4.0	.40
3	3.1	9.5	0	0	0	60	54	60	12	2.3	3.7	.60
4	5.2	12	0	0	0	90	49	48	12	2.0	3.7	.80
5	2.0	11	0	0	0	100	43	44	11	1.7	3.7	.70
6	2.7	10	0	0	0	120	38	43	9.8	1.5	4.3	.50
7	4.0	8.4	0	0	0	120	38	49	8.8	1.4	4.7	.70
8	4.3	7.6	0	0	0	100	41	55	7.9	1.2	4.9	1.0
9	4.3	6.5	0	0	0	85	43	63	7.0	1.0	5.2	1.1
10	3.5	5.0	0	0	0	70	37	73	5.8	.90	4.7	1.6
11	4.1	4.5	0	0	0	60	35	70	4.7	1.3	3.5	1.6
12	4.1	4.5	0	0	0	55	34	67	4.6	.60	2.9	2.5
13	4.1	4.5	0	0	0	50	33	70	4.6	1.6	2.3	3.2
14	4.6	5.0	0	0	0	40	33	93	4.1	1.2	1.4	4.4
15	5.7	5.0	0	0	0	35	33	122	4.0	.80	1.0	5.7
16	5.7	4.5	0	0	0	35	31	157	3.6	1.7	.80	8.9
17	5.0	4.0	0	0	0	40	30	216	3.6	2.9	.90	10
18	4.6	4.0	0	0	0	50	229	3.6	1.7	.70	11	
19	5.2	4.0	0	0	0	55	56	184	3.6	1.2	1.1	11
20	5.7	4.5	0	0	0	60	60	138	3.4	1.6	1.1	11
21	5.7	5.0	0	0	.10	70	61	105	2.4	1.6	.80	11
22	4.7	4.5	0	0	.50	78	64	79	2.6	1.5	.60	10
23	4.0	4.5	0	0	.10	80	73	64	2.5	2.1	.50	9.3
24	4.6	4.5	0	0	.10	100	84	53	2.5	3.2	.30	8.4
25	4.6	4.5	0	0	.20	125	98	43	2.3	3.2	.50	7.9
26	4.6	4.0	0	0	4.0	128	117	35	2.3	2.7	.50	7.4
27	5.7	3.0	0	0	10	111	146	29	2.8	2.3	.50	6.9
28	4.9	2.0	0	0	15	88	139	25	2.9	2.5	.80	6.5
29	5.3	1.0	0	0	-----	88	146	22	3.1	3.5	.70	6.2
30	8.2	.50	0	0	-----	72	160	20	3.0	3.2	.90	5.7
31	9.7	-----	0	0	-----	88	-----	16	-----	3.1	.70	-----
TOTAL	142.00	167.50	0.20	0	30.00	2,323	1,955	2,425	166.5	61.20	65.00	156.50
MEAN	4.58	5.58	.007	0	1.07	74.9	65.2	78.2	5.55	1.97	2.10	5.22
MAX	9.7	12	.20	0	15	128	160	229	14	3.5	5.2	11
MIN	.80	.50	0	0	0	30	30	16	2.3	.60	.30	.40
AC-FT	282	332	.4	0	60	4,610	3,880	4,810	330	121	129	310
CAL YR 1960: TOTAL	17,933.80			MEAN 49.0		MAX 960	MIN 0	AC-FT 35,570				
WAT YR 1961: TOTAL	7,491.90			MEAN 20.5		MAX 229	MIN 0	AC-FT 14,860				

## 5-0615. South Branch Buffalo River at Sabin, Minn.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	5.7	7.4	5.5	4.0	0	0	0	158	418	92	57	4.0
2	6.7	7.4	5.0	.30	0	0	0	175	376	92	67	4.0
3	6.4	7.0	5.2	.20	0	0	0	171	309	122	64	4.0
4	5.3	5.5	5.5	.20	0	0	0	137	247	220	60	4.0
5	5.8	4.8	5.5	.20	0	0	20	111	206	371	53	6.0
6	6.0	4.2	5.2	.20	0	0	600	91	177	509	100	5.5
7	6.5	4.4	5.0	.20	0	0	1,000	77	159	720	153	4.3
8	8.4	4.6	5.0	.20	0	0	900	65	376	1,150	87	6.4
9	8.8	4.8	4.8	.20	0	0	600	59	3,940	1,040	40	7.2
10	8.9	5.2	4.4	.20	0	0	550	55	5,750	716	33	15
11	9.1	5.4	4.2	.20	0	0	510	52	4,240	512	100	33
12	10	6.0	4.0	.20	0	0	480	50	3,010	329	250	42
13	11	5.0	3.8	.10	0	0	48	500	1,770	218	370	42
14	12	7.5	3.2	.10	0	0	700	47	965	180	326	38
15	13	7.5	2.6	.10	0	0	751	47	702	150	220	32
16	13	7.5	2.4	.10	0	0	689	56	778	120	132	27
17	12	7.5	2.2	0	0	0	628	77	1,400	96	76	28
18	12	7.5	2.2	0	0	0	530	200	1,740	81	55	30
19	12	7.0	2.0	0	0	0	428	572	1,380	88	35	25
20	11	6.8	1.8	0	0	0	328	1,140	950	103	29	23
21	11	6.8	1.6	0	0	0	220	1,520	698	115	23	19
22	10	6.8	1.2	0	0	0	176	1,190	550	125	20	18
23	9.5	6.6	1.2	0	0	0	154	1,500	451	135	18	16
24	8.9	6.6	1.0	0	0	0	138	2,530	365	156	16	15
25	8.6	6.4	1.0	0	0	0	122	2,700	297	143	14	18
26	8.2	6.2	.80	0	0	0	105	1,760	236	100	12	20
27	8.1	6.2	.80	0	0	0	102	1,050	185	72	9.1	24
28	7.6	6.2	.60	0	0	0	106	756	148	60	5.8	24
29	7.4	6.1	.70	0	-----	0	128	625	120	49	6.2	24
30	7.4	6.0	.60	0	-----	0	146	520	97	56	6.4	24
31	7.0	-----	.50	0	-----	0	-----	442	-----	44	4.0	-----
TOTAL	277.3	189.9	89.50	3.10	0	0	10,611	17,982	32,040	7,964	2,441.5	582.4
MEAN	8.95	6.33	2.89	.10	0	0	354	580	1,068	257	78.8	19.4
MAX	13	8.0	5.5	.40	0	0	1,000	2,700	5,750	1,150	370	42
MIN	5.3	4.2	.50	0	0	0	0	47	97	44	4.0	4.0
AC-FT	550	377	178	6.2	0	0	21,050	35,670	63,550	15,800	4,840	1,160

CAL YR 1961: TOTAL 7,738.90 MEAN 21.2 MAX 229 MIN 0 AC-FT 15,350  
WAT YR 1962: TOTAL 72,180.70 MEAN 198 MAX 5,750 MIN 0 AC-FT 143,200

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	21	19	31	.20	0	0	80	57	330	12	1.8	48
2	22	18	30	.10	0	0	70	50	521	12	2.6	48
3	24	19	31	.10	0	0	60	46	965	13	3.2	49
4	23	19	30	0	0	0	45	44	1,330	12	3.8	54
5	24	18	28	0	0	0	55	42	910	11	4.6	57
6	24	18	22	0	0	0	150	39	669	11	1.7	58
7	24	20	20	0	0	0	324	38	553	12	1.6	54
8	25	22	18	0	0	0	315	38	490	12	1.6	44
9	25	26	14	0	0	0	287	41	482	8.9	2.1	37
10	25	32	10	0	0	0	196	45	422	7.6	1.7	30
11	25	41	4.0	0	0	0	89	45	339	7.0	3.0	24
12	26	42	6.0	0	0	0	72	45	315	6.0	4.4	20
13	26	42	4.0	0	0	0	68	46	282	5.0	4.1	16
14	26	42	3.5	0	0	0	65	53	232	4.0	6.9	12
15	25	40	3.2	0	0	0	59	54	200	2.5	7.2	10
16	21	39	3.0	0	0	.10	58	60	170	2.4	8.4	8.2
17	23	38	2.8	0	0	.20	56	65	130	1.9	8.4	7.4
18	19	36	2.6	0	0	.50	63	120	100	1.9	4.6	6.9
19	16	38	2.4	0	0	1.0	56	170	63	2.0	2.4	7.2
20	16	38	2.2	0	0	2.0	55	137	52	2.2	1.7	8.1
21	15	36	2.0	0	0	5.0	50	95	44	2.4	5.5	7.5
22	15	34	2.0	0	0	10	45	70	38	2.6	5.8	7.0
23	15	32	1.9	0	0	40	61	56	32	2.4	3.8	6.5
24	16	32	1.8	0	0	150	40	54	28	1.8	6.0	6.0
25	17	34	1.6	0	0	220	37	50	27	1.2	9.0	5.8
26	17	35	1.4	0	0	200	40	60	22	1.2	12	6.4
27	18	34	1.0	0	0	190	44	20	14	1.2	15	5.8
28	18	32	1.0	0	0	150	46	238	18	1.1	30	5.4
29	18	30	.80	0	-----	115	46	334	16	2.5	37	5.0
30	18	30	.60	0	-----	110	55	385	14	1.6	48	4.7
31	18	-----	.40	0	-----	90	-----	318	-----	1.7	50	-----
TOTAL	645	936	282.40	0.40	0	1,283.80	2,667	3,065	8,814	166.1	297.9	658.9
MEAN	20.8	31.2	9.11	.013	0	41.4	88.9	98.9	294	5.36	9.61	22.0
MAX	26	42	31	.20	0	220	324	385	1,330	13	50	58
MIN	15	18	.40	0	0	0	37	38	14	1.1	1.6	4.7
AC-FT	1,280	1,860	560	.8	0	2,550	5,290	6,080	17,480	329	591	1,310

CAL YR 1962: TOTAL 73,487.40 MEAN 201 MAX 5,750 MIN 0 AC-FT 145,800  
WAT YR 1963: TOTAL 18,816.50 MEAN 51.6 MAX 1,330 MIN 0 AC-FT 37,320

## 5-0615. South Branch Buffalo River at Sabin, Minn.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	4.3	5.2	7.2	0	0	0	8.0	159	6.9	15	3.6	7.2
2	4.1	6.2	7.0	0	0	0	10	140	5.2	11	5.0	5.8
3	3.2	4.9	6.5	0	0	0	20	130	5.2	8.2	6.2	5.2
4	3.6	6.0	6.5	0	0	0	100	121	4.7	7.2	6.2	5.2
5	3.7	6.4	6.5	0	0	0	350	123	4.7	6.9	4.3	5.0
6	2.4	6.9	6.2	0	0	0	500	131	3.8	5.2	3.5	4.5
7	2.4	8.1	6.0	0	0	0	480	155	3.8	4.6	1.8	4.1
8	5.5	7.0	5.5	0	0	0	440	199	3.6	4.3	2.0	6.7
9	3.0	7.6	5.0	0	0	-10	410	233	5.8	4.4	2.6	10
10	2.7	8.4	4.5	0	0	-50	360	186	5.2	6.2	3.7	14
11	4.4	8.1	4.0	0	0	1.0	300	153	7.2	6.5	2.4	13
12	5.5	7.2	3.5	0	0	4.0	241	110	13	9.5	4.6	11
13	6.5	7.5	3.0	0	0	8.0	230	90	12	12	4.3	7.0
14	5.5	7.4	2.5	0	0	8.0	226	73	9.8	8.9	3.5	4.9
15	4.9	7.5	2.0	0	0	10	401	62	9.3	7.9	2.8	3.7
16	7.6	7.2	1.5	0	0	12	658	50	7.2	5.2	2.2	4.3
17	6.5	7.0	1.0	0	0	6.0	780	48	8.6	4.3	1.6	2.9
18	8.1	8.1	-50	0	0	5.0	714	46	8.9	2.7	1.8	3.4
19	6.9	8.0	-10	0	0	5.0	540	38	16	2.9	1.7	3.0
20	7.5	8.0	-10	0	0	4.0	401	33	53	3.6	2.0	3.6
21	8.2	9.0	-10	0	0	4.0	353	30	100	2.5	3.7	3.0
22	8.5	8.5	0	0	0	4.0	415	23	132	2.2	4.1	3.1
23	8.9	8.5	0	0	0	4.0	478	21	132	2.0	9.3	4.4
24	8.9	8.0	0	0	0	4.0	468	19	100	1.7	13	5.3
25	11	8.0	0	0	0	5.0	383	16	76	1.7	12	7.4
26	9.5	8.2	0	0	0	5.0	292	14	55	1.3	11	8.4
27	8.4	8.5	0	0	0	5.5	241	12	42	1.5	10	16
28	7.4	8.0	0	0	0	6.0	220	11	29	1.9	9.0	17
29	8.1	7.8	0	0	0	6.5	204	8.6	24	2.3	8.0	14
30	13	7.6	0	0	-----	6.9	191	8.2	19	1.7	6.5	10
31	6.5	-----	-----	-----	-----	7.5	-----	6.5	-----	2.3	5.3	-----
TOTAL	195.1	224.8	79.20	0	0	122.00	10,414.0	2,450.3	901.5	159.0	157.7	213.1
MEAN	6.29	7.49	2.55	0	0	3.94	347	79.0	30.1	5.13	5.09	7.10
MAX	13	9.0	7.2	0	0	12	780	233	132	15	13	17
MIN	2.4	4.9	0	0	0	0	8.0	6.5	3.6	1.3	1.6	2.9
AC-FT	387	446	157	0	0	242	20,660	4,860	1,790	315	313	423

CAL YR 1963: TOTAL 17,452.20 MEAN 47.8 MAX 1,330 MIN 0 AC-FT 34,620  
WAT YR 1964: TOTAL 14,916.70 MEAN 40.8 MAX 780 AC-FT 29,590

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	8.1	8.0	1.2	0	0	0	1.0	67	67	25	33	4.9
2	5.7	10	1.80	0	0	0	1.1	60	75	22	29	4.6
3	5.2	10	.50	0	0	0	1.3	58	76	18	25	3.5
4	5.7	11	.30	0	0	0	2.5	56	83	16	21	4.7
5	6.0	10	.30	0	0	0	15	55	94	14	40	4.2
6	4.7	11	.30	0	0	0	80	51	113	13	40	3.6
7	4.9	11	.20	0	0	0	500	54	146	12	36	3.1
8	2.9	11	.20	0	0	0	2,750	63	312	13	35	2.4
9	4.7	12	.20	0	0	0	3,100	60	363	12	41	1.6
10	4.1	12	.10	0	0	0	3,350	55	384	13	34	1.4
11	5.7	13	-10	0	0	0	3,850	55	310	16	13	1.4
12	6.7	16	0	0	0	0	3,150	49	197	19	9.8	1.8
13	7.0	17	0	0	0	0	1,910	45	123	20	7.2	2.6
14	7.4	19	0	0	0	0	1,150	44	94	20	6.2	4.3
15	7.6	21	0	0	0	0	887	44	77	23	5.0	12
16	7.9	20	0	0	0	0	733	49	70	24	3.7	12
17	7.7	19	0	0	0	0	580	65	56	23	2.7	18
18	7.6	15	0	0	0	0	443	77	46	23	2.2	20
19	7.7	11	0	0	0	0	350	82	38	22	1.8	27
20	7.4	9.0	0	0	0	0	285	75	34	21	2.0	27
21	7.4	7.5	0	0	0	0	239	62	29	28	5.0	28
22	6.9	6.4	0	0	0	0	208	50	25	38	8.4	31
23	6.7	5.6	0	0	0	0	181	46	21	72	8.6	33
24	5.7	5.2	0	0	0	0	156	45	16	67	7.0	36
25	6.2	4.7	0	0	0	0	135	54	16	45	6.4	38
26	6.2	4.2	0	0	0	0	114	73	14	34	4.4	41
27	5.7	3.5	0	0	0	0	97	92	17	29	3.4	45
28	5.3	3.0	0	0	0	-10	88	98	18	27	3.0	44
29	6.4	2.2	0	0	-----	-40	78	92	29	27	3.1	43
30	6.2	1.6	0	0	-----	-70	72	84	27	32	4.9	48
31	6.0	-----	0	0	-----	-90	-----	74	-----	32	4.9	-----
TOTAL	193.4	309.9	4.20	0	0	2.10	24,506.9	1,934	2,972	800	446.7	547.1
MEAN	6.24	10.3	1.4	0	0	0.068	817	62.4	99.1	25.8	14.6	18.2
MAX	8.1	21	1.2	0	0	90	3,850	98	384	72	41	48
MIN	2.9	1.6	0	0	0	0	1.0	44	12	12	1.8	1.4
AC-FT	384	615	8.3	0	0	4.2	48,610	3,840	5,890	1,590	886	1,090

CAL YR 1964: TOTAL 14,925.10 MEAN 40.8 MAX 780 MIN 0 AC-FT 29,600  
WAT YR 1965: TOTAL 31,716.30 MEAN 86.9 MAX 3,850 AC-FT 62,910

5-0620. Buffalo River near Dilworth, Minn.

Location.--Lat 46°57'40", long 96°39'40", in SW 1/4 sec. 6, T. 140 N., R. 47 W., on left bank 4 1/2 miles southeast of Kragnes, 6 1/2 miles northeast of Dilworth, and 9 miles downstream from South Branch.

Drainage area.--1,040 sq mi, approximately.

Records available.--March 1931 to September 1965. Monthly discharge only for some periods, published in WSP 1308.

Gage.--Water-stage recorder. Altitude of gage is 870 ft (from topographic map). Prior to Apr. 5, 1937, chain gage at same site and datum.

Average discharge.--34 years, 119 cfs (86,150 acre-ft per year).

Extremes.--Maximum and minimum discharges for the water years 1961-65 are contained in the following table:

Water year	Maximum			Minimum		
	Date	Discharge (cfs)	Gage height (feet)	Date	Discharge (cfs)	Gage height (feet)
1961	May 19, 1961	480	9.90	Aug. 17, 1961	5.1	1.67
1962	June 11, 1962	5,140	23.56	Jan. 30 to Feb. 3	a 2.2	-
1963	June 7, 1963	1,300	14.76	Jan. 25 to Feb. 3	a 5.8	-
1964	Apr. 22, 1964	1,740	16.40	Aug. 20, 1964	10	1.98
1965	Apr. 11, 1965	5,960	b 23.37	(c)	a 14	-

a Minimum daily.

b From floodmark.

c Dec. 1-5, 20-30, 1964.

1931-65: Maximum discharge, 6,140 cfs June 11, 1962 (gage height, 23.56 ft); no flow at times in 1936.

Remarks.--Records good except those for periods of no gage-height record and those for winter periods, which are fair. Records of chemical analyses for the water years 1962-63 and 1965 are published in reports of the Geological Survey.

Revisions (water years).--WSP 1308: 1931(M).

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	27	40	12	18	15	20	160	238	105	21	21	6.0
2	27	46	10	18	15	25	162	214	97	24	19	6.4
3	27	49	18	18	15	50	137	195	89	26	18	6.0
4	27	49	28	18	15	100	118	174	83	23	16	6.9
5	28	44	28	18	15	150	125	156	78	20	14	7.3
6	27	41	27	18	16	180	134	148	74	19	12	8.8
7	27	40	29	18	16	190	124	161	68	20	11	9.0
8	27	39	29	18	16	190	112	166	64	17	11	10
9	27	36	29	18	16	180	110	168	64	17	8.8	12
10	28	26	30	18	16	170	110	181	59	14	8.4	14
11	28	28	28	18	16	160	112	189	58	16	8.6	14
12	28	24	26	18	16	150	113	190	59	15	8.2	17
13	28	36	24	18	16	140	113	221	57	16	7.8	18
14	29	34	22	18	16	140	106	290	56	16	7.8	18
15	30	34	22	18	16	140	105	334	54	23	7.4	20
16	28	30	20	18	16	130	96	386	50	20	5.8	21
17	28	36	20	19	17	130	105	400	45	20	5.8	21
18	28	24	20	19	17	135	101	456	41	21	6.2	19
19	26	22	20	19	17	140	102	477	38	21	5.8	18
20	26	26	20	18	17	140	122	448	35	20	6.0	18
21	27	30	18	18	17	140	181	394	32	19	6.2	18
22	26	30	16	18	17	150	224	342	33	21	6.5	19
23	26	24	16	17	18	150	235	298	33	21	6.2	21
24	25	22	16	17	18	150	247	262	31	19	6.5	21
25	25	20	16	16	18	170	265	232	29	19	6.9	23
26	25	28	16	16	18	170	266	205	29	18	6.7	23
27	25	20	16	16	18	170	271	184	26	18	6.4	23
28	25	18	16	16	19	170	280	164	25	17	6.4	22
29	25	16	16	16	---	170	281	147	23	17	6.5	22
30	32	14	17	15	---	160	264	128	23	19	6.7	23
31	37	---	18	15	---	160	---	114	---	22	6.0	---
TOTAL	849	926	643	543	462	4,420	4,881	7,662	1,558	601	279.6	485.4
MEAN	27.4	30.9	20.7	17.5	16.5	143	163	247	51.9	19.4	9.02	16.2
MAX	37	49	30	19	19	190	281	477	105	25	21	23
MIN	25	14	10	15	15	20	96	114	23	15	5.8	6.0
AC-FT	1,680	1,840	1,280	1,080	916	8,770	9,680	15,200	3,090	1,190	555	963

CAL YR 1960: TOTAL 51,955 MEAN 142 MAX 1,380 MIN 10 AC-FT 103,100  
 MAY YR 1961: TOTAL 23,310.0 MEAN 63.9 MAX 477 MIN 5.8 AC-FT 46,230

## 5-0620. Buffalo River near Dilworth, Minn.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	24	26	22	11	9.2	11	22	347	1,330	288	153	40
2	23	26	20	11	9.2	11	24	341	1,160	284	144	38
3	22	25	20	12	9.2	11	45	332	1,040	299	134	42
4	21	24	20	12	9.3	11	70	314	944	381	123	46
5	20	20	19	12	11	11	100	279	832	542	121	45
6	19	18	18	11	12	12	250	241	719	663	116	45
7	19	22	16	10	12	12	500	211	621	814	108	43
8	22	18	18	10	12	12	960	189	716	1,030	136	45
9	24	20	19	10	12	13	1,320	174	1,100	1,300	152	46
10	24	18	18	10	12	13	1,450	162	3,300	1,630	127	77
11	28	22	18	9.8	12	13	1,320	154	5,990	1,620	133	92
12	30	22	17	9.6	13	14	1,150	148	5,830	1,410	232	106
13	32	26	15	9.6	13	15	1,050	144	5,220	1,140	365	115
14	31	24	14	9.6	13	15	1,000	139	4,400	890	445	114
15	30	22	14	9.6	13	16	1,000	138	3,600	676	444	104
16	30	23	13	9.6	12	16	1,070	158	2,800	512	365	90
17	30	24	13	9.4	12	16	1,100	216	2,900	395	268	84
18	29	26	13	9.4	12	16	1,100	271	3,080	325	200	78
19	28	22	13	9.4	11	16	1,090	421	3,300	297	154	72
20	29	20	13	9.4	11	16	987	734	3,100	292	122	69
21	28	22	13	9.4	11	16	817	970	2,600	285	101	66
22	28	24	13	9.4	11	16	636	1,320	2,200	284	89	61
23	27	24	13	9.3	11	16	519	1,800	1,800	280	84	55
24	26	23	12	9.3	11	16	470	1,500	2,270	1,500	277	78
25	26	22	12	9.3	11	16	446	2,860	1,200	290	69	54
26	27	22	12	9.3	11	17	412	3,100	900	292	62	54
27	27	21	12	9.3	11	18	345	2,890	690	251	55	54
28	27	21	12	9.3	11	19	323	2,410	534	211	49	58
29	26	18	12	9.2	10	20	307	2,050	412	181	44	60
30	27	20	12	9.2	10	20	325	1,770	331	165	42	61
31	27	-----	11	9.2	-----	21	-----	1,540	-----	160	40	-----
TOTAL	811	663	467	306.7	317.9	465	20,208	28,093	64,149	17,464	4,755	1,966
MEAN	26.2	22.1	15.1	9.89	11.4	15.0	674	906	2,138	543	153	65.5
MAX	32	26	22	12	13	21	1,450	3,100	5,990	1,630	445	115
MIN	19	18	11	9.2	9.2	11	22	138	331	160	40	38
AC-FT	1,610	1,320	926	608	631	922	40,080	55,720	127,200	34,660	9,430	3,900

CAL YR 1961: TOTAL 22,833.0 MEAN 62.6 MAX 477 MIN 5.8 AC-FT 45,290  
WAT YR 1962: TOTAL 139,665.6 MEAN 383 MAX 5,990 MIN 9.2 AC-FT 277,000

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	58	50	74	16	5.8	6.1	310	120	654	53	17	209
2	58	52	74	15	5.8	6.1	250	120	745	48	21	204
3	58	53	74	15	5.8	6.0	200	116	784	47	20	196
4	57	53	73	14	5.9	6.0	150	108	908	46	22	190
5	58	53	70	14	6.0	7.0	210	103	1,130	45	25	188
6	58	56	65	14	6.5	8.0	370	98	1,280	44	24	186
7	58	56	60	13	6.5	9.0	340	96	1,260	42	22	180
8	61	56	55	13	6.5	10	626	92	1,140	42	20	169
9	62	50	50	13	6.5	10	599	89	975	38	18	157
10	63	73	45	12	6.5	12	482	86	846	32	17	139
11	63	68	38	12	6.5	12	337	88	754	29	24	124
12	64	69	34	11	6.5	13	257	88	658	30	46	112
13	64	77	30	10	6.5	12	228	92	576	30	125	97
14	64	82	26	9.0	6.5	12	209	94	511	29	169	85
15	64	85	24	9.0	6.5	13	189	93	435	29	133	76
16	64	85	22	9.0	6.5	14	171	96	355	28	101	67
17	62	84	22	8.5	6.5	14	160	100	296	29	82	61
18	58	82	22	8.0	6.2	14	159	99	242	26	71	57
19	56	82	20	7.5	6.2	15	163	135	200	26	64	54
20	53	75	20	7.5	6.2	15	162	213	165	26	58	53
21	51	71	20	7.0	6.1	15	150	204	139	26	53	51
22	48	73	19	7.0	6.1	16	139	158	118	25	50	47
23	47	71	19	6.5	6.1	20	127	120	104	23	52	46
24	46	76	19	6.0	6.0	50	118	104	89	20	66	45
25	47	76	18	5.8	6.0	160	112	91	81	18	73	44
26	48	76	18	5.8	6.0	380	108	84	73	16	76	44
27	50	78	18	5.8	6.1	470	105	98	68	15	74	43
28	50	74	17	5.8	6.1	440	108	353	63	14	80	43
29	50	42	17	5.8	-----	410	114	488	60	15	145	43
30	50	64	17	5.8	-----	400	118	525	57	16	211	43
31	50	-----	16	5.8	-----	360	-----	562	-----	16	230	-----
TOTAL	1,740	2,042	1,096	297.6	174.4	2,935.2	6,971	4,913	14,766	923	2,189	3,053
MEAN	56.1	68.1	35.4	9.60	6.23	94.7	232	158	492	29.8	70.6	102
MAX	64	85	74	16	6.5	470	626	562	1,280	53	230	209
MIN	46	42	16	5.8	5.8	6.0	105	84	57	14	17	43
AC-FT	3,450	4,050	2,170	590	346	5,820	13,830	9,740	29,290	1,830	4,340	6,060

CAL YR 1962: TOTAL 142,602.6 MEAN 391 MAX 5,990 MIN 9.2 AC-FT 282,800  
WAT YR 1963: TOTAL 41,100.2 MEAN 113 MAX 1,280 MIN 5.8 AC-FT 81,520

## RED RIVER OF THE NORTH BASIN

5-0620. Buffalo River near Dilworth, Minn.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	44	34	40	16	17	20	45	684	96	97	20	29
2	44	35	37	16	17	21	48	613	89	83	19	27
3	43	36	35	16	17	21	55	553	80	68	19	29
4	42	36	38	16	17	22	75	513	73	57	19	28
5	41	34	37	16	18	24	150	481	67	54	17	24
6	40	33	35	16	18	26	300	457	64	53	15	22
7	38	32	33	17	18	26	455	446	64	53	14	21
8	38	32	31	17	18	26	580	445	65	51	14	21
9	36	32	28	17	18	26	680	457	73	53	15	23
10	36	32	24	17	18	27	750	489	80	62	14	23
11	36	33	22	17	18	28	900	498	89	57	15	22
12	35	32	20	17	18	28	890	485	98	52	15	23
13	35	33	18	17	18	30	874	454	93	47	15	25
14	35	33	17	17	18	34	768	415	84	46	15	27
15	36	33	15	17	18	45	934	378	75	45	14	27
16	38	32	14	17	18	55	1,020	347	66	43	13	27
17	38	32	14	17	18	65	1,040	324	64	41	13	20
18	36	32	13	17	18	70	1,110	305	86	38	13	24
19	36	32	12	17	18	80	1,220	285	161	35	11	24
20	36	32	12	17	18	90	1,300	267	171	34	11	23
21	36	36	12	17	18	95	1,380	254	154	31	14	23
22	37	34	11	17	18	85	1,670	239	202	31	15	24
23	40	32	11	17	19	70	1,670	222	230	31	18	25
24	40	34	11	17	19	60	1,500	206	244	29	21	28
25	40	32	12	17	19	50	1,360	191	231	26	23	31
26	40	37	13	17	19	48	1,220	174	197	24	25	38
27	39	40	14	17	19	45	1,070	157	177	23	31	47
28	39	38	14	17	19	42	955	140	156	22	31	52
29	38	40	15	17	19	38	846	127	133	21	30	54
30	37	40	16	17	-----	39	758	113	116	22	31	53
31	36	-----	16	17	-----	42	-----	104	-----	20	30	-----
TOTAL	1,185	1,023	640	521	525	1,378	25,623	10,823	3,576	1,348	570	870
MEAN	38.2	34.1	24.6	16.1	18.1	44.5	854	343	113	43.5	18.4	29.0
MAX	44	40	40	17	19	95	1,670	684	244	97	31	54
MIN	35	32	11	16	17	20	45	104	64	20	11	21
AC-FT	2,350	2,030	1,270	1,030	1,040	2,730	50,820	21,470	7,090	2,670	1,130	1,730
CAL YR 1963: TOTAL	39,070.2			MEAN 107	MAX 1,280	MIN 5.8	AC-FT 77,490					
WAT YR 1964: TOTAL	48,082			MEAN 131	MAX 1,670	MIN 11	AC-FT 95,370					

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	50	31	14	15	16	16	20	374	234	117	57	37
2	46	33	14	15	16	16	22	341	232	116	59	35
3	43	34	14	15	16	16	24	322	256	108	59	32
4	39	37	14	15	17	16	26	306	244	99	58	31
5	36	38	14	15	17	16	29	294	247	90	53	29
6	34	39	15	16	17	16	34	286	261	83	56	28
7	33	38	15	16	17	17	42	328	343	113	60	27
8	34	38	15	16	17	17	53	274	362	73	60	26
9	35	38	15	16	17	17	180	271	424	72	60	25
10	36	37	15	16	17	17	700	282	496	71	60	24
11	37	38	16	15	17	17	5,900	301	537	69	55	25
12	37	41	16	15	17	17	5,650	306	524	69	50	27
13	36	45	16	15	17	17	5,000	303	461	67	46	34
14	34	47	15	15	17	18	3,900	311	387	69	42	40
15	34	48	15	15	17	18	2,950	341	329	74	36	47
16	34	52	15	15	17	18	2,480	380	290	77	34	55
17	34	51	15	15	17	18	2,190	400	261	68	30	66
18	35	48	15	15	17	17	1,920	400	235	59	27	74
19	34	39	15	16	16	17	1,650	388	208	63	25	78
20	33	34	14	16	16	17	1,420	367	186	63	24	77
21	32	31	14	16	16	17	1,220	350	170	62	22	73
22	32	30	14	17	16	17	1,080	326	159	62	21	72
23	32	29	14	17	16	17	952	306	148	70	20	76
24	32	27	14	17	15	17	850	288	139	86	21	81
25	31	25	14	17	15	16	760	272	133	104	24	84
26	31	22	14	17	15	17	678	256	124	102	27	84
27	31	20	14	17	15	17	603	247	117	86	29	89
28	31	18	14	16	15	17	539	253	120	73	31	96
29	31	16	14	16	-----	18	474	260	130	63	33	98
30	32	15	14	16	-----	18	419	256	116	58	35	104
31	31	-----	15	16	-----	19	-----	242	-----	56	36	-----
TOTAL	1,080	1,039	452	489	458	528	41,765	9,584	7,824	2,405	1,250	1,674
MEAN	34.8	34.6	14.6	15.6	16.4	17.0	1,302	309	261	77.6	40.3	55.8
MAX	50	52	16	17	17	19	5,900	400	537	117	60	104
MIN	31	15	14	15	15	16	20	242	116	56	20	24
AC-FT	2,140	2,060	897	970	908	1,050	82,840	19,010	15,520	4,770	2,480	3,320
CAL YR 1964: TOTAL	47,805			MEAN 131	MAX 1,670	MIN 11	AC-FT 94,820					
WAT YR 1965: TOTAL	68,548			MEAN 188	MAX 5,900	MIN 14	AC-FT 136,000					

Note.--No gage-height record Aug. 28 to Sept. 27.

5-0622. Elm River near Kelso, N. Dak.

Location.--Lat 47°17', long 97°07', on west line of sec.14, T.144 N., R.51 W., on downstream side of highway bridge, 5 miles southwest of Kelso and 14 miles downstream from North Branch.

Drainage area.--208 sq mi (revised).

Records available.--October 1955 to September 1963 (discontinued).

Gage.--Water-stage recorder. Datum of gage is 887.60 ft above mean sea level, datum of 1929, Emerson Crookston supplementary adjustment of 1941. Prior to Mar. 30, 1957, wire-weight gage at same site and datum.

Average discharge.--8 years, 2.49 cfs (1,800 acre-ft per year).

Extremes.--Maximums and minimums (discharge in cubic feet per second, gage height in feet).

Annual maximum discharge (\*) and peak discharges above base (70 cfs), water years 1961-53

Date	Time	Discharge	Gage height	Date	Time	Discharge	Gage height	Date	Time	Discharge	Gage height
Mar. 7, 1961	0830	-	a 5.01	Apr. 5, 1962	0200	-	a 10.20	July 8, 1962	1600	200	8.07
Mar. 18, 1961	1700	* 9.9	a 4.81	Apr. 8, 1962	0700	* 440	9.51	Apr. 7, 1963	2020	* 53	5.80

a Backwater from ice.

No flow at times in each year.

1955-63: Maximum discharge, 440 cfs Apr. 8, 1962 (gage height, 9.51 ft); maximum gage height, 10.20 ft Apr. 5, 1962 (backwater from ice); no flow at times in each year.

Maximum stage known since 1925, about 14 ft in 1950, from information by local resident.

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

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	0	0	0	0	0	0	.70	.10	0	0	0	0
2	0	0	0	0	0	0	0	.50	0	0	0	0
3	0	0	0	0	0	0	0	.30	0	0	0	0
4	0	0	0	0	0	0	0	.30	0	0	0	0
5	0	0	0	0	0	0	0	.70	0	0	0	0
6	0	0	0	0	0	0	.50	0	0	0	0	0
7	0	0	0	0	0	1.0	.30	.20	0	0	0	0
8	0	0	0	0	0	.80	.30	.30	0	0	0	0
9	0	0	0	0	0	.50	.10	.20	0	0	0	0
10	0	0	0	0	0	.40	.10	.20	0	0	0	0
11	0	0	0	0	0	1.6	.10	.20	0	0	0	0
12	0	0	0	0	0	1.7	.10	.10	0	0	0	0
13	0	0	0	0	0	1.7	.20	.10	0	0	0	0
14	0	0	0	0	0	1.9	.20	.10	0	0	0	0
15	0	0	0	0	0	1.6	.10	.10	0	0	0	0
16	0	0	0	0	0	1.4	.10	0	0	0	0	0
17	0	0	0	0	0	1.4	.20	0	0	0	0	0
18	0	0	0	0	0	7.0	.20	0	0	0	0	0
19	0	0	0	0	0	7.5	.10	0	0	0	0	0
20	0	0	0	0	0	5.5	.10	0	0	0	0	0
21	0	0	0	0	0	4.0	.10	0	0	0	0	0
22	0	0	0	0	0	3.4	.10	0	0	0	0	0
23	0	0	0	0	0	2.4	0	0	0	0	0	0
24	0	0	0	0	0	1.9	.10	0	0	0	0	0
25	0	0	0	0	0	1.7	.20	0	0	0	0	0
26	0	0	0	0	0	3.0	.20	0	0	0	0	0
27	0	0	0	0	0	3.0	.20	0	0	0	0	0
28	0	0	0	0	0	1.6	.20	0	0	0	0	0
29	0	0	0	0	0	1.3	.10	0	0	0	0	0
30	0	0	0	0	0	1.0	.10	0	0	0	0	0
31	0	0	0	0	0	.70	0	0	0	0	0	0
TOTAL	0	0	0	0	0	58.00	6.40	1.60	0	0	0	0
MEAN	0	0	0	0	0	1.87	.21	.052	0	0	0	0
MAX	0	0	0	0	0	7.5	.70	.30	0	0	0	0
MIN	0	0	0	0	0	0	0	0	0	0	0	0
AC-FT	0	0	0	0	0	115	13	3.2	0	0	0	0

CAL YR 1960: TOTAL 1,570.20 MEAN 4.29 MAX 15.4 MIN 0 AC-FT 3,110  
 WAT YR 1961: TOTAL 66.00 MEAN .18 MAX 7.5 MIN 0 AC-FT 131

## RED RIVER OF THE NORTH BASIN

5-0622. Elm River near Kelso, N. Dak.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	0	0	0	0	0	0	0	4.5	9.5	.90	3.7	0
2	0	0	0	0	0	0	0	3.5	8.3	1.2	3.0	0
3	0	0	0	0	0	0	0	2.2	7.0	1.5	2.7	0
4	0	0	0	0	0	0	20	2.2	6.3	1.6	3.0	0
5	0	0	0	0	0	0	220	2.2	6.3	1.6	2.2	0
6	0	0	0	0	0	0	300	2.0	5.6	3.2	3.0	0
7	0	0	0	0	0	0	324	1.6	7.0	89	1.6	0
8	0	0	0	0	0	0	329	1.6	12	193	1.5	0
9	0	0	0	0	0	0	169	1.4	8.3	147	2.2	.20
10	0	0	0	0	0	0	295	1.4	5.9	95	2.2	12
11	1.2	0	0	0	0	0	210	1.3	4.1	66	2.8	26
12	4.9	0	0	0	0	0	170	1.0	3.0	68	2.4	19
13	1.7	0	0	0	0	0	135	1.0	3.7	68	2.2	12
14	.50	0	0	0	0	0	115	1.0	3.7	64	2.4	6.3
15	.20	0	0	0	0	0	86	1.5	2.4	56	2.0	3.9
16	.10	0	0	0	0	0	72	2.0	5.2	48	1.5	3.9
17	0	0	0	0	0	0	62	2.4	46	38	.80	5.2
18	0	0	0	0	0	0	56	3.0	45	32	7.8	0
19	0	0	0	0	0	0	51	7.8	30	32	.80	8.8
20	0	0	0	0	0	0	37	6.3	16	31	.80	8.0
21	0	0	0	0	0	0	31	20	9.8	25	.60	7.0
22	0	0	0	0	0	0	22	29	6.6	21	6.60	0
23	0	0	0	0	0	0	18	36	4.3	18	.60	5.4
24	0	0	0	0	0	0	16	54	3.0	14	.20	4.3
25	0	0	0	0	0	0	13	40	2.4	11	.20	3.7
26	0	0	0	0	0	0	11	33	1.8	9.3	.10	3.5
27	0	0	0	0	0	0	7.8	27	1.8	8.3	.10	3.6
28	0	0	0	0	0	0	5.6	21	1.6	7.2	.10	3.4
29	0	0	0	0	-----	0	5.2	16	1.2	5.9	.10	2.8
30	0	0	0	0	-----	0	5.0	14	.90	5.0	.10	2.7
31	0	-----	0	0	-----	0	-----	12	-----	4.7	0	-----
TOTAL	8.60	0	0	0	0	0	2,745.6	352.1	208.20	1,166.40	44.30	155.60
MEAN	.28	0	0	0	0	0	91.5	11.4	8.94	37.6	1.43	5.19
MAX	4.9	0	0	0	0	0	329	5.4	46	193	3.7	26
MIN	0	0	0	0	0	0	0	1.0	.90	.90	0	0
AC-FT	17	0	0	0	0	0	5,450	698	532	2,310	88	309
CAL YR 1961:	TOTAL	74.60	MEAN	.20	MAX	7.5	MIN	0	AC-FT	148		
WAT YR 1962:	TOTAL	4,740.80	MEAN	13.0	MAX	329	MIN	0	AC-FT	9,400		

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	2.7	0	2.0	0		0	2.5	2.3	1.4	0	0	0
2	2.6	0	1.9	0		0	2.9	2.2	2.5	0	0	0
3	2.5	0	1.8	0		0	2.2	1.8	2.1	0	0	0
4	2.1	0	1.7	0		0	5.0	1.4	1.5	0	0	0
5	2.1	0	1.6	0		0	7.1	1.1	1.2	0	0	0
6	1.9	0	1.4	.10		0		.80	.80	0	0	0
7	1.8	0	1.2	.20		0	7.1	.60	1.1	0	0	0
8	1.8	.10	1.0	.20	0	0	34	.60	.90	0	0	0
9	1.7	.10	.80	.20	0	0	19	.50	.60	0	0	0
10	1.6	.20	.60	.10	0	0	13	.50	.50	0	0	0
11	1.4	.20	.40	0	0	0	9.0	.40	.40	0	0	0
12	1.4	.20	.30	0	0	0	13	.50	.40	0	0	0
13	1.2	.20	.20	0	0	0	19	.60	.50	0	0	0
14	1.1	.30	.10	0	0	0	16	.50	.40	0	0	0
15	1.1	.40	.10	0	0	0	13	.40	.20	0	0	0
16	.90	.40	.10	0	0	0	12	.40	.10	0	0	0
17	.80	.50	.10	0	0	0	12	.90	0	0	0	0
18	.70	.60	.10	0	0	0	9.2	1.3	0	0	0	0
19	.70	.60	.10	0	0	0	7.3	1.3	0	0	0	0
20	.60	.70	0	0	0	0	6.5	1.4	0	0	0	0
21	.60	.80	0	0	0	0	5.7	1.4	0	0	0	0
22	.60	.90	0	0	0	2.0	5.2	1.6	0	0	0	0
23	.50	1.0	0	0	0	4.0	4.2	1.2	0	0	0	0
24	.50	1.0	0	0	0	6.0	3.4	.60	0	0	0	0
25	.40	1.1	0	0	0	7.2	2.5	.40	0	0	0	0
26	.40	1.3	0	0	0	8.0	2.0	.30	0	0	0	0
27	.20	1.4	0	0	0	8.0	1.8	.60	0	0	0	0
28	.20	1.7	0	0	0	5.5	1.8	1.0	0	0	0	0
29	.20	2.0	0	0	-----	5.0	2.0	.70	0	0	0	0
30	.10	2.0	0	0	-----	4.0	2.5	.60	0	0	0	0
31	.10	-----	0	0	-----	3.5	-----	.60	-----	0	0	0
TOTAL	34.50	17.70	15.50	0.80	0	53.2	265.0	28.50	14.60	0	0	0
MEAN	1.11	.59	.50	.026	0	1.72	8.83	.92	.49	0	0	0
MAX	2.7	2.0	2.0	.20	0	8.0	34	2.3	2.5	0	0	0
MIN	.10	0	0	0	0	0	1.8	.30	0	0	0	0
AC-FT	68	35	31	1.6	0	106	526	57	29	0	0	0
CAL YR 1962:	TOTAL 4,799.90			MEAN 13.2	MAX 329	MIN 0	AC-FT 9,520					
WAT YR 1963:	TOTAL 429.80			MEAN 1.18	MAX 34	MIN 0	AC-FT 853					

5-0625. Wild Rice River at Twin Valley, Minn.

Location--Lat 47°16'00", long 96°14'40", in NE $\frac{1}{4}$  sec.27, T.144 N., R.44 W., on left bank 100 ft upstream from highway bridge, three-quarters of a mile northeast of village of Twin Valley, and 2 miles upstream from small tributary.

Drainage area--888 sq mi.

Records available--June 1909 to September 1917, July 1930 to September 1965. Monthly discharge only for some periods, published in WSP 1308.

Gage--Water-stage recorder. Datum of gage is 1,008.16 ft above mean sea level, datum of 1929 (Corps of Engineers bench mark). June 1909 to September 1917, staff gage at site a quarter of a mile downstream at different datum. July 23, 1930, to Nov. 24, 1934, chain gage at highway bridge 100 ft downstream from present site at present datum. Nov. 25, 1934, to Aug. 2, 1950, water-stage recorder 80 ft upstream from present site at present datum.

Average discharge--43 years, 161 cfs (116,600 acre-ft per year).

Extremes--Maximum and minimum discharges for the water years 1961-65 are contained in the following table:

Water year	Maximum			Minimum		
	Date	Discharge (cfs)	Gage height (feet)	Date	Discharge (cfs)	Gage height (feet)
1961	May 17, 1961	847	5.29	Aug. 17, 1961a	8.6	0.82
1962	June 9, 1962	2,760	9.83	Oct. 24, 1961	15	1.03
1963	May 30, 1963	1,680	8.00	Mar. 1-4, 1963	b 6.4	c .90
1964	Apr. 17, 1964	1,640	7.68	Oct. 17, 1964	12	.81
1965	Apr. 12, 1965	3,160	d 10.48	Aug. 22, 1965	18	.99

a About.

b Minimum daily.

c Occurred Sept. 27, 1963.

d From floodmark.

1909-17, 1930-65: Maximum discharge, 9,200 cfs July 22, 1909 (gage height, 20.0 ft, site and datum then in use), from rating curve extended above 3,300 cfs; minimum, 0.5 cfs Nov. 4, 1939.

Remarks--Records good except those for periods of no gage-height record and those for winter periods, which are poor. Flow slightly regulated by Rice Lake and many other small lakes above station. Diurnal fluctuation caused by operation of mill at Faith, 17 miles above station.

Revisions (water years)--WSP 955: 1941. WSP 1308: 1915(M), 1917(M).

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	68	80	45	42	32	44	166	382	320	38	31	18
2	65	89	55	42	32	75	142	367	314	39	30	16
3	68	85	55	42	32	120	158	346	302	47	29	14
4	82	75	60	42	32	125	158	335	276	55	27	13
5	104	68	65	42	32	150	152	318	248	56	27	15
6	111	68	65	42	32	150	135	329	224	55	21	12
7	117	72	65	42	32	150	134	329	208	58	17	14
8	115	68	70	40	32	140	134	335	190	58	23	12
9	113	62	68	40	32	135	150	318	188	54	14	20
10	113	40	68	38	32	135	153	314	170	49	12	40
11	107	48	66	38	32	125	150	294	155	50	14	38
12	107	55	70	38	32	115	142	308	148	51	12	35
13	100	60	65	38	32	110	139	371	145	51	12	42
14	97	70	62	36	32	100	147	467	129	46	11	40
15	94	60	62	34	32	90	145	664	120	45	11	38
16	88	50	62	36	32	85	124	763	107	44	10	36
17	91	45	60	34	34	90	121	839	95	53	10	36
18	81	50	58	34	34	100	139	825	88	50	25	38
19	74	65	56	34	36	95	218	784	83	46	32	40
20	61	75	54	34	36	125	274	742	75	38	30	42
21	59	70	52	34	36	128	331	708	73	56	28	40
22	61	65	52	32	37	142	365	677	74	46	27	38
23	56	50	50	34	40	148	371	646	70	47	27	36
24	61	65	48	32	40	175	360	615	66	52	28	36
25	57	65	48	32	40	186	356	579	59	42	28	35
26	59	60	48	32	42	218	393	545	55	39	26	35
27	56	55	46	32	42	224	411	509	47	36	25	36
28	56	55	44	32	42	165	411	465	43	30	30	38
29	58	50	44	32	---	136	404	415	40	35	29	50
30	68	50	42	32	---	190	396	378	39	29	22	47
31	77	---	42	32	---	206	---	348	---	35	20	---
TOTAL	2,524	1,869	1,747	1,124	971	4,177	6,879	15,315	4,151	1,430	688	950
MEAN	81.4	62.3	56.4	36.3	34.7	135	229	494	138	46.1	22.2	31.7
MAX	117	88	70	42	42	224	411	839	320	58	32	50
MIN	56	40	42	32	32	44	121	294	39	29	10	12
AC-FT	5,010	3,710	3,470	2,230	1,930	8,280	13,640	30,380	8,230	2,840	1,360	1,880

CAL YR 1960: TOTAL 56,132 MEAN 153 MAX 635 MIN 28 AC-FT 111,300  
 WAT YR 1961: TOTAL 41,825 MEAN 115 MAX 839 MIN 10 AC-FT 82,960

## 5-0625. Wild Rice River at Twin Valley, Minn.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	41	46	34	24	26	20	110	444	1,290	404	202	81
2	42	47	36	25	26	21	150	449	1,260	396	190	76
3	42	42	36	25	26	21	190	435	1,210	411	181	80
4	41	48	36	26	27	21	270	422	1,150	504	175	81
5	35	39	36	26	27	22	480	415	1,090	524	163	75
6	39	56	40	27	26	23	490	400	1,020	509	158	72
7	33	49	38	28	26	24	490	393	984	604	156	68
8	32	55	38	28	26	24	450	378	1,740	715	153	83
9	36	49	38	28	26	24	360	360	2,550	737	147	129
10	37	46	36	27	26	24	324	350	2,640	715	144	150
11	39	47	34	27	25	25	339	337	2,440	693	161	142
12	37	51	34	26	25	25	335	331	2,210	646	184	145
13	34	61	34	26	25	24	324	324	1,880	589	206	132
14	34	61	34	26	25	23	327	318	1,540	196	122	66
15	37	50	32	28	25	22	341	314	1,340	512	181	118
16	39	48	30	28	25	22	418	343	1,240	483	168	114
17	34	48	30	28	25	22	481	409	1,220	458	160	111
18	34	58	30	28	25	22	507	507	1,190	435	150	104
19	33	48	30	27	25	23	557	659	1,150	426	139	100
20	36	41	29	27	25	24	568	698	1,050	402	134	94
21	34	45	28	28	24	26	521	716	960	382	128	91
22	50	28	28	28	24	29	490	768	865	126	37	12
23	32	48	27	28	23	39	467	912	808	363	114	85
24	29	53	26	29	22	60	449	1,230	737	360	108	91
25	36	45	26	28	22	65	440	1,480	677	339	97	86
26	36	43	25	27	21	70	426	1,680	607	312	88	85
27	36	42	24	26	21	75	415	1,620	550	286	96	81
28	34	42	23	26	20	80	415	1,470	497	266	90	76
29	30	36	23	26	-----	90	444	1,370	453	250	86	74
30	36	35	23	26	-----	90	449	1,360	-----	230	85	68
31	33	-----	24	26	-----	95	-----	1,350	-----	214	83	-----
TOTAL	1,103	1,629	962	835	689	1,175	12,067	22,242	36,793	14,085	4,445	2,901
MAX	35.6	47.6	31.0	26.9	24.6	37.9	402	717	1,226	454	143	96.7
MIN	42	61	40	29	27	95	567	1,680	2,640	737	206	150
AC-FT	2,190	2,830	1,910	1,660	1,370	2,330	23,930	44,120	72,980	27,940	8,820	5,750
CAL YR 1961:	TOTAL 39,179			MEAN 107	MAX 839	MIN 10	AC-FT 77,710					
YR 1962:	TOTAL 98,726			MEAN 270	MAX 2,650	MIN 20	AC-FT 195,800					

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963

OAY	UCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	71	61	82	16	6.5	6.4	240	264	1,350	194	58	60
2	71	62	78	16	6.5	6.4	280	242	1,230	181	64	63
3	73	59	84	15	6.5	6.4	300	253	1,220	168	64	63
4	72	58	76	15	6.5	6.4	343	268	1,260	156	64	62
5	73	58	62	14	6.5	6.8	400	242	1,180	145	66	66
6	74	58	60	14	6.5	8.0	438	230	1,080	13f	58	61
7	68	67	65	14	6.5	10	434	222	986	133	56	58
8	78	62	60	14	6.5	12	417	224	908	125	49	52
9	76	52	55	13	6.5	14	424	228	874	117	54	46
10	75	63	50	11	6.5	18	422	242	910	111	43	46
11	74	81	45	10	6.5	20	405	236	822	10f	38	45
12	71	84	40	9.5	6.5	22	389	244	757	105	54	46
13	68	78	38	9.0	6.5	22	369	242	687	108	48	45
14	67	77	35	8.5	6.5	25	354	258	628	113	49	58
15	70	83	35	8.4	6.5	26	336	257	578	106	49	56
16	66	81	36	8.2	6.5	50	325	246	525	105	44	57
17	77	81	37	8.1	6.5	45	321	250	474	132	59	41
18	64	64	37	8.0	6.5	42	345	257	429	135	26	66
19	68	68	36	7.6	6.5	45	325	261	389	137	40	58
20	65	84	34	7.2	6.5	50	292	242	363	11f	40	45
21	59	76	34	7.0	6.5	55	292	230	331	104	35	42
22	68	50	32	6.8	6.5	60	270	242	321	95	44	36
23	65	55	30	6.6	6.5	100	253	244	270	86	38	38
24	65	68	28	6.6	6.5	130	253	232	255	80	38	31
25	70	82	26	6.5	6.5	120	250	230	244	72	36	29
26	64	86	24	6.6	6.5	160	257	230	234	64	48	34
27	61	89	22	6.5	6.5	160	257	472	248	67	50	30
28	59	93	22	6.5	6.5	180	246	913	248	66	50	28
29	64	86	20	6.5	-----	200	250	1,300	226	75	53	26
30	62	86	18	6.5	-----	220	268	1,640	210	69	71	28
31	62	-----	17	6.5	-----	220	-----	1,480	-----	65	68	-----
TOTAL	2,110	2,148	1,318	299.1	182.0	2,065.4	9,755	12,109	19,247	3,477	1,523	1,445
MEAN	68.1	71.6	42.5	9.65	6.50	66.0	312.5	391	642	112	49.1	48.2
MAX	93	84	84	10	6.6	6.6	438	1,640	1,360	194	69	69
MIN	59	50	17	6.5	6.5	6.4	240	222	210	64	26	26
AC-FT	4,190	4,260	2,610	593	361	4,060	19,350	24,020	38,180	6,900	3,020	2,870
CAL YR 1962: TOTAL	100,808			MEAN 276	MAX 2,640			MIN 17	AC-FT 199,900			
WAT YR 1963: TOTAL	55,658.5			MEAN 152	MAX 1,640			AC-FT 110,400				

## 5-0625. Wild Rice River at Twin Valley, Minn.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	29	29	29	19	29	31	45	750	206	331	69	37
2	24	28	28	20	29	31	50	721	192	302	63	34
3	24	24	26	21	29	32	80	706	175	274	66	32
4	25	26	26	22	29	32	100	711	166	250	56	30
5	21	29	26	23	29	34	120	708	153	228	48	30
6	20	26	26	23	29	36	135	703	161	232	50	27
7	23	23	27	23	29	36	145	716	168	222	48	21
8	30	30	27	23	29	38	170	758	194	216	42	31
9	17	29	26	23	29	38	175	768	367	200	35	33
10	28	25	25	22	29	38	200	755	519	206	38	33
11	25	28	24	22	29	38	270	739	429	202	39	32
12	24	29	24	22	30	38	350	708	366	200	36	30
13	20	29	23	22	30	40	550	682	304	183	34	23
14	18	27	22	22	30	40	446	651	300	161	30	25
15	28	28	22	22	30	40	514	617	292	148	28	29
16	25	29	21	23	30	42	984	589	254	136	26	28
17	17	29	21	24	30	42	1,500	562	246	128	26	28
18	28	31	20	24	30	41	1,580	543	424	118	29	26
19	26	29	20	25	30	41	1,330	504	927	110	24	26
20	27	31	20	25	30	42	1,120	483	1,140	120	22	23
21	35	29	20	26	30	42	1,170	451	975	118	32	23
22	33	29	19	27	30	41	1,380	420	850	114	32	30
23	31	35	19	28	30	40	1,280	404	760	104	26	38
24	31	25	20	28	30	42	1,170	378	716	104	31	44
25	33	27	20	28	30	41	1,050	348	674	103	32	52
26	33	35	20	28	30	41	945	320	628	96	30	72
27	26	30	19	29	30	42	870	296	548	94	38	71
28	28	32	19	29	30	42	825	276	469	87	32	69
29	29	31	19	29	30	42	794	246	402	85	30	67
30	25	30	18	29	-----	42	776	232	360	78	25	76
31	27	-----	18	29	-----	42	-----	224	-----	74	29	-----
TOTAL	810	862	694	760	859	1,207	20,124	16,969	13,345	5,024	1,146	1,120
MEAN	26.1	28.7	22.4	24.5	29.6	38.9	671	547	445	162	37.0	37.3
MAX	35	35	29	30	42	42	1,580	768	1,140	331	69	76
MIN	17	23	18	19	29	31	45	224	153	74	22	21
AC-FT	1,610	1,710	1,380	1,510	1,700	2,390	39,920	33,660	26,470	9,960	2,270	2,220

CAL YR 1963: TOTAL 52,448.5

MEAN 144

MAX 1,640

MIN 6.4

AC-FT 104,000

WAT YR 1964: TOTAL 62,920

MEAN 172

MAX 1,580

MIN 17

AC-FT 124,800

Note.--No gage-height record Dec. 21 to Jan. 28.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	74	49	38	28	37	30	43	741	592	323	79	42
2	74	54	37	28	37	30	56	713	582	297	82	36
3	71	51	36	28	37	29	72	682	582	279	74	35
4	74	54	36	28	37	29	100	674	598	253	67	33
5	79	54	35	29	38	29	156	638	640	230	61	31
6	75	53	35	29	38	30	310	594	656	213	75	30
7	70	50	35	29	38	30	640	558	625	202	70	29
8	72	49	34	29	38	31	1,380	524	827	190	68	32
9	75	52	34	30	38	32	1,800	510	848	178	70	30
10	72	49	34	30	37	32	2,050	552	866	170	61	30
11	68	59	34	30	36	33	2,500	592	858	160	51	29
12	67	59	33	30	35	34	3,080	576	825	173	51	27
13	66	62	33	30	35	35	2,840	550	775	215	43	33
14	67	63	33	31	34	36	2,280	528	728	255	41	40
15	64	63	32	31	34	36	2,050	530	682	253	33	47
16	61	63	32	32	34	36	1,930	626	633	217	37	48
17	60	59	32	32	33	36	1,790	734	588	187	33	59
18	60	50	31	33	33	35	1,500	760	556	176	31	61
19	60	43	31	34	33	35	1,360	744	580	163	28	62
20	57	46	30	35	33	34	1,300	718	705	152	26	66
21	56	50	30	36	32	33	1,220	726	710	145	25	64
22	52	51	30	37	32	33	1,170	718	594	138	23	67
23	55	51	30	39	31	33	1,130	708	498	142	22	71
24	54	50	29	40	31	33	1,080	684	370	128	23	81
25	49	49	29	40	31	33	1,020	669	330	121	25	92
26	53	47	29	39	30	33	973	650	344	114	28	94
27	52	45	29	39	30	34	921	640	405	104	28	98
28	51	43	29	38	30	34	871	630	391	93	32	97
29	49	42	29	38	-----	35	827	621	378	83	41	101
30	49	40	29	37	-----	36	778	616	354	77	48	112
31	50	-----	28	37	-----	37	-----	606	-----	76	42	-----
TOTAL	1,942	1,550	996	1,026	962	1,026	37,227	19,812	18,221	5,507	1,418	1,677
MEAN	62.6	51.7	32.1	33.1	34.4	33.1	1,241	639	607	178	45.7	55.9
MAX	79	63	38	40	38	37	3,080	760	866	323	82	112
MIN	49	40	28	28	30	29	43	510	330	76	22	27
AC-FT	3,850	3,070	1,980	2,040	1,910	2,040	73,840	39,300	36,140	10,920	2,810	3,330

CAL YR 1964: TOTAL 65,042

MEAN 178

MAX 1,580

MIN 19

AC-FT 129,000

WAT YR 1965: TOTAL 91,364

MEAN 250

MAX 3,080

MIN 22

AC-FT 181,200

Note.--No gage-height record Jan. 29 to Feb. 28.

## 5-0640. Wild Rice River at Hendrum, Minn.

Location.--Lat 47°16'05", long 96°47'50", in SE $\frac{1}{4}$  sec.19, T.144 N., R.48 W., near center of span on downstream side of highway bridge, half a mile east of Hendrum and 4 miles upstream from mouth.

Drainage area.--1,600 sq mi, approximately.

Records available.--March 1944 to September 1965.

Gage.--Wire-weight gage read once or twice daily. Datum of gage is 836.75 ft above mean sea level, datum of 1929 (levels by Corps of Engineers). Prior to Aug. 2, 1949, chain gage at same site and datum.

Average discharge.--21 years, 216 cfs (156,400 acre-ft per year).

Extremes.--Maximum and minimum discharges for the water years 1961-65 are contained in the following table:

Water year	Maximum			Minimum		
	Date	Discharge (cfs)	Gage height (feet)	Date	Discharge (cfs)	Gage height (feet)
1961	May 17, 1961	1,080	10.66	Aug. 18, Sept. 8, 9	12	a 0.82
1962	June 13, 1962	3,680	b 22.26	Feb. 26-28, 1962	c 13	d 1.40
1963	June 3, 1963	1,670	e 13.89	Feb. 28 to Mar. 4	c 4.7	f 1.85
1964	Apr. 23, 1964	2,690	17.55	Dec. 23-25, 1963	c 12	-
1965	Apr. 14, 1965	6,800	g 29.44	Mar. 26-31, 1965	c 18	h 1.90

a Occurred Sept. 9, 1961.

b Backwater from Red River of the North.

c Minimum daily.

d Occurred Nov. 20, 1961.

e From floodmarks.

f Occurred Aug. 20, 1963.

g Maximum gage height for year, 29.52 ft Apr. 15, 1965, from floodmark, backwater from Red River of the North.

h Occurred Aug. 23, 1965.

1944-65: Maximum discharge, 6,800 cfs Apr. 14, 1965 (gage height, 29.44 ft); maximum gage height, 29.52 ft Apr. 15, 1965 (from floodmark, backwater from Red River of the North); no flow for some days in 1948-49.

Remarks.--Records good except those for periods of shifting-control and those for winter periods, which are fair. Large part of high flow diverted into Marsh River basin at overflow section  $3\frac{1}{2}$  miles east of Ada. Another diversion into Marsh River basin, formed  $1\frac{1}{2}$  miles southeast of Ada, diverted water at all stages 1947-51, after which it was closed except for small regulated flow diverted at same point. Amount of diversion not known. Records of chemical analyses for the water year 1963 are published in reports of the Geological Survey.

Revisions (water years).--WSP 1728: 1958.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	97	97	35	44	34	50	330	413	391	55	36	23
2	92	105	45	44	34	55	310	458	362	50	34	20
3	91	106	45	44	34	75	290	437	367	50	38	19
4	88	109	50	44	34	95	276	411	343	49	39	17
5	85	109	60	44	34	120	243	391	317	48	38	16
6	101	106	65	44	34	200	220	388	296	58	33	15
7	117	103	70	44	34	240	213	417	262	55	24	13
8	117	99	70	44	34	270	210	440	252	54	24	12
9	118	90	70	42	34	280	204	442	238	58	17	12
10	128	85	70	42	34	260	201	420	230	62	17	21
11	135	80	70	42	34	250	206	410	215	65	14	50
12	132	78	70	42	34	210	203	397	198	71	14	44
13	129	75	70	42	34	190	206	402	186	70	14	46
14	127	75	70	42	34	200	195	490	180	68	15	52
15	123	90	70	40	35	220	133	678	168	65	15	52
16	114	90	65	40	35	190	150	956	152	60	14	49
17	111	80	65	40	35	175	212	1,080	139	56	13	44
18	106	75	60	40	36	165	212	1,050	131	56	12	42
19	103	75	60	40	36	160	195	1,030	119	54	21	38
20	93	80	55	40	38	180	250	961	112	54	26	38
21	91	85	55	38	38	200	326	865	107	55	30	45
22	77	90	50	38	40	210	391	808	104	60	27	37
23	71	80	50	36	40	220	431	822	101	60	30	42
24	68	70	50	36	40	220	462	743	98	54	35	42
25	64	65	50	36	40	250	487	667	91	49	34	41
26	65	65	48	36	40	280	506	572	88	46	30	40
27	69	60	48	35	40	330	520	540	77	43	28	42
28	69	50	46	35	44	320	527	542	70	42	27	42
29	72	45	46	35	-----	260	517	503	60	42	25	42
30	74	30	44	35	-----	260	501	460	57	39	18	46
31	89	-----	44	35	-----	315	-----	418	-----	38	27	-----
TOTAL	3,016	2,447	1,766	1,239	1,013	6,450	9,127	18,611	5,491	1,686	769	1,044
MEAN	97.3	81.6	57.0	40.0	36.2	208	304	600	183	54.4	24.8	34.8
MAX	135	109	70	44	44	330	527	1,080	391	71	39	52
MIN	64	30	35	35	34	50	133	388	57	38	12	12
AC-FT	5,980	4,850	3,500	2,460	2,010	12,790	18,100	36,910	10,890	3,340	1,530	2,070

CAL YR 1960: TOTAL 80,396

MEAN 220

MAX 1,550

MIN 30

AC-FT 159,500

WAT YR 1961: TOTAL 52,659

MEAN 144

MAX 1,080

MIN 12

AC-FT 104,400

## 5-0640. Wild Rice River at Hendrum, Minn.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	47	42	34	20	26	20	150	533	2,040	450	347	94
2	48	44	34	20	26	22	200	520	1,980	412	290	93
3	44	37	33	20	26	22	200	508	1,790	414	280	92
4	44	37	34	20	26	21	300	508	1,580	782	292	89
5	44	37	36	22	26	21	450	500	1,400	997	313	95
6	44	36	30	22	25	23	700	477	1,280	1,020	258	90
7	44	32	27	22	25	22	770	444	1,200	1,500	211	85
8	44	28	32	22	25	22	750	440	1,270	1,880	190	89
9	50	50	32	24	24	22	700	425	1,960	1,940	176	100
10	44	30	30	24	24	24	650	398	2,790	1,610	171	137
11	57	40	30	26	23	26	600	380	3,300	1,160	174	166
12	66	52	30	26	23	26	580	376	3,620	986	182	179
13	60	48	30	26	23	25	600	374	3,630	889	194	175
14	50	44	28	27	23	25	680	375	3,310	855	295	168
15	44	50	28	28	22	24	750	370	2,640	812	314	160
16	38	55	23	28	22	24	700	384	2,070	749	317	150
17	38	50	26	28	22	24	700	424	1,930	737	304	128
18	42	35	26	28	21	24	850	482	1,850	675	295	124
19	50	30	26	28	21	24	950	625	1,800	508	255	119
20	50	20	24	28	20	24	889	840	1,730	407	188	114
21	48	50	24	28	20	24	846	1,020	1,640	443	168	109
22	46	50	24	28	20	24	806	1,110	1,520	445	148	106
23	40	50	24	28	20	26	752	1,140	1,390	466	138	101
24	38	50	22	28	20	28	688	1,760	1,380	494	124	96
25	38	48	22	30	20	30	626	2,080	954	542	121	96
26	42	46	22	30	19	32	570	2,230	849	591	108	97
27	36	45	20	30	19	34	514	2,270	758	561	108	92
28	46	35	20	30	19	40	505	2,230	625	593	101	92
29	44	20	20	28	-----	100	510	2,190	527	510	104	93
30	42	35	20	28	-----	110	519	2,100	475	463	97	98
31	41	-----	20	28	-----	120	-----	2,040	-----	427	96	-----
TOTAL	1,409	1,224	841	805	630	1,033	18,505	29,553	53,288	24,318	6,359	3,427
MEAN	45.5	40.8	27.1	26.0	22.5	33.3	617	953	1,776	784	205	114
MAX	66	55	30	30	30	30	950	2,270	3,630	1,940	347	179
MIN	36	20	20	20	19	20	150	370	475	407	96	85
AC-FT	2,790	2,430	1,670	1,600	1,1250	2,050	36,700	58,620	105,700	48,230	12,610	6,800

CAL YR 1961: TOTAL 48,904

MEAN 134

MAX 1,080

MIN 12

AC-FT 97,000

WAT YR 1962: TOTAL 141,392

MEAN 387

MAX 3,630

MIN 19

AC-FT 280,400

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	95	72	112	19	6.4	4.7	500	312	1,550	240	75	89
2	93	73	109	18	6.4	4.7	480	313	1,580	223	80	94
3	93	72	101	17	6.3	4.7	500	292	1,610	210	70	98
4	91	73	102	16	6.2	4.7	440	289	1,480	190	66	107
5	91	74	95	15	6.1	4.8	724	290	1,420	179	59	105
6	94	74	90	15	6.2	5.0	911	292	1,370	166	50	113
7	93	76	80	15	6.2	5.0	920	274	1,290	160	39	98
8	94	74	75	14	6.2	5.5	941	263	1,190	152	42	83
9	94	73	70	13	6.2	5.5	773	259	1,120	142	55	64
10	96	100	60	12	6.2	5.5	629	265	1,040	133	48	69
11	95	118	55	11	6.0	5.8	556	266	1,020	127	53	57
12	94	106	50	10	6.0	6.0	505	270	996	134	61	48
13	92	97	48	10	6.0	8.0	467	274	863	125	89	38
14	88	103	46	9.5	5.8	8.0	440	274	814	117	89	38
15	86	100	44	9.5	5.8	9.0	410	277	775	122	70	36
16	85	97	42	9.0	5.8	12	393	283	710	124	56	64
17	85	103	42	9.0	5.8	15	377	275	636	117	36	64
18	82	110	40	8.5	5.6	15	368	271	567	143	35	64
19	79	120	38	8.5	5.6	20	378	272	515	141	32	64
20	79	115	36	8.0	5.4	25	391	272	455	128	30	62
21	79	120	34	8.0	5.4	40	358	271	407	119	36	58
22	78	110	32	7.5	5.2	50	339	257	372	110	37	56
23	75	80	30	5.2	5.2	60	329	259	330	100	44	44
24	74	80	28	6.8	5.0	120	310	267	309	91	49	44
25	73	85	26	6.6	5.0	300	296	264	297	87	44	44
26	73	85	25	6.6	4.8	400	294	264	291	79	34	40
27	73	100	24	6.6	4.8	420	293	263	269	70	35	35
28	72	120	23	6.5	4.7	430	295	386	271	61	62	33
29	72	125	22	6.5	-----	460	305	956	272	70	73	27
30	70	118	21	6.5	-----	500	306	1,230	263	76	76	32
31	71	-----	20	6.5	-----	520	-----	1,440	-----	76	79	-----
TOTAL	2,609	2,853	1,620	322.1	160.3	3,473.9	14,228	11,440	24,082	4,018	1,704	1,875
MEAN	84.2	95.1	52.3	10.4	5.73	112	474	369	803	130	55.0	62.5
MAX	96	125	112	19	6.4	520	941	1,440	1,610	240	89	113
MIN	70	72	20	6.5	4.7	4.7	293	257	263	61	30	27
AC-FT	5,170	5,660	3,210	639	318	6,890	28,220	22,690	47,770	7,970	3,380	3,720

CAL YR 1962: TOTAL 145,000

MEAN 397

MAX 3,630

MIN 19

AC-FT 287,600

WAT YR 1963: TOTAL 68,385.3

MEAN 187

MAX 1,610

MIN 4.7

AC-FT 135,600

Note.--Shifting-control method used Oct. 1 to Nov. 5.

## 5-0640, Wild Rice River at Hendrum, Minn.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	29	36	31	16	22	26	48	940	236	198	90	26
2	29	38	30	17	22	26	50	930	229	198	87	29
3	28	45	30	17	22	26	55	910	215	198	80	29
4	27	36	29	18	22	26	65	900	214	196	80	29
5	24	33	28	18	22	26	80	884	196	196	76	30
6	24	34	27	18	23	26	170	864	190	194	76	30
7	24	35	26	18	23	26	270	848	193	195	74	31
8	25	37	25	18	23	26	300	829	191	196	72	31
9	21	34	24	18	23	26	440	789	169	220	71	32
10	37	33	23	19	23	26	560	747	223	252	69	33
11	32	32	22	19	23	26	710	730	260	257	68	36
12	30	30	21	19	24	27	830	717	356	257	62	39
13	29	26	20	19	24	27	900	686	246	245	62	38
14	29	28	19	19	24	27	950	658	260	247	59	33
15	25	28	17	19	24	28	1,300	691	263	235	58	33
16	22	28	17	20	25	28	1,610	610	270	227	56	34
17	20	28	16	20	25	28	1,790	601	318	222	54	34
18	20	30	15	20	25	28	2,070	589	410	173	47	34
19	21	30	15	20	25	29	2,260	584	703	112	39	34
20	26	30	14	20	25	29	2,320	573	1,180	126	31	35
21	26	30	14	20	25	29	2,310	547	1,400	129	24	35
22	29	30	13	21	26	29	2,280	530	1,540	127	24	37
23	32	30	12	21	26	29	2,570	511	1,410	127	24	38
24	33	30	12	21	26	29	2,480	487	957	127	25	48
25	33	30	12	21	26	29	2,150	454	718	125	25	42
26	31	32	14	21	26	30	1,900	427	600	120	29	42
27	31	31	14	21	26	30	1,600	418	520	111	25	69
28	31	31	15	21	26	30	1,300	394	440	112	29	94
29	30	31	15	21	26	33	1,020	394	340	107	24	97
30	33	31	15	21	-----	36	950	320	250	100	24	90
31	33	-----	16	22	-----	40	-----	246	-----	97	24	-----
TOTAL	864	957	601	603	702	881	35,338	19,748	14,497	5,436	1,582	1,232
MEAN	27.9	31.9	19.4	19.5	24.2	28.4	1,178	637	483	175	51.0	41.1
MAX	37	45	31	22	26	40	2,570	940	1,540	257	90	97
MIN	20	26	12	16	22	26	48	246	169	97	24	26
AC-FT	1,710	1,900	1,190	1,200	1,390	1,750	70,090	39,170	28,750	10,780	3,140	2,440

CAL YR 1963: TOTAL 63,725.3

MEAN 175

MAX 1,610

MIN 4.7

AC-FT 126,400

WAT YR 1964: TOTAL 82,441

MEAN 225

MAX 2,570

MIN 12

AC-FT 163,500

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	90	54	34	26	32	29	19	903	644	354	114	61
2	90	54	33	26	32	28	22	839	660	363	108	56
3	89	52	32	25	31	28	38	818	664	332	108	50
4	90	54	32	25	31	28	36	774	697	305	103	48
5	90	55	31	25	31	28	50	716	727	280	97	46
6	92	56	31	26	31	27	150	684	734	255	94	61
7	60	94	31	27	32	27	400	640	814	239	109	48
8	95	62	31	27	32	27	800	623	926	230	108	51
9	92	66	31	27	32	27	1,910	610	1,000	214	94	47
10	89	78	30	27	32	27	3,200	603	1,020	198	93	42
11	88	82	30	27	33	26	4,900	610	1,020	188	87	37
12	87	90	30	27	33	26	5,840	598	1,020	188	80	41
13	87	90	30	28	33	26	5,780	568	989	205	69	40
14	88	92	29	28	33	26	6,660	543	930	303	65	43
15	87	97	29	28	33	25	6,400	522	850	349	61	55
16	92	98	29	28	33	25	5,420	706	774	320	57	63
17	95	100	28	29	32	24	4,340	930	698	256	52	74
18	100	99	28	30	32	23	3,300	962	644	257	51	86
19	107	95	28	31	32	22	2,510	936	580	230	47	97
20	111	86	27	32	31	21	2,070	888	664	211	43	97
21	110	60	27	33	31	21	1,900	852	941	156	42	91
22	109	44	27	34	30	20	1,780	859	918	186	40	91
23	108	42	26	35	30	19	1,660	848	711	316	38	92
24	106	44	26	35	29	19	1,540	816	581	346	40	100
25	98	45	26	35	30	18	1,430	818	509	239	45	105
26	86	45	26	35	30	18	1,320	834	470	152	45	119
27	80	43	26	34	30	18	1,210	816	453	166	42	127
28	70	40	26	34	29	18	1,110	767	457	147	43	125
29	70	38	26	33	-----	18	1,020	762	439	129	44	132
30	61	36	26	33	-----	18	951	738	412	126	52	152
31	61	-----	26	32	-----	18	-----	684	-----	117	59	-----
TOTAL	2,812	1,957	892	921	880	725	67,756	23,268	21,946	7,527	2,130	2,277
MEAN	90.7	65.2	28.8	29.7	31.4	23.4	2,259	751	732	243	68.7	75.9
MAX	111	100	34	35	33	29	6,660	962	1,020	354	114	152
MIN	61	36	26	25	29	18	19	522	412	117	38	37
AC-FT	5,580	3,880	1,770	1,830	1,750	1,440	134,400	46,150	43,530	14,970	4,220	4,520

CAL YR 1964: TOTAL 85,680

MEAN 234

MAX 2,570

MIN 16

AC-FT 169,900

WAT YR 1965: TOTAL 133,091

MEAN 365

MAX 6,660

MIN 18

AC-FT 264,000

5-0645. Red River of the North at Halstad, Minn.

Location.--Lat 47°21'10", long 96°50'50", on line between secs.24 and 25, T.145 N., R.49 W., on left bank on upstream side of highway bridge, half a mile west of Halstad, 2½ miles downstream from Wild Rice River, and at mile 375.2.

Drainage area.--21,800 sq mi, approximately (includes 3,800 sq mi in closed basins).

Records available.--April 1936 to June 1937 (no winter records), April 1942 to September 1960 (spring and summer months only), May 1961 to September 1965.

Gage.--Water-stage recorder. Datum of gage is 826.65 ft above mean sea level, datum of 1929. Prior to July 17, 1961, wire-weight gage at same site and datum.

Extremes.--Maximum and minimum discharges for May 1961 to September 1965 are contained in the following Table:

Water year	Maximum			Minimum		
	Date	Discharge (cfs)	Gage height (feet)	Date	Discharge (cfs)	Gage height (feet)
1961	May 22, 1961	1,900	6.96	Sept. 7, 1961	133	1.91
1962	June 16, 1962	15,900	24.70	Dec. 27-31, 1961	a 131	-
1963	June 16, 1963	5,850	13.14	Sept. 18, 19, 1963	266	2.61
1964	Apr. 23, 1964	7,820	15.27	Aug. 20, 1964	164	2.06
1965	Apr. 17, 1965	25,600	35.27	Mar. 25, 1965	a 225	-

a Minimum daily.

1936-37, 1942-65: Maximum discharge, 25,600 cfs Apr. 17, 1965 (gage height, 35.27 ft); minimum discharge observed, 5.4 cfs Oct. 8, 9, 12-14, 1936.

Flood in 1897 reached a stage of about 38.5 ft.

Remarks.--Records good except those for winter periods, which are fair. Some regulation by many controlled lakes and reservoirs on tributaries.

Revisions (water years).--WSP 1388: 1936, 1950.

DISCHARGE, IN CUBIC FEET PER SECOND, MAY TO SEPTEMBER 1961

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1								-	1,050	510	312	145
2								-	1,000	474	300	143
3								-	948	408	278	139
4								-	906	352	257	139
5								-	876	297	246	134
6								-	849	275	231	134
7								-	819	268	217	133
8								-	816	268	217	134
9								-	834	282	210	140
10								-	864	297	201	155
11								-	1,160	302	196	184
12								-	1,050	304	192	248
13								-	906	347	189	229
14								-	845	339	186	192
15								-	801	336	183	198
16								-	758	344	178	196
17								-	729	317	170	187
18								-	704	302	168	179
19								-	682	297	178	181
20								-	654	292	194	186
21								-	616	294	179	196
22								1,880	596	302	176	219
23								1,770	585	304	178	231
24								1,660	599	287	178	227
25								1,540	567	282	168	221
26								1,450	510	282	162	221
27								1,360	453	275	160	225
28								1,290	447	264	154	223
29								1,230	477	259	151	214
30								1,160	498	264	148	212
31								1,100	292	145		
TOTAL								-	22,599	9,716	6,102	5,565
MEAN								-	753	313	197	186
MAX								-	1,160	510	312	248
MIN								-	447	259	145	133
AC-FT								-	44,820	19,270	12,100	11,040

## 5-0645. Red River of the North at Halstad, Minn.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	217	229	190	132	155	170	550	2,540	13,200	4,000	5,940	1,500
2	216	227	175	132	155	170	650	2,570	12,800	3,930	5,310	1,450
3	214	229	170	132	155	170	850	2,590	11,500	4,040	4,870	1,420
4	219	240	170	132	155	175	1,200	2,560	10,000	5,240	4,710	1,400
5	221	221	165	133	155	175	1,900	2,470	8,020	6,740	4,460	1,360
6	217	240	160	133	160	175	1,700	2,340	6,250	7,780	4,190	1,330
7	210	240	160	133	160	175	5,400	2,220	5,240	10,000	4,020	1,310
8	203	235	160	134	160	175	6,700	2,140	4,920	11,600	3,880	1,300
9	196	225	155	134	160	175	7,100	2,060	5,900	12,500	3,750	1,320
10	192	235	155	135	160	175	7,600	1,990	8,000	13,000	3,650	1,360
11	259	240	150	135	160	175	8,100	1,940	9,900	13,300	3,640	1,380
12	444	250	145	135	160	175	8,300	1,870	12,000	13,500	3,780	1,420
13	690	250	145	135	160	175	8,200	1,830	13,800	13,700	4,130	1,520
14	519	260	140	135	160	180	8,800	1,800	15,000	13,800	4,870	1,660
15	390	255	140	135	165	185	9,400	1,740	15,600	13,400	5,480	1,650
16	347	250	140	135	165	195	10,500	1,720	15,800	12,900	5,770	1,570
17	361	250	135	135	170	210	9,800	1,840	15,400	11,900	5,730	1,500
18	390	235	135	135	170	220	10,000	2,180	15,000	10,500	5,360	1,410
19	390	240	135	137	170	240	10,400	2,720	14,600	8,980	4,800	1,350
20	366	240	135	139	170	250	10,400	3,900	14,000	7,650	4,270	1,300
21	336	240	135	141	170	265	10,100	5,110	13,300	6,820	3,860	1,250
22	310	235	134	143	170	285	9,680	5,970	12,400	7,300	3,530	1,210
23	290	210	134	143	170	310	8,960	7,300	11,200	7,800	3,240	1,170
24	273	190	133	143	170	325	7,880	9,700	9,900	8,540	2,960	1,140
25	264	200	133	144	170	340	6,280	11,500	8,500	9,350	2,690	1,130
26	257	200	132	145	170	345	4,640	12,600	7,100	9,900	2,360	1,110
27	250	205	131	147	170	350	3,560	13,300	6,000	10,000	2,000	1,100
28	242	190	131	149	170	360	2,970	13,700	5,120	9,400	1,760	1,070
29	186	131	150	152	170	400	2,670	13,900	4,660	8,660	1,640	1,060
30	242	195	131	150	170	490	2,950	13,900	4,280	7,740	1,600	1,010
31	233	-----	131	152	-----	520	-----	13,500	-----	6,780	1,550	-----
TOTAL	9,202	6,836	4,516	4,293	4,585	7,730	189,240	165,500	309,190	290,731	119,840	39,740
MEAN	297	228	146	138	164	249	6,308	5,339	10,130	9,373	3,896	1,325
MAX	690	260	190	152	170	250	10,500	13,900	15,800	13,800	5,940	1,660
MIN	192	180	131	132	155	170	550	1,720	4,280	3,930	1,550	1,010
AC-FT	18,250	13,560	8,960	8,520	9,090	15,330	375,400	328,300	613,300	576,700	237,700	78,820

CAL YR 1961: TOTAL

MEAN

MAX

MIN

AC-FT

WAT YR 1962: TOTAL 1,151,402

MEAN 3,155

MAX 15,800

MIN 131

AC-FT 2,284,000

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	997	664	751	430	270	270	3,060	1,270	2,950	1,850	471	516
2	997	679	744	420	270	270	2,600	1,270	3,120	1,750	546	546
3	982	685	729	440	270	270	2,430	1,260	3,690	1,690	606	537
4	952	695	729	470	280	270	1,870	1,240	4,290	1,600	573	534
5	914	704	726	490	280	270	1,820	1,240	4,870	1,600	537	500
6	887	708	637	500	280	270	2,320	1,240	5,270	1,500	489	477
7	876	751	630	510	290	280	2,420	1,230	5,370	1,400	438	477
8	887	760	620	520	310	280	3,330	1,200	5,110	1,300	390	471
9	902	770	610	530	330	290	4,320	1,180	4,890	1,200	358	453
10	914	780	520	500	330	290	4,310	1,170	4,840	1,120	369	429
11	921	790	500	470	330	290	3,810	1,130	4,780	986	396	402
12	929	800	580	460	330	290	3,210	1,110	4,710	936	435	378
13	917	820	620	460	320	300	2,730	1,110	4,920	890	623	341
14	914	830	580	430	320	310	2,330	1,100	5,370	845	672	307
15	906	834	550	400	320	320	2,080	1,100	5,740	812	555	292
16	898	834	530	380	320	320	1,950	1,110	5,820	808	507	285
17	898	830	530	370	330	310	1,800	1,120	5,530	776	492	280
18	887	820	520	390	330	310	1,720	1,170	4,890	758	438	266
19	876	810	520	400	330	320	1,640	1,260	4,140	747	381	266
20	868	800	520	400	330	340	1,600	1,300	3,510	726	350	292
21	826	794	510	380	320	350	1,570	1,310	3,060	718	325	310
22	751	800	500	340	300	370	1,530	1,320	2,780	661	322	317
23	690	800	490	320	300	390	1,510	1,290	2,590	592	339	336
24	654	810	470	290	280	420	1,490	1,240	2,460	528	384	378
25	636	812	460	280	280	580	1,460	1,260	2,380	462	366	399
26	609	805	450	280	275	850	1,450	1,100	2,280	429	347	399
27	596	780	430	290	275	1,200	1,400	1,080	2,170	414	350	393
28	592	715	420	300	275	1,800	1,370	1,180	2,100	423	381	396
29	592	754	420	290	-----	2,600	1,340	1,980	2,000	435	414	399
30	610	758	430	280	-----	3,400	1,300	2,680	1,900	426	444	393
31	633	-----	430	270	-----	3,500	-----	2,870	-----	432	465	-----
TOTAL	25,511	23,192	17,146	12,270	8,475	21,330	65,680	41,020	117,530	28,822	13,763	11,769
MEAN	823	773	553	396	303	688	2,189	1,323	3,918	930	444	392
MAX	997	834	751	520	330	3,500	4,320	2,870	5,820	1,850	672	546
MIN	592	664	420	270	270	250	1,300	1,080	1,900	614	322	266
AC-FT	50,600	46,000	34,010	24,340	16,810	42,310	130,300	81,360	233,100	57,170	27,300	23,340

CAL YR 1962: TOTAL 1,196,697

MEAN 3,279

MAX 15,800

MIN 132

AC-FT 2,374,000

WAT YR 1963: TOTAL 386,508

MEAN 1,059

MAX 5,820

MIN 266

AC-FT 766,600

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965												
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	336	381	330	255	290	275	450	6,110	3,480	3,100	1,560	640
2	347	378	295	255	280	280	470	5,600	3,540	2,990	1,460	633
3	361	375	290	260	275	285	500	5,190	3,750	2,870	1,390	626
4	350	372	285	270	265	295	520	4,840	3,880	2,770	1,390	630
5	339	372	285	270	265	295	590	4,460	3,830	2,710	1,390	592
6	333	364	280	270	265	300	880	4,160	3,880	2,660	1,390	558
7	328	364	280	275	265	305	1,750	3,960	4,020	2,560	1,390	525
8	352	358	280	275	265	310	3,300	3,760	4,230	2,390	1,380	507
9	432	361	280	280	270	315	4,800	3,620	4,470	2,280	1,330	513
10	471	366	280	285	270	320	8,100	3,590	4,770	2,260	1,310	516
11	477	396	275	290	260	320	12,500	3,470	5,080	2,280	1,280	510
12	444	426	270	290	265	315	16,900	3,230	5,310	2,330	1,240	510
13	405	456	260	295	265	310	21,900	2,950	5,420	2,370	1,170	510
14	390	441	255	290	255	310	24,500	2,750	5,410	2,430	1,090	516
15	378	432	255	290	260	310	25,400	2,710	5,200	2,440	1,010	513
16	384	435	250	295	265	305	25,600	2,820	4,880	2,340	929	543
17	405	432	250	300	265	300	25,600	3,120	4,560	2,230	864	570
18	408	430	245	305	265	280	24,700	3,230	4,300	2,120	845	619
19	393	420	240	300	265	260	23,500	3,230	4,120	2,020	830	697
20	355	405	230	300	265	255	21,700	3,220	4,010	1,910	810	790
21	328	390	230	295	265	260	19,800	3,160	4,140	1,810	800	902
22	336	370	230	295	270	265	17,900	3,100	4,120	1,720	790	982
23	358	365	235	295	265	260	16,000	3,030	3,910	1,930	770	1,050
24	378	360	240	290	265	240	14,200	2,960	3,700	2,010	760	1,090
25	369	340	250	290	265	225	12,400	2,930	3,530	1,770	755	1,110
26	347	340	250	285	265	230	10,700	3,040	3,610	1,640	740	1,140
27	361	350	250	290	265	290	9,200	3,190	3,340	1,600	720	1,160
28	387	350	250	290	270	340	8,100	3,290	3,350	1,590	770	1,160
29	399	355	250	290	270	390	7,250	3,290	3,290	1,640	780	1,180
30	396	340	255	290	265	400	6,700	3,450	3,190	1,640	665	1,230
31	387	-----	255	290	-----	420	-----	3,470	-----	1,660	661	-----
TOTAL	11,734	11,509	8,115	8,845	7,470	9,255	365,910	111,020	124,130	68,030	32,099	22,522
MEAN	374	364	262	283	247	297	12,200	3,581	2,195	1,035	78	718
MAX	477	436	330	305	290	420	25,600	6,110	5,420	3,100	1,560	1,230
MIN	328	340	230	255	255	225	450	2,710	3,190	1,590	661	507
AC-FT	23,270	22,830	16,100	17,540	14,820	18,360	725,890	220,200	246,200	134,900	63,670	44,670
CAL YR 1964: TOTAL	345,489											
CAL YR 1965: TOTAL	780,629											
MEAN	944			7,750			MIN 164			AC-FT 685,300		
MEAN	2,139			25,600			MIN 225			AC-FT 1,548,000		

5-0649. Beaver Creek near Finley, N. Dak.

(Hydrologic bench-mark station)

Location.--Lat 47°36', long 97°43', in NE $\frac{1}{4}$  sec.31, T.148 N., R.55 W., on right bank 500 ft upstream from bridge on county road and  $\frac{7}{8}$  miles northeast of Finley.

Drainage area.--160 sq mi, approximately.

Records available.--October 1964 to September 1965.

Gage.--Water-stage recorder and concrete broad-crested weir. Datum of gage is 1,170.08 ft above mean sea level, datum of 1929.

Extremes.--Maximum discharge during water year 1965, 1,250 cfs Apr. 11 (gage height, 6.88 ft, backwater from ice); no flow for several months.

1964-65: Maximum discharge, 1,250 cfs Apr. 11, 1965 (gage height, 6.88 ft, backwater from ice); no flow for several months.

Remarks.--Records good except those for winter periods, which are fair. Records of chemical analyses for the water year 1965 are published in reports of the Geological Survey.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	2.9	.30	0	0	0	0	.10	2.5	3.0	.40	2.1	.10
2	3.2	.30	0	0	0	0	2.5	2.8	8.0	.40	1.7	0
3	3.1	.20	0	0	0	0	6.0	3.3	14	.30	1.3	0
4	2.6	.20	0	0	0	0	20	3.5	26	.80	1.1	14
5	2.5	.20	0	0	0	0	31	9.8	32	.10	.80	8.0
6	2.5	.10	0	0	0	0	30	14	26	.10	.60	4.0
7	1.9	.10	0	0	0	0	26	30	20	0	.40	1.1
8	1.6	.10	0	0	0	0	180	17	14	0	.30	.90
9	1.5	.20	0	0	0	0	420	13	8.8	0	.20	.70
10	1.4	.20	0	0	0	0	650	9.9	6.9	0	.20	.60
11	1.2	.30	0	0	0	0	1,020	7.5	5.5	0	.10	.50
12	1.2	.30	0	0	0	0	224	6.2	4.4	.80	0	.60
13	1.0	.30	0	0	0	0	183	5.0	3.3	1.0	0	.60
14	1.0	.30	0	0	0	0	121	4.4	3.0	.40	0	.80
15	.80	.20	0	0	0	0	86	4.4	2.4	.30	0	1.2
16	.80	.20	0	0	0	0	53	3.5	1.7	.30	0	1.3
17	.60	.20	0	0	0	0	40	2.7	1.3	.30	0	2.1
18	.60	.20	0	0	0	0	32	2.4	1.0	.30	0	2.1
19	.50	.20	0	0	0	0	25	1.9	.80	.40	0	1.5
20	.50	.10	0	0	0	0	21	1.5	.50	.70	0	1.3
21	.50	0	0	0	0	0	17	1.7	.40	1.1	0	1.1
22	.50	0	0	0	0	0	17	1.7	.30	2.4	0	1.2
23	.40	0	0	0	0	0	14	2.5	.30	7.5	0	1.3
24	.40	0	0	0	0	0	10	5.0	.20	17	0	1.3
25	.40	0	0	0	0	0	8.0	6.0	.20	10	0	1.1
26	.40	0	0	0	0	0	6.9	6.5	.30	7.5	1.8	1.0
27	.40	0	0	0	0	0	5.7	5.0	.50	4.6	.40	.80
28	.40	0	0	0	0	0	4.0	3.5	.60	3.7	.20	.80
29	.40	0	0	0	0	0	2.8	2.5	.60	3.2	.30	1.5
30	.30	0	0	0	0	0	2.4	3.5	.40	3.0	.20	4.2
31	.30	0	0	0	0	0	0	3.0	0	2.7	.10	0
TOTAL	35.80	4.20	0	0	0	0	3,258.40	186.2	186.40	69.30	11.80	55.70
MEAN	1.15	.14	0	0	0	0	109	6.01	6.21	2.24	.38	1.86
MAX	3.2	.30	0	0	0	0	1,020	30	32	17	2.1	14
MIN	.30	0	0	0	0	0	.10	1.5	.20	0	0	0
AC-FT	71	8.3	0	0	0	0	6,460	369	370	137	23	110
CAL YR 1964: TOTAL				MEAN			MAX	MIN	AC-FT			
WAT YR 1965: TOTAL	3,807.80			MEAN	10.4		MAX	MIN	7,550			

5-0655. Goose River near Portland, N. Dak.

Location.--Lat 47°32', long 97°27', in SE $\frac{1}{4}$  sec. 19, T.147 N., R.53 W., on left bank 75 ft upstream from bridge on State Highway 18,  $\frac{1}{4}$  miles upstream from unnamed tributary, 4 miles downstream from Beaver Creek, and 5 miles northwest of Portland.

Drainage area.--517 sq mi, of which about 110 sq mi is probably noncontributing.

Records available.--October 1939 to September 1965.

Gage.--Water-stage recorder and wooden control. Datum of gage is 967.48 ft above mean sea level, datum of 1929. Prior to Oct. 1, 1956, wire-weight or chain gage at site 2 miles upstream at datum 11.28 ft higher.

Average discharge.--26 years, 23.8 cfs (17,230 acre-ft per year); median of yearly mean discharges, 12 cfs (8,690 acre-ft per year).

Extremes.--Maximums and minimums (discharge in cubic feet per second, gage height in feet).

Annual maximum discharge (\*) and peak discharges above base (200 cfs), water years 1961-65

Date	Time	Discharge	Gage height	Date	Time	Discharge	Gage height	Date	Time	Discharge	Gage height
Mar. 10, 1961	1000	* 71	a 4.13	Apr. 8, 1963	1900	* 150	a 5.85	June 15, 1964	0600	211	6.20
Apr. 8, 1962	0200	* 1,610	15.39	June 12, 1964	1700	221	6.31	June 22, 1964	0305	* 381	7.96
								Apr. 13, 1965	0600	* 3,740	18.22

a Backwater from ice.

No flow for several months in each year.

1939-65: Maximum discharge, 8,090 cfs May 9, 1950; maximum gage height, 22.98 ft Apr. 18, May 9, 1950, former site and datum; no flow for several months in each year.

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

Revisions.--WSP 1728: Drainage area.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	0	0	0	0	0	0	9.0	1.7	0	0	0	0
2	0	0	0	0	0	0	8.0	1.5	0	0	0	0
3	0	0	0	0	0	0	10	1.1	0	0	0	0
4	0	0	0	0	0	0	9.5	.70	0	0	0	0
5	0	0	0	0	0	.10	8.6	.60	0	0	0	0
6	0	0	0	0	0	.70	7.2	.70	0	0	0	0
7	0	0	0	0	0	.70	6.1	1.1	0	0	0	0
8	0	0	0	0	0	.40	5.7	1.3	0	0	0	0
9	0	0	0	0	0	5.0	4.3	.90	0	0	0	0
10	0	0	0	0	0	55	3.4	1.3	0	0	0	0
11	0	0	0	0	0	26	3.1	1.7	0	0	0	0
12	0	0	0	0	0	19	2.5	1.7	0	0	0	0
13	0	0	0	0	0	18	2.2	1.3	0	0	0	0
14	0	0	0	0	0	18	1.7	1.3	0	0	0	0
15	0	0	0	0	0	16	1.3	.90	0	0	0	0
16	0	0	0	0	0	12	2.2	.70	0	0	0	0
17	0	0	0	0	0	13	1.1	.60	0	0	0	0
18	0	0	0	0	0	16	.70	.60	0	0	0	0
19	0	0	0	0	0	16	.60	.40	0	0	0	0
20	0	0	0	0	0	14	.40	.40	0	0	0	0
21	0	0	0	0	0	15	.30	.30	0	0	0	0
22	0	0	0	0	0	17	.30	.20	0	0	0	0
23	0	0	0	0	0	15	.40	.20	0	0	0	0
24	0	0	0	0	0	12	1.7	.20	0	0	0	0
25	0	0	0	0	0	13	2.0	.20	0	0	0	0
26	0	0	0	0	0	25	1.7	.10	0	0	0	0
27	0	0	0	0	0	18	1.5	.10	0	0	0	0
28	0	0	0	0	0	16	1.5	0	0	0	0	0
29	0	0	0	0	-----	13	2.0	0	0	0	0	0
30	0	0	0	0	-----	15	2.0	0	0	0	0	0
31	0	-----	0	0	-----	12	-----	0	-----	0	0	0
TOTAL	0	0	0	0	0	400.90	101.00	21.80	0	0	0	0
MEAN	0	0	0	0	0	12.9	3.37	.70	0	0	0	0
MAX	0	0	0	0	0	55	10	1.7	0	0	0	0
MIN	0	0	0	0	0	0	.30	0	0	0	0	0
AC-FT	0	0	0	0	0	795	200	.43	0	0	0	0

CAL YR 1960: TOTAL 6,356.50 MEAN 17.4 MAX 831 MIN 0 AC-FT 12,610  
 MAY 1961: TOTAL 523.70 MEAN 1.43 MAX 55 MIN 0 AC-FT 1,040

## 5-0655. Goose River near Portland, N. Dak.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	0	0	0	0	0	0	0	19	105	15	1.0	0
2	0	0	0	0	0	0	12	17	138	15	.60	0
3	0	0	0	0	0	0	35	14	143	14	.50	.10
4	0	0	0	0	0	0	90	12	118	13	.60	.20
5	0	0	0	0	0	0	300	12	93	11	3.2	.10
6	0	0	0	0	0	0	1,020	10	62	11	2.9	0
7	0	0	0	0	0	0	1,440	9.2	52	25	1.8	0
8	0	0	0	0	0	0	1,460	8.7	47	23	1.3	7.0
9	0	0	0	0	0	0	1,050	8.2	50	17	1.0	6.9
10	0	0	0	0	0	0	694	7.7	40	16	1.1	2.9
11	0	0	0	0	0	0	328	7.7	83	14	3.2	1.8
12	0	0	0	0	0	0	266	7.3	98	11	4.6	1.8
13	0	0	0	0	0	0	224	6.9	95	9.2	4.4	1.5
14	0	0	0	0	0	0	159	6.9	73	8.2	2.9	1.0
15	0	0	0	0	0	0	126	9.7	47	7.3	2.9	.50
16	0	0	0	0	0	0	126	12	55	6.9	3.6	.60
17	0	0	0	0	0	0	140	19	47	6.5	2.2	1.0
18	0	0	0	0	0	0	136	17	40	6.1	4.0	1.1
19	0	0	0	0	0	0	123	16	66	6.1	2.9	.80
20	0	0	0	0	0	0	119	13	157	6.5	2.1	.50
21	0	0	0	0	0	0	107	38	133	5.2	1.8	.30
22	0	0	0	0	0	0	82	82	102	5.2	1.5	.40
23	0	0	0	0	0	0	71	116	70	5.2	2.1	.30
24	0	0	0	0	0	0	60	140	60	4.8	4.4	.20
25	0	0	0	0	0	0	52	87	46	4.0	2.1	.10
26	0	0	0	0	0	0	42	108	37	3.2	.80	.10
27	0	0	0	0	0	0	34	163	30	2.5	.60	0
28	0	0	0	0	0	0	29	127	25	1.8	.50	.60
29	0	0	0	0	-----	0	25	62	21	1.5	.40	.70
30	0	0	0	0	-----	0	22	57	17	1.5	.30	.60
31	0	-----	0	0	-----	0	-----	49	-----	1.1	.10	-----
TOTAL	0	0	0	0	0	0	8,406	1,283.3	2,185	279.8	64.60	31.00
MEAN	0	0	0	0	0	0	280	41.4	72.8	9.03	2.08	1.03
MAX	0	0	0	0	0	0	1,460	163	157	25	5.2	7.0
MIN	0	0	0	0	0	0	0	6.9	17	1.1	.10	0
AC-FT	0	0	0	0	0	0	16,680	2,550	4,330	555	129	61
CAL YR 1961: TOTAL	523.70			MEAN 1.43	MAX 55	MIN 0	AC-FT 1,040					
WAT YR 1962: TOTAL	12,251.70			MEAN 33.6	MAX 1,460	MIN 0	AC-FT 24,300					

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	.30	.30	.80	0	0	0	25	5.8	1.4	0	.40	0
2	.30	.40	1.0	0	0	0	18	5.5	1.1	0	.10	0
3	.30	.20	1.0	.10	0	0	15	4.4	.80	0	0	0
4	.20	.20	.70	.10	0	0	15	3.7	.50	0	0	0
5	.20	.30	.60	.10	0	0	55	3.7	.40	0	0	0
6	.20	.40	.50	.10	0	0	65	3.4	.40	0	0	0
7	.20	.50	.50	0	0	0	80	3.0	.50	0	0	0
8	.20	.50	.40	0	0	0	140	2.7	.50	0	0	0
9	0	.40	.40	0	0	0	125	2.7	2.1	0	0	0
10	0	.40	.30	0	0	0	100	2.7	2.7	0	0	0
11	0	.40	.20	0	0	0	70	2.7	1.4	1.2	0	0
12	0	.50	.20	0	0	0	50	2.1	.90	7.9	0	0
13	0	.50	.20	0	0	0	42	1.8	.80	5.1	0	0
14	0	.50	.10	0	0	0	36	2.4	.60	3.7	0	0
15	0	.60	.10	0	0	0	31	2.1	.50	2.1	0	0
16	0	.60	.10	0	0	0	29	2.4	.40	1.1	0	0
17	0	.60	.10	0	0	0	26	2.7	.20	.50	0	0
18	0	.70	.10	0	0	0	22	2.4	.10	.20	0	0
19	0	.60	.10	0	0	0	20	2.1	.10	0	0	0
20	0	.70	.10	0	0	0	16	1.8	.10	0	0	0
21	0	.70	.10	0	0	0	12	1.8	0	0	0	0
22	.30	.60	.10	0	0	0	10	1.6	0	0	0	0
23	.30	.50	.10	0	0	0	10	1.6	0	0	0	0
24	.40	.40	0	0	0	0	20	1.4	.20	0	0	0
25	.30	.40	0	0	0	0	50	5.1	1.4	0	0	0
26	.20	.50	0	0	0	0	60	4.4	1.4	0	0	0
27	.20	.50	0	0	0	0	65	4.4	1.6	0	0	0
28	.20	.60	0	0	0	0	65	7.5	1.8	0	0	0
29	.20	.80	0	0	-----	0	50	8.3	1.4	0	0	0
30	.20	1.0	0	0	-----	0	40	7.5	1.4	0	0	0
31	.20	-----	0	0	-----	0	30	-----	1.1	-----	0	0
TOTAL	4.40	15.30	7.80	0.40	0	390	1,053.3	76.6	15.80	21.80	0.50	0
MEAN	.14	.51	.25	.013	0	12.6	35.1	2.47	.53	.70	.016	0
MAX	.40	1.0	1.0	.10	0	65	140	5.8	2.7	7.9	.40	0
MIN	0	.20	0	0	0	0	6.4	1.1	0	0	0	0
AC-FT	8.7	30	15	.8	0	774	2,090	152	31	43	1.0	0
CAL YR 1962: TOTAL	12,279.20			MEAN 33.6	MAX 1,460	MIN 0	AC-FT 24,300					
WAT YR 1963: TOTAL	1,585.90			MEAN 4.34	MAX 140	MIN 0	AC-FT 3,150					

5-0655. Goose River near Portland, N. Dak.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	0	0	0	0	0	0	0	14	.10	67	.30	.10
2	0	0	0	0	0	0	.10	18	0	37	.50	.10
3	0	0	0	0	0	0	.20	12	0	30	.20	.20
4	0	0	0	0	0	0	.40	12	0	26	.10	.50
5	0	0	0	0	0	0	2.1	11	0	22	.10	.80
6	0	0	0	0	0	0	5.1	10	0	21	.10	.20
7	0	0	0	0	0	0	4.4	9.2	0	19	.10	.10
8	0	0	0	0	0	0	1.4	8.8	3.4	17	.10	.10
9	0	0	0	0	0	0	3.0	8.3	24	16	.10	.10
10	0	0	0	0	0	0	35	7.9	11	15	.10	0
11	0	0	0	0	0	0	32	7.0	21	12	.10	0
12	0	0	0	0	0	0	35	6.6	197	10	.10	0
13	0	0	0	0	0	0	45	5.1	153	8.3	.10	0
14	0	0	0	0	0	0	105	4.4	106	7.5	.10	0
15	0	0	0	0	0	0	136	3.7	185	6.2	.10	0
16	0	0	0	0	0	0	131	3.7	104	5.5	.10	0
17	0	0	0	0	0	0	112	3.0	67	4.4	.10	0
18	0	0	0	0	0	0	143	2.7	90	3.4	.10	0
19	0	0	0	0	0	0	136	3.0	66	2.7	.10	0
20	0	0	0	0	0	0	113	2.4	53	2.7	.10	0
21	0	0	0	0	0	0	83	1.8	221	1.8	.20	0
22	0	0	0	0	0	0	60	1.8	350	1.1	.20	0
23	0	0	0	0	0	0	44	1.6	332	.60	.20	0
24	0	0	0	0	0	0	37	1.1	312	1.4	.20	0
25	0	0	0	0	0	0	31	.60	259	.80	.20	0
26	0	0	0	0	0	0	26	.30	177	.10	.20	.23
27	0	0	0	0	0	0	23	.20	128	1.8	.50	.49
28	0	0	0	0	0	0	20	.10	100	1.1	1.1	.67
29	0	0	0	0	0	0	17	.10	78	.50	.30	.52
30	0	0	0	0	0	0	16	.10	59	.60	.20	106
31	0	0	0	0	0	0	10	.10	-----	.30	.10	-----
TOTAL	0	0	0	0	0	0	1,396.70	160.60	3,096.50	342.80	6.10	299.20
MEAN	0	0	0	0	0	0	46.6	5.18	103	11.1	.20	9.97
MAX	0	0	0	0	0	0	143	18	350	67	1.1	106
MIN	0	0	0	0	0	0	0	0	0	0	.10	0
AC-FT	0	0	0	0	0	0	2,770	319	6,140	680	12	593

CAL YR 1963: TOTAL 1,558.40

MEAN 4.27

MAX 140

MIN 0

AC-FT 3,090

WAT YR 1964: TOTAL 5,301.90

MEAN 14.5

MAX 350

MIN 0

AC-FT 10,520

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	63	1.4	.50	.20	0	0	1.0	49	25	11	21	.80
2	35	1.8	.50	.20	0	0	2.5	45	24	9.8	18	.50
3	27	1.8	.40	.20	0	0	5.0	44	24	8.4	16	.50
4	20	1.8	.50	.20	.10	0	15	45	23	7.1	12	3.9
5	18	1.8	.40	.20	.20	0	62	45	21	6.6	13	5.4
6	15	1.8	.40	.20	.20	0	75	52	22	5.8	13	6.2
7	13	1.8	.40	.20	.10	.10	157	49	22	4.6	12	8.8
8	11	1.6	.40	.20	.10	.20	270	57	21	4.6	10	19
9	10	1.6	.40	.20	.10	.20	280	102	23	4.6	9.8	20
10	10	1.8	.40	.20	.10	.20	620	89	30	4.2	9.3	13
11	9.2	1.8	.40	.20	.10	.20	1,470	77	30	4.2	6.2	8.8
12	7.9	1.8	.40	.20	.10	.10	2,620	67	27	5.0	5.4	6.6
13	7.9	1.8	.40	.20	.10	.10	3,620	55	26	8.8	5.4	6.6
14	7.5	1.8	.40	.20	.10	.10	2,920	49	26	8.8	4.6	5.4
15	7.5	1.8	.30	.20	.10	.10	2,280	45	23	7.5	2.8	6.2
16	7.5	1.6	.30	.20	.10	.10	1,430	40	21	6.6	1.2	5.8
17	6.2	1.6	.30	.10	.10	.10	1,250	36	19	7.1	1.2	6.2
18	5.1	1.6	.30	.10	.10	.10	450	34	17	7.1	1.2	6.6
19	4.4	1.4	.30	.10	.10	.10	290	31	16	6.2	1.0	6.2
20	4.0	.90	.30	.10	.10	.10	220	30	15	8.8	.20	6.2
21	3.4	.80	.30	.10	0	.10	181	28	14	9.8	.10	6.6
22	3.4	.60	.30	.10	0	.10	150	27	12	8.4	.10	5.8
23	3.0	.50	.30	.10	0	.10	131	26	11	23	.10	5.8
24	2.7	.60	.30	.10	0	.10	112	26	11	36	.20	6.6
25	2.7	.60	.30	.10	0	.10	99	27	9.8	25	.30	7.1
26	2.4	.60	.20	.10	0	.10	87	27	9.8	26	.50	7.9
27	2.4	.60	.20	.10	0	.10	75	27	18	27	.60	6.2
28	2.1	.60	.20	.10	0	.10	66	27	51	22	.50	5.0
29	1.8	.60	.20	.10	-----	.10	58	27	23	31	1.0	5.8
30	1.8	.50	.20	.10	-----	.10	53	26	14	32	1.2	9.3
31	1.6	-----	.20	0	-----	.20	-----	26	-----	25	1.2	-----
TOTAL	316.5	39.30	10.40	4.60	1.90	3.00	19,049.5	1,335	628.6	402.0	169.10	208.80
MEAN	10.2	1.31	.34	.15	.068	.097	635	13.0	21.0	13.0	5.45	6.96
MAX	63	1.8	.50	.20	.20	.20	3,620	102	51	36	21	20
MIN	1.6	.50	.20	0	0	0	1.0	26	9.8	4.2	1.0	.50
AC-FT	628	78	21	9.1	3.8	6.0	37,780	2,650	1,250	797	335	414

CAL YR 1964: TOTAL 5,668.10

MEAN 15.5

MAX 350

MIN 0

AC-FT 11,240

WAT YR 1965: TOTAL 22,168.70

MEAN 60.7

MAX 3,620

MIN 0

AC-FT 43,970

## RED RIVER OF THE NORTH BASIN

5-0665. Goose River at Hillsboro, N. Dak.

Location.--Lat 47°24'20", long 97°03'40", in NW $\frac{1}{4}$  sec.5, T.145 N., R.50 W., on left bank 50 ft upstream from Poogman Dam in Hillsboro and 22 miles upstream from mouth.

Drainage area.--1,203 sq mi, of which about 110 sq mi is probably noncontributing.

Records available.--March 1931 to September 1965 (no winter records 1932-34). Monthly discharge only for some periods, published in WSP 1308.

Gage.--Water-stage recorder and masonry dam. Datum of gage is 879.52 ft above mean sea level, datum of 1929. Chain gages at sites 1,000 ft downstream Mar. 17, 1931, to Mar. 20, 1935, and 600 ft downstream Mar. 21, 1935, to Mar. 28, 1940, at datum 11.45 ft lower. Mar. 29, 1940, to Sept. 25, 1941, staff gage at present site and datum.

Average discharge.--32 years (1931-32, 1935-65), 48.9 cfs (35,400 acre-ft per year); median of yearly mean discharges, 26 cfs (18,800 acre-ft per year).

Extremes.--Maximums and minimums (discharge in cubic feet per second, gage height in feet).

Annual maximum discharge (\*) and peak discharges above base (200 cfs), water years 1961-65

Date	Time	Discharge	Gage height	Date	Time	Discharge	Gage height	Date	Time	Discharge	Gage height
(a)	-	* 82	0.68	Sept. 11, 1962	1500	505	1.81	June 24, 1964	1400	419	2.79
Apr. 9, 1962	1010	* 2,350	b 8.64	Apr. 8, 1963	1300	* 290	b 1.24	Apr. 13, 1965	1950	* 6,800	14.01
May 17, 1962	2000	690	1.90					May 7, 1965	1200	548	2.99
May 25, 1962	0600	552	1.68	Apr. 17, 1964	1800	494	2.91				
June 12, 1962	1100	226	1.09	June 14, 1964	1000	* 1,110	3.61				

a Mar. 7, 8, 12, 13, 1961.

b Backwater from ice.

Annual minimum discharge, water years 1961-65

Water year	Date	Discharge	Gage height	Water year	Date	Discharge	Gage height
1961	-	0	-	1964	Long periods	0	-
1962	Nov. 3, 1962	.10	0.17	1965	Mar. 23-26, 1965	.80	-
1963	(a)	.10	b .14				

a Feb. 22 to Mar. 1, Sept. 12-23, 26-30, 1963.

b Occurred Mar. 1, 1963.

1931-65: Maximum discharge, 9,420 cfs Apr. 19, 1950; maximum gage height, 14.94 ft Apr. 19, 1950; no flow at times.

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

Revisions (water years).--WSP 925: 1935-36, 1939. WSP 1728: Drainage area.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	.10	.80	1.1	.80	.70	2.0	39	22	5.1	.20	.30	0
2	0	.80	1.1	.80	.70	3.0	46	22	5.1	.10	.60	0
3	0	1.2	1.1	.80	.70	5.0	44	22	5.1	0	.70	0
4	0	.80	1.2	.80	.70	15	39	22	5.9	0	.40	0
5	0	.80	1.2	.80	.60	30	29	21	5.9	0	.30	0
6	0	.50	1.1	.80	.60	56	33	24	4.4	0	.10	0
7	0	.50	1.1	.80	.60	70	35	25	3.7	0	.10	0
8	0	.80	1.0	.80	.60	82	33	25	4.4	0	0	0
9	0	.50	1.0	.80	.60	70	29	25	4.4	0	0	0
10	0	.50	1.0	.80	.70	70	27	27	3.7	0	0	0
11	0	.80	1.0	.80	.80	60	27	27	15	0	0	0
12	.10	1.2	1.0	.80	.80	63	27	29	14	0	0	0
13	.50	1.2	1.0	.80	.80	80	24	27	6.8	0	0	.20
14	.80	1.7	1.0	.80	.80	72	24	25	4.4	.10	0	.40
15	.50	1.7	1.0	.80	.80	63	22	25	3.1	.10	0	.40
16	.50	1.2	1.0	.80	.80	60	18	24	2.1	.10	0	.30
17	.50	1.2	1.0	.80	.80	60	19	22	1.3	.10	0	.40
18	.30	1.2	1.0	.80	.70	60	19	22	1.0	.10	0	.30
19	.10	1.2	1.0	.80	.70	60	18	20	1.3	.10	0	1.6
20	0	1.2	1.0	.80	.70	63	19	19	1.0	.20	0	3.1
21	0	1.2	1.0	.80	.80	67	19	18	1.0	.40	0	1.6
22	.10	1.2	.90	.80	1.0	65	20	16	1.3	.70	0	1.0
23	.10	1.2	.90	.80	1.0	60	24	15	1.3	.40	0	.40
24	0	1.2	.90	.70	1.0	56	25	15	.70	.30	0	.40
25	0	1.2	.90	.60	1.0	72	24	14	.70	.30	0	.30
26	0	1.2	.90	.70	1.2	65	27	12	.40	.30	0	.30
27	0	1.2	.90	.60	1.2	53	25	11	.40	.30	0	.30
28	.10	1.1	.80	.70	1.5	46	25	9.9	.30	.20	0	.30
29	.30	1.1	.80	.70	---	63	24	8.8	.20	.30	0	.40
30	2.3	1.1	.80	.70	---	56	22	5.9	.20	.30	0	.40
31	1.7	---	.80	.70	---	39	---	5.9	---	.30	0	---
TOTAL	8.00	31.50	30.50	23.80	22.90	1,686.0	806	606.5	104.20	4.90	2.50	12.10
MEAN	.26	1.09	.98	.77	.82	54.4	26.9	19.6	3.67	.16	.081	.40
MAX	2.3	1.7	1.2	.80	1.5	82	46	29	15	.70	.70	3.1
MIN	0	.50	.80	.60	.60	2.0	18	5.9	.20	0	0	0
AC-FT	16	62	61	47	45	3,340	1,600	1,200	207	9.7	5.0	24
CAL YR 1960: TOTAL	16,751.60			MEAN 45.8		MAX 1,350	MIN 0	AC-FT 33,230				
WAT YR 1961: TOTAL	3,338.90			MEAN 9.15		MAX 82	MIN 0	AC-FT 6,620				

5-0665. Goose River at Hillsboro, N. Dak.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	.30	.50	.70	.60	.50	.50	135	66	187	33	11	5.1
2	.30	.30	.70	.60	.50	.50	171	55	192	33	9.9	4.3
3	.30	.10	.60	.60	.50	.50	209	50	209	31	11	2.9
4	.50	.30	.60	.60	.60	.50	308	50	204	29	9.9	2.9
5	.50	.50	.60	.60	.70	.50	700	48	196	26	8.8	2.9
6	.50	.50	.60	.60	.60	.50	1,500	44	162	29	7.8	2.9
7	.80	.80	.60	.60	.60	.50	1,750	42	149	91	5.9	2.9
8	.50	.80	.60	.60	.60	.50	2,150	38	128	117	5.1	2.9
9	.80	.80	.60	.60	.50	.50	2,250	36	120	147	4.3	436
10	2.3	.80	.60	.60	.50	.50	1,900	34	117	158	4.3	482
11	16	.80	.60	.60	.50	.50	1,650	33	192	124	11	499
12	16	.80	.60	.60	.50	.80	1,400	31	217	88	8.8	448
13	11	.80	.60	.60	.50	.80	1,100	29	192	68	12	443
14	5.9	.80	.60	.60	.50	.80	841	29	166	60	13	266
15	5.1	.80	.60	.60	.50	.50	596	33	154	50	16	209
16	4.3	.80	.60	.60	.50	.50	505	38	154	44	23	158
17	2.3	.80	.60	.60	.50	.50	448	350	139	40	25	124
18	1.2	.80	.60	.60	.50	.50	454	505	166	36	20	94
19	1.2	.80	.60	.60	.50	.50	494	454	166	34	17	74
20	.80	.80	.60	.60	.50	.50	426	313	135	31	16	60
21	.80	.80	.60	.60	.50	.50	349	209	147	28	15	53
22	.50	.80	.60	.50	.50	.50	284	158	192	26	13	46
23	.50	.80	.60	.50	.50	.50	230	200	166	26	12	40
24	.50	.70	.60	.50	.50	.50	192	471	131	25	11	36
25	.50	.70	.60	.50	.50	.50	162	540	104	20	9.9	34
26	.30	.70	.60	.50	.50	.80	139	431	88	19	8.8	31
27	.50	.70	.60	.50	.50	1.7	117	288	74	19	7.8	29
28	.50	.70	.60	.50	.50	1.2	91	261	60	16	6.8	26
29	.50	.70	.60	.50	-----	1.2	77	261	50	16	5.9	25
30	.50	-----	.60	.50	-----	1.2	71	243	36	12	5.9	23
31	.50	-----	.60	.50	-----	6.8	-----	209	-----	11	6.4	-----
TOTAL	75.90	20.70	18.80	17.60	14.60	26.30	20,699	5,549	4,383	1,487	342.3	3,683.9
MEAN	2.45	.69	.61	.57	.52	.85	690	179	146	48.0	11.0	123
MAX	16	.70	.60	.70	.60	.68	2,250	540	217	158	25	499
MIN	.30	.10	.60	.50	.50	.10	29	36	11	4.3	2.9	2.9
AC-FT	151	41	37	35	29	52	41,060	11,010	8,690	2,950	679	7,310

CAL YR 1961: TOTAL 3,384.30 MEAN 9.27 MAX 82 MIN 0 AC-FT 6,710

WAT YR 1962: TOTAL 36,318.10 MEAN 99.5 MAX 2,250 MIN .10 AC-FT 72,040

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	23	11	17	3.0	.40	.10	82	29	13	5.9	1.7	.80
2	23	11	17	3.0	.40	.20	66	29	13	5.1	2.9	1.2
3	22	11	17	8.0	.40	.20	44	25	12	4.3	3.6	1.7
4	20	11	17	12	.40	.20	33	25	12	4.3	2.9	1.2
5	20	11	13	6.0	.40	.20	55	25	12	4.3	2.3	1.2
6	20	12	16	5.2	.50	.20	58	23	12	2.9	1.7	.80
7	20	12	15	5.1	.40	.30	140	22	12	2.9	1.2	.50
8	20	12	14	5.0	.40	.30	240	23	11	2.3	.80	.30
9	20	15	12	4.5	.40	.30	261	22	12	1.7	.80	.30
10	20	15	11	4.0	.40	.20	261	22	12	.80	1.7	.20
11	20	15	10	3.0	.40	.20	234	20	16	4.3	5.1	.20
12	20	15	9.0	2.0	.40	.20	187	19	13	5.9	5.1	.10
13	20	15	8.0	1.5	.40	.20	147	19	13	23	5.1	.10
14	20	16	7.0	1.0	.40	.20	117	17	13	40	4.3	.10
15	20	16	7.0	.80	.30	.40	98	17	13	42	4.3	.10
16	17	17	7.0	.80	.30	.40	88	17	12	36	2.9	.10
17	16	13	7.0	.80	.30	.30	71	17	12	31	2.3	.10
18	16	20	7.0	.60	.30	.30	66	17	11	28	1.7	.10
19	13	16	7.0	.60	.30	.50	53	17	11	25	1.2	.10
20	13	15	7.0	.60	.20	.80	48	17	9.9	19	1.2	.10
21	13	13	7.0	.40	.20	8.0	42	16	8.8	15	1.2	.10
22	13	13	7.0	.40	.10	14	38	16	7.8	12	.80	.10
23	13	17	7.0	.40	.10	18	42	13	7.8	9.9	.80	.10
24	13	16	6.0	.40	.10	38	29	13	7.8	8.8	.50	.20
25	11	13	6.0	.40	.10	75	29	13	7.8	7.8	.30	.20
26	11	15	5.0	.40	.10	110	29	13	6.8	5.9	1.2	.10
27	11	16	5.0	.40	.10	120	28	13	5.9	5.1	1.7	.10
28	11	16	5.0	.40	.10	130	28	13	6.8	5.1	1.7	.10
29	11	18	3.0	.40	-----	140	28	13	5.9	2.9	1.2	.10
30	11	16	3.0	.40	-----	120	33	12	5.9	2.9	1.2	.10
31	11	-----	3.0	.40	-----	130	-----	13	-----	2.9	1.2	-----
TOTAL	512	431	282.0	71.90	8.30	908.70	2,669	570	316.2	367.00	64.60	10.50
MEAN	16.5	14.4	9.10	2.32	.30	29.3	89.0	18.4	10.5	11.8	2.08	.35
MAX	23	20	17	12	.50	140	261	29	16	42	5.1	1.7
MIN	11	11	3.0	.40	.10	.10	28	12	5.9	.80	.30	.10
AC-FT	1,020	855	559	143	16	1,800	5,290	1,130	627	728	128	21

CAL YR 1962: TOTAL 37,427.70 MEAN 103 MAX 2,250 MIN .50 AC-FT 74,240

WAT YR 1963: TOTAL 6,211.20 MEAN 17.0 MAX 261 MIN .10 AC-FT 12,320

## 5-0665. Goose River at Hillsboro, N. Dak.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	.10	1.3	.60	0	0	0	8.5	50	1.0	138	3.4	12
2	0	1.3	.60	0	0	0	9.4	47	1.3	118	3.3	13
3	0	.50	.30	0	0	0	11	50	1.6	95	3.3	13
4	0	0	.30	0	0	0	18	47	1.9	74	3.2	12
5	0	0	.40	0	0	0	45	42	1.9	58	3.1	11
6	0	.40	.40	0	0	0	58	42	1.9	45	3.1	10
7	0	.40	.40	0	0	0	69	40	2.0	37	3.1	9.5
8	0	.40	.30	0	0	0	92	35	2.2	26	3.0	9.0
9	0	.40	.20	0	0	0	86	33	2.2	24	3.0	8.0
10	0	.40	.10	0	0	0	101	30	3.0	30	3.0	6.8
11	0	.50	0	0	0	0	156	24	193	35	3.1	5.6
12	0	.50	0	0	0	0	216	22	220	32	3.1	5.6
13	0	.40	0	0	0	0	216	18	695	28	3.0	4.7
14	.10	.40	0	0	0	0	132	15	1,040	24	2.9	3.8
15	.10	.40	0	0	0	.20	189	12	880	20	2.8	3.8
16	.20	.40	0	0	0	.50	321	11	625	18	2.8	3.8
17	.20	.40	0	0	0	1.0	450	9.4	514	16	2.8	3.1
18	.20	.50	0	0	0	1.0	396	8.0	351	15	2.7	3.1
19	.10	.50	0	0	0	1.0	296	6.8	272	14	2.7	1.9
20	.20	.60	0	0	0	1.0	277	5.6	282	11	2.7	1.9
21	.80	.60	0	0	0	1.0	258	4.7	321	10	2.7	1.4
22	.50	.60	0	0	0	1.2	237	3.8	341	8.6	2.7	1.4
23	.30	.70	0	0	0	2.0	185	3.8	384	7.0	3.0	1.9
24	7.2	.70	0	0	0	2.5	142	2.4	413	6.4	5.0	.90
25	5.0	.80	0	0	0	2.8	121	2.4	401	5.8	10	.60
26	3.5	.80	0	0	0	3.0	101	2.4	361	4.6	15	.90
27	2.6	.70	0	0	0	4.0	95	1.9	316	4.2	15	.90
28	1.0	.70	0	0	0	5.0	77	1.9	258	4.0	14	.90
29	1.3	.70	0	0	0	6.0	69	1.4	212	3.8	13	24
30	1.3	.70	0	0	0	7.0	61	.90	171	3.6	12	74
31	1.3	-----	0	0	0	8.0	-----	.90	-----	3.5	12	-----
TOTAL	26.60	10.70	3.60	0	0	67.20	4,492.9	574.30	8,269.0	919.5	164.5	248.20
MEAN	.86	.56	.12	0	0	1.52	150	18.5	276	29.7	5.31	8.27
MAX	7.2	1.3	.60	0	0	8.0	650	50	1,040	138	15	74
MIN	0	0	0	0	0	0	8.5	.90	1.0	3.5	2.7	.60
AC-FT	53	33	7.1	0	0	94	8,910	1,140	16,400	1,820	326	492
CAL YR 1963: TOTAL	5,033.10			MEAN 13.8		MAX 261	MIN 0	AC-FT 9,980				
WAT YR 1964: TOTAL	14,762.50			MEAN 40.3		MAX 1,040	MIN 0	AC-FT 29,280				

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	86	8.0	3.8	3.6	1.9	1.7	1.5	146	101	118	83	14
2	80	8.0	3.8	3.6	1.9	1.7	4.0	156	105	86	74	12
3	77	8.0	3.8	3.5	1.9	1.7	6.0	153	108	65	63	12
4	60	8.0	3.8	3.5	1.9	1.7	10	149	108	66	52	12
5	45	8.0	3.8	3.5	1.9	1.6	50	149	108	63	47	14
6	35	8.0	3.8	3.5	1.9	1.6	133	277	108	52	42	22
7	33	8.0	3.8	3.5	1.9	1.6	400	528	105	45	33	24
8	30	8.0	3.8	3.5	1.9	1.6	550	372	101	45	30	42
9	28	8.0	3.8	3.5	1.9	1.6	980	306	92	42	24	63
10	26	8.0	3.8	3.5	1.9	1.6	2,150	306	83	40	24	58
11	26	8.0	3.8	3.5	1.9	1.6	2,900	301	74	37	20	58
12	24	8.0	3.8	3.5	1.9	1.6	4,240	233	74	37	18	50
13	22	11	3.8	3.4	1.9	1.6	5,930	201	69	37	18	45
14	22	8.0	3.8	3.2	1.8	1.6	6,620	174	63	37	17	40
15	22	8.0	3.7	3.2	1.8	1.6	5,950	163	58	40	17	33
16	22	8.0	3.7	3.2	1.8	1.5	5,330	149	55	50	17	33
17	20	8.0	3.7	3.2	1.8	1.5	4,410	135	50	52	12	33
18	20	8.0	3.7	3.2	1.8	1.4	2,940	128	47	60	11	33
19	20	8.0	3.7	3.0	1.8	1.4	2,200	118	42	60	9.4	35
20	20	6.8	3.7	3.0	1.8	1.3	900	111	37	63	9.4	37
21	15	6.8	3.7	3.0	1.8	1.2	657	98	35	63	6.8	40
22	12	6.8	3.7	2.8	1.8	1.0	520	95	35	63	6.8	42
23	11	6.8	3.6	2.6	1.8	.80	401	95	30	95	6.8	42
24	11	6.8	3.6	2.4	1.8	.80	340	92	28	69	6.8	42
25	9.4	5.6	3.6	2.4	1.8	.80	277	92	26	77	9.4	42
26	9.4	5.6	3.6	2.2	1.7	.80	277	95	26	118	9.4	40
27	8.0	5.6	3.6	2.2	1.7	1.0	250	95	30	124	8.0	40
28	8.0	5.6	3.6	2.0	1.7	1.0	210	98	66	111	9.4	40
29	8.0	5.6	3.6	1.9	-----	1.2	180	101	95	101	12	42
30	8.0	5.6	3.6	1.9	-----	1.2	149	101	138	95	14	45
31	8.0	-----	3.6	1.9	-----	1.4	-----	101	-----	85	14	-----
TOTAL	825.8	222.6	115.2	92.9	51.4	42.70	48,965.5	5,318	2,095	2,104	724.2	1,085
MEAN	26.6	7.42	3.72	3.00	1.84	1.38	1,632	172	69.8	67.9	23.4	36.2
MAX	86	11	3.8	3.6	1.9	1.7	6,620	528	138	124	83	63
MIN	8.0	5.6	3.6	1.9	1.7	.80	1.5	92	26	37	6.8	12
AC-FT	1,640	442	229	184	102	85	97,120	10,550	4,160	4,170	1,440	2,150
CAL YR 1964: TOTAL	15,879.20			MEAN 43.4		MAX 1,040	MIN 0	AC-FT 31,500				
WAT YR 1965: TOTAL	61,642.30			MEAN 169		MAX 6,620	MIN .80	AC-FT 122,300				

5-0675. Marsh River near Shelly, Minn.

Location.--Lat 47°24'45", long 96°45'50", in NE¼NW¼ sec.3, T.145 N., R.48 W., near center of span on downstream truss of bridge, 3½ miles southeast of Shelly and 10 miles upstream from mouth.

Drainage area.--151 sq mi.

Records available.--March 1944 to September 1965. Monthly discharge only for March 1944, published in WSP 1308.

Gage.--Chain gage read once or twice daily. Datum of gage is 844.14 ft above mean sea level, datum of 1929 (levels by Corps of Engineers).

Average discharge.--21 years, 87.5 cfs (63,350 acre-ft per year).

Extremes.--Maximum and minimum discharges for the water years 1961-65 are contained in the following table:

Water year	Date	Maximum		Date	Minimum	
		Discharge (cfs)	Gage height (feet)		Discharge (cfs)	Gage height (feet)
1961	Mar. 9, 1961	100	a 3.51	Many days	0	-
1962	June 11, 1962	1,240	3.87	do.	0	-
1963	Apr. 8, 1963	274	4.60	do.	0	-
1964	Apr. 22, 1964	450	5.41	do.	0	-
1965	Apr. 13, 1965	3,120	b 16.87	do.	0	-

a Backwater from ice.

b From floodmark, backwater from Red River of the North.

1944-65: Maximum discharge, 4,660 cfs May 11, 1950 (gage height, 18.96 ft, from floodmark); no flow for many days in most years.

Remarks.--Records good except those for winter periods, which are fair. Large part of high flow of Wild Rice River diverted into Marsh River basin at overflow section 3½ miles east of Ada. Another diversion from Wild Rice River, formed 1 mile southeast of Ada, supplemented flow at all stages 1947-51, after which it was closed except for small regulated flow diverted at same point for abatement of pollution from Ada sewage plant effluent.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	0	0	0	0	0	.10	20	20	15	0	0	0
2	0	0	0	0	0	.10	16	18	12	0	0	0
3	0	0	0	0	0	.20	13	16	11	0	0	0
4	0	0	0	0	0	10	12	15	10	0	0	0
5	0	0	0	0	0	20	11	14	7.9	0	0	0
6	0	0	0	0	0	35	12	14	6.6	0	0	0
7	0	0	0	0	0	40	9.0	15	5.9	0	0	0
8	0	0	0	0	0	65	9.0	21	5.0	0	0	0
9	0	.10	0	0	0	85	8.5	24	4.0	0	0	0
10	0	.10	0	0	0	70	7.9	27	3.1	0	0	.20
11	0	.10	0	0	0	50	7.7	26	2.4	0	0	.10
12	0	.10	0	0	0	45	7.1	23	2.0	0	0	0
13	0	.20	0	0	0	42	6.9	22	1.7	0	0	.10
14	0	.20	0	0	0	40	6.9	20	1.2	0	0	0
15	0	.20	0	0	0	40	6.6	21	.90	0	0	0
16	0	.20	0	0	0	36	6.0	22	.90	0	0	0
17	0	.20	0	0	0	36	5.4	28	.50	0	0	0
18	0	.20	0	0	0	35	8.4	37	.30	0	0	0
19	0	.20	0	0	0	34	9.0	38	.20	0	0	0
20	0	.20	0	0	0	34	12	39	.10	0	0	0
21	0	.20	0	0	0	40	13	43	.10	0	0	0
22	0	.20	0	0	0	45	15	40	.10	0	0	0
23	0	.20	0	0	0	43	17	37	0	0	0	0
24	0	.20	0	0	0	39	17	34	0	0	0	0
25	0	.20	0	0	0	43	16	30	0	0	0	0
26	0	.20	0	0	0	46	20	28	0	0	0	0
27	0	.10	0	0	0	38	23	25	0	0	0	0
28	0	.10	0	0	0	29	25	22	0	0	0	0
29	0	.10	0	0	0	22	25	20	0	0	0	0
30	0	0	0	0	0	21	22	18	0	0	0	0
31	0	-----	0	0	0	20	-----	17	-----	0	0	-----
TOTAL	0	3.50	0	0	0	1,103.40	387.4	774	90.90	0	0	0.40
MEAN	0	.12	0	0	0	35.6	12.9	25.0	3.03	0	0	.013
MAX	0	.20	0	0	0	85	25	43	15	0	0	.20
MIN	0	0	0	0	0	.10	5.4	14	0	0	0	0
AC-FT	0	6.9	0	0	0	2,190	768	1,540	180	0	0	.8

CAL YR 1960: TOTAL 5,080.40 MEAN 13.9 MAX 477 MIN 0 AC-FT 10,080

WAT YR 1961: TOTAL 2,359.60 MEAN 6.46 MAX 85 MIN 0 AC-FT 4,680

5-0675, Marsh River near Shelly, Minn.--Continued

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	0	0	0	0	0	0	5.0	18	397	15	13	.60
2	0	0	0	0	0	0	3.0	15	333	13	11	.60
3	0	0	0	0	0	0	15	14	254	17	10	.50
4	0	0	0	0	0	0	30	13	210	78	10	.50
5	0	0	0	0	0	0	80	12	164	425	14	.70
6	0	0	0	0	0	0	140	11	135	482	16	.70
7	0	0	0	0	0	0	115	10	111	570	14	1.0
8	0	0	0	0	0	0	50	10	140	1,010	10	1.6
9	0	0	0	0	0	0	40	9.3	482	1,130	8.0	1.1
10	0	0	0	0	0	0	45	8.1	952	974	6.8	2.1
11	0	0	0	0	0	0	65	8.1	1,190	558	7.3	4.2
12	.90	0	0	0	0	0	95	7.5	1,200	457	7.7	4.0
13	1.4	0	0	0	0	0	105	8.1	1,020	384	12	3.6
14	1.8	0	0	0	0	0	110	9.5	751	344	18	3.0
15	1.6	0	0	0	0	0	105	15	511	315	17	2.6
16	1.4	0	0	0	0	0	175	35	359	29	23	2.4
17	1.2	0	0	0	0	0	260	69	342	259	18	2.3
18	1.0	0	0	0	0	0	380	111	467	210	13	2.6
19	.90	0	0	0	0	0	280	151	442	166	8.8	1.6
20	.60	0	0	0	0	0	228	191	316	119	7.0	1.5
21	.40	0	0	0	0	0	165	235	.213	80	5.4	1.4
22	.40	0	0	0	0	0	113	268	137	58	4.6	1.2
23	.20	0	0	0	0	0	78	461	64	49	3.3	1.1
24	.10	0	0	0	0	0	58	782	55	38	2.5	1.0
25	.10	0	0	0	0	0	48	830	45	27	2.2	.80
26	0	0	0	0	0	0	41	730	35	26	2.0	.60
27	0	0	0	0	0	0	37	596	28	25	1.6	.50
28	0	0	0	0	0	0	28	485	23	24	1.6	.50
29	0	0	0	0	-----	-----	23	391	20	20	1.4	.40
30	0	0	0	0	-----	-----	19	330	16	16	1.6	.40
31	0	-----	0	0	-----	-----	8.0	-----	320	-----	14	.60
TOTAL	12.00	0	0	0	0	8.0	2,936.0	6,153.6	10,412	8,194	271.20	45.10
MEAN	.39	0	0	0	0	.26	97.9	199	347	264	8.75	1.50
MAX	1.8	0	0	0	0	8.0	380	830	1,200	1,130	23	4.2
MIN	0	0	0	0	0	0	3.0	7.5	16	13	.60	.40
AC-FT	24	0	0	0	0	16	5,820	12,210	20,650	16,250	538	89

CAL YR 1961: TOTAL 2,368.10 MEAN 6.49 MAX 85 MIN 0 AC-FT 4,700

WAT YR 1962: TOTAL 28,031.90 MEAN 76.8 MAX 1,200 MIN 0 AC-FT 55,600

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	.40	.60	2.8	.20	0	0	34	11	109	2.2	0	0
2	.40	.70	2.6	.20	0	0	27	9.5	128	1.8	0	0
3	.40	.80	2.4	.20	0	0	22	9.0	131	1.5	0	0
4	.40	1.0	2.6	.20	0	0	13	8.8	109	1.5	0	0
5	.50	.90	2.1	.10	0	0	16	7.9	92	1.2	0	0
6	.60	.90	1.6	.10	0	0	21	7.5	77	.90	0	0
7	.80	.90	1.2	.10	0	0	150	6.8	59	.80	0	0
8	.80	1.2	1.0	.10	0	0	233	6.4	38	.70	0	0
9	.70	1.1	.90	.50	0	0	137	6.2	26	.40	0	0
10	.90	1.1	.60	1.0	0	0	75	7.7	23	.20	0	0
11	.80	1.5	.50	.80	0	.20	46	7.7	20	.20	0	0
12	.70	2.1	.40	.60	0	.60	30	7.9	18	.40	0	0
13	.60	2.6	.40	.40	0	.20	23	7.7	16	.40	0	0
14	.70	3.3	.40	.20	0	.50	17	8.4	14	.20	0	0
15	.70	2.5	.20	.10	0	3.0	15	8.8	13	.20	0	0
16	.40	1.6	.20	0	0	10	13	9.5	12	.20	0	0
17	.60	2.1	.20	0	0	9.0	13	10	10	.20	0	0
18	.90	1.7	.10	0	0	6.0	13	12	8.6	.30	0	0
19	.60	1.7	.10	0	0	7.0	12	12	7.5	.20	0	0
20	.70	1.8	.10	0	0	15	11	12	5.8	.10	0	0
21	.90	1.0	.10	0	0	30	10	10	5.8	.10	0	0
22	.80	.90	.10	0	0	45	9.3	11	5.8	.10	0	0
23	.70	.70	.10	0	0	35	8.4	9.0	6.8	0	0	0
24	.80	1.9	.10	0	0	55	7.7	7.9	3.3	0	0	0
25	.90	1.6	.20	0	0	80	7.3	5.4	10	0	0	0
26	.90	1.5	.20	0	0	75	7.0	5.2	10	0	0	0
27	.90	2.5	.20	0	0	60	8.1	8.6	8.0	0	0	0
28	.90	2.6	.30	0	0	60	9.0	19	7.5	0	0	0
29	.80	2.5	.20	0	-----	55	10	23	6.0	0	0	0
30	.60	2.6	.10	0	-----	51	12	32	3.5	0	0	0
31	.50	-----	.10	0	-----	42	-----	51	-----	0	0	-----
TOTAL	21.30	47.90	22.10	4.80	0	639.50	1,005.8	358.9	981.6	13.80	0	0
MEAN	.69	1.60	.71	.15	0	20.6	33.7	11.6	32.7	.45	0	0
MAX	.90	3.3	2.8	1.0	0	80	233	51	131	2.2	0	0
MIN	.40	.60	.10	0	0	0	7.0	5.2	3.3	0	0	0
AC-FT	42	95	44	9.5	0	1,270	2,000	712	1,950	27	0	0

CAL YR 1962: TOTAL 28,111.20 MEAN 77.0 MAX 1,200 MIN 0 AC-FT 55,760

WAT YR 1963: TOTAL 3,099.70 MEAN 8.49 MAX 233 MIN 0 AC-FT 6,150

## 5-0675. Marsh River near Shelly, Minn.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	0	0	0	0	0	0	0	19	.30	13	0	.40
2	0	0	0	0	0	0	0	16	.20	11	0	.90
3	0	0	0	0	0	0	0	16	.20	9.3	0	.30
4	0	0	0	0	0	0	.20	17	0	6.7	0	0
5	0	0	0	0	0	0	1.0	24	0	3.9	0	0
6	0	0	0	0	0	0	3.0	217	.20	4.5	0	0
7	0	0	0	0	0	0	5.0	146	.50	4.7	0	0
8	0	0	0	0	0	0	5.5	62	.60	3.7	0	0
9	0	0	0	0	0	0	7.0	41	4.0	4.3	0	0
10	0	0	0	0	0	0	12	31	1.4	5.3	0	0
11	0	0	0	0	0	0	53	23	2.5	3.3	0	0
12	0	0	0	0	0	0	102	18	3.3	7.0	0	0
13	0	0	0	0	0	0	158	15	1.4	5.3	0	0
14	0	0	0	0	0	0	128	12	2.5	3.7	0	0
15	0	0	0	0	0	0	90	9.8	7.7	2.5	0	0
16	0	0	0	0	0	0	228	8.4	6.4	1.8	0	0
17	0	0	0	0	0	0	343	8.0	6.0	1.0	0	0
18	0	0	0	0	0	0	228	6.2	9.0	.90	0	0
19	0	0	0	0	0	0	169	4.9	14	.90	0	0
20	0	0	0	0	0	0	130	4.0	50	.90	0	0
21	0	0	0	0	0	0	109	3.6	62	1.0	0	0
22	0	0	0	0	0	0	370	3.2	86	1.1	0	0
23	0	0	0	0	0	0	393	3.0	74	.90	0	0
24	0	0	0	0	0	0	245	2.5	57	.70	0	0
25	0	0	0	0	0	0	120	2.2	44	.50	0	0
26	0	0	0	0	0	0	72	1.5	35	.50	0	.50
27	0	0	0	0	0	0	48	1.2	30	.60	.40	1.6
28	0	0	0	0	0	0	34	1.0	24	.80	1.0	.90
29	0	0	0	0	0	0	25	.80	20	.70	.40	.40
30	0	0	0	0	0	0	22	.60	16	.70	.10	0
31	0	-----	0	0	-----	0	-----	.30	-----	0	0	-----
TOTAL	0	0	0	0	0	0	3,100.70	718.20	558.20	101.20	1.90	5.00
MEAN	0	0	0	0	0	0	103	23.2	18.6	3.26	.061	.17
MAX	0	0	0	0	0	0	393	217	86	1.0	1.0	1.6
MIN	0	0	0	0	0	0	0	.30	0	0	0	0
AC-FT	0	0	0	0	0	0	6,150	1,420	1,110	201	3.8	9.9

CAL YR 1963: TOTAL 3,008.40

WAT YR 1964: TOTAL 4,485.20

MEAN 8.24

MEAN 12.3

MAX 233

MAX 393

MIN 0

MIN 0

AC-FT 5,970

AC-FT 8,900

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	0	.10	0	0	0	0	0	25	23	23	2.2	.80
2	0	.30	0	0	0	0	0	25	39	19	1.4	.80
3	.30	.20	0	0	0	0	.20	25	58	16	1.2	.60
4	.50	.10	0	0	0	0	.50	26	65	11	1.1	.60
5	.60	0	0	0	0	0	2.0	26	70	9.5	.70	.40
6	.70	0	0	0	0	0	9.0	22	79	8.2	3.7	.20
7	.30	0	0	0	0	0	68	16	67	7.0	25	.10
8	0	0	0	0	0	0	315	19	60	6.4	20	.70
9	0	0	0	0	0	0	920	19	66	5.5	14	.70
10	0	0	0	0	0	0	1,350	21	57	4.9	10	.70
11	0	.20	0	0	0	0	1,890	27	47	4.6	7.2	.70
12	0	.40	0	0	0	0	2,460	27	39	5.6	5.3	.60
13	0	.30	0	0	0	0	2,950	26	34	56	4.0	.30
14	0	.40	0	0	0	0	2,350	24	28	105	3.3	1.2
15	0	.60	0	0	0	0	1,720	29	22	82	2.8	1.7
16	0	.30	0	0	0	0	1,110	50	21	48	2.0	2.5
17	0	.30	0	0	0	0	480	43	14	31	1.0	3.0
18	0	.20	0	0	0	0	350	31	10	38	.70	3.3
19	0	.20	0	0	0	0	265	27	9.3	35	.60	4.7
20	0	.10	0	0	0	0	215	29	8.6	28	.50	3.7
21	0	0	0	0	0	0	170	26	8.0	22	.20	4.0
22	0	0	0	0	0	0	14	24	7.0	13	0	4.7
23	0	0	0	0	0	0	107	24	6.0	14	0	5.8
24	0	0	0	0	0	0	78	22	5.3	12	.20	6.7
25	0	0	0	0	0	0	62	24	5.0	10	.70	8.4
26	0	0	0	0	0	0	50	24	4.7	8.4	.90	8.0
27	0	0	0	0	0	0	42	24	5.0	6.4	.90	7.8
28	0	0	0	0	0	0	36	25	6.5	5.3	.60	8.7
29	0	0	0	0	0	0	31	25	11	4.7	.70	8.4
30	0	0	0	0	0	0	27	26	15	3.7	1.1	23
31	0	-----	0	0	-----	0	-----	22	-----	3.3	.60	-----
TOTAL	2.40	3.70	0	0	0	0	17,197.70	803	890.4	650.6	112.60	112.80
MEAN	.077	.12	0	0	0	0	573	25.9	29.7	21.0	3.63	3.76
MAX	.70	.60	0	0	0	0	2,950	50	79	105	25	23
MIN	0	0	0	0	0	0	0	16	4.7	3.3	0	.10
AC-FT	4.8	7.3	0	0	0	0	34,110	1,590	1,770	1,290	223	224

CAL YR 1964: TOTAL 4,491.30

WAT YR 1965: TOTAL 19,773.20

MEAN 12.3

MEAN 34.2

MAX 393

MAX 2,950

MIN 0

MIN 0

AC-FT 8,910

AC-FT 39,220

5-0690. Sandhill River at Climax, Minn.

Location (revised).--Lat 47°36'03", long 96°47'35", in SE 1/4 sec. 29, T.148 N., R.48 W., near center of span on upstream side of highway bridge, 1 mile southeast of Climax and 6.9 miles upstream from mouth. Records above about 1,500 cfs include flow from three tributaries located 1.3, 2.0, and 2.4 miles downstream.

Drainage area.--405 sq mi, approximately.

Records available.--March 1943 to September 1965 (winter records incomplete in some years). Monthly discharge only for some periods, published in WSP 1308 and 1728.

Gage.--Chain gage read once daily. Datum of gage is 833.69 ft above mean sea level, adjustment of 1912 (levels by Corps of Engineers).

Average discharge.--19 years (1946-65), 59.9 cfs (43,370 acre-ft per year).

Extremes.--Maximum and minimum discharges for the water years 1961-65 are contained in the following table:

Water year	Date	Maximum		Date	Minimum	
		Discharge (cfs)	Gage height (feet)		Discharge (cfs)	Gage height (feet)
1961	Mar. 25, 1961	140	a 4.86	Sept. 5, 1961	4.1	0.46
1962	July 8, 1962	1,570	b 11.70	Jan. 17, 18, 1962	c 1.0	d .80
1963	Apr. 7, 1963	300	e 6.34	Mar. 3, 4, 1963	c 3.0	f .92
1964	Apr. 17, 1964	730	b 9.40	Dec. 9, 10, 1963	c 3.6	g .92
1965	Apr. 14, 1965	4,560	b 17.81	Feb. 22-26, 1965	c 8.0	h 1.31

a Backwater from ice.

b From floodmark.

c Minimum daily.

d Occurred Oct. 1, 1961.

e Maximum gage height for year, 7.26 ft Mar. 25, 1963 (from floodmark), backwater from ice.

f Occurred Sept. 26, 1963.

g Occurred Oct. 4, 1965.

h Occurred Sept. 3, 1965.

1943-65: Maximum discharge, 4,560 cfs Apr. 14, 1965 (gage height, 17.81 ft, from floodmark); minimum not determined.

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

Revisions (water years).--WSP 1388: 1943(M), 1944, 1947(M). WSP 1728: 1951(M), 1960 (average discharge).

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	9.8	28	10	6.4	6.8	20	80	56	19	9.4	8.5	4.9
2	9.8	27	10	6.4	6.8	25	55	49	19	9.4	8.2	4.9
3	8.8	21	12	6.4	6.8	30	40	47	20	9.0	7.8	4.3
4	8.8	20	12	6.4	6.8	45	50	44	21	9.0	7.5	4.3
5	8.3	21	11	6.4	6.8	45	45	39	19	8.5	6.9	4.1
6	8.8	23	11	6.6	6.6	40	60	44	19	8.8	6.6	4.3
7	8.8	17	11	6.6	6.6	40	55	61	18	8.5	6.6	4.6
8	8.3	16	10	6.6	6.4	42	35	52	17	7.5	6.3	4.9
9	8.8	10	10	6.4	6.4	40	38	48	17	6.9	6.6	5.2
10	9.6	12	9.5	6.4	6.4	38	40	46	16	9.6	6.0	5.2
11	9.0	16	9.5	6.4	6.4	36	48	46	15	9.2	6.6	17
12	10	16	9.0	6.4	6.4	50	26	47	14	11	6.3	20
13	11	15	9.0	6.6	6.2	64	27	45	13	13	6.0	16
14	11	16	8.5	6.6	6.2	65	36	45	13	15	5.4	12
15	11	16	8.5	6.6	6.0	65	26	47	11	15	5.4	11
16	10	15	8.0	6.6	6.0	60	35	49	10	13	5.2	10
17	11	15	8.0	6.8	5.8	65	61	47	10	12	6.0	10
18	12	14	7.5	6.8	5.8	70	45	53	10	10	6.9	11
19	10	12	7.5	6.8	5.6	70	57	52	9.3	9.2	6.6	12
20	9.3	18	7.0	6.8	5.6	75	52	50	9.8	9.2	6.3	15
21	11	16	7.0	7.0	5.6	85	53	46	10	9.9	6.0	11
22	14	16	6.5	7.0	5.4	86	57	43	12	12	6.0	22
23	13	16	6.4	7.0	5.4	88	62	34	11	12	6.3	15
24	14	16	6.4	7.0	5.4	110	74	33	10	12	6.0	13
25	16	15	6.4	7.0	5.6	125	80	29	10	12	6.0	12
26	12	15	6.4	7.0	10	110	81	27	9.7	9.9	6.0	9.9
27	13	14	6.2	7.0	20	95	75	24	9.7	9.6	5.7	8.8
28	13	8.0	6.2	7.0	20	90	67	23	9.4	8.8	5.4	7.8
29	16	12	6.4	7.0	-----	70	64	23	9.0	9.2	5.7	7.2
30	21	11	6.4	7.0	-----	65	61	22	9.4	8.8	5.4	7.5
31	29	-----	6.4	7.0	-----	85	-----	21	-----	8.5	5.2	-----
TOTAL	366.1	487.0	259.7	208.0	203.8	1,994	1,585	1,292	400.3	315.9	195.4	294.9
MEAN	11.8	16.2	8.38	6.71	7.28	64.3	52.8	41.7	13.3	10.2	6.30	9.83
MAX	29	28	12	7.0	20	125	81	61	21	15	8.5	22
MIN	8.3	8.0	6.2	6.4	5.4	20	26	21	9.0	6.9	5.2	4.1
AC-FT	726	966	515	413	404	3,960	3,140	2,560	794	627	388	585

CAL YR 1960: TOTAL 11,992.4 MEAN 32.8 MAX 440 MIN 6.2 AC-FT 23,790

WAT YR 1961: TOTAL 7,602.1 MEAN 20.8 MAX 125 MIN 4.1 AC-FT 15,080

5-0690. Sandhill River at Climax, Minn.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	7.8	11	10	3.5	2.0	4.8	14	76	257	98	81	30
2	8.0	12	9.5	3.5	2.0	4.8	16	73	231	86	81	30
3	8.3	9.9	10	3.5	2.0	4.8	35	63	176	87	102	29
4	8.5	12	10	3.5	2.5	4.8	90	57	179	137	89	30
5	8.5	13	9.0	3.0	2.5	4.8	180	54	181	144	110	28
6	9.2	14	9.0	3.0	2.5	5.0	250	47	168	145	90	27
7	9.2	12	8.5	2.5	2.5	5.0	220	44	168	675	90	28
8	9.4	13	8.5	2.5	2.5	5.2	110	40	218	1,310	92	31
9	9.9	12	8.0	2.0	2.5	5.2	100	41	461	751	72	57
10	10	13	8.0	1.5	2.5	5.2	180	38	490	647	61	68
11	38	14	7.5	1.5	2.5	5.2	220	39	526	582	57	64
12	47	16	7.5	1.1	2.5	5.4	260	51	576	540	61	57
13	48	15	7.0	1.1	2.5	5.4	210	53	615	522	59	51
14	40	14	6.5	1.1	2.5	5.4	230	67	523	514	60	47
15	38	14	6.4	1.1	2.5	5.4	300	74	455	430	56	46
16	31	14	6.2	1.1	3.5	5.4	600	107	420	343	55	46
17	27	12	6.0	1.0	4.5	5.2	618	383	402	282	53	51
18	22	12	5.5	1.0	5.0	5.2	647	326	382	234	52	53
19	16	12	5.5	1.5	5.1	5.0	579	240	328	205	50	55
20	15	12	5.5	1.5	5.1	5.0	526	300	280	177	49	58
21	13	12	5.0	2.0	5.2	5.0	482	276	251	156	48	66
22	9.7	13	5.0	2.0	5.2	5.5	373	368	235	140	46	62
23	6.9	13	5.0	2.0	5.2	7.3	352	541	220	135	45	60
24	16	12	5.0	2.0	5.0	7.5	301	845	201	127	42	57
25	8.2	12	4.5	2.0	5.0	8.0	220	657	210	120	41	51
26	8.8	12	4.5	2.0	5.0	8.0	121	535	168	118	39	47
27	9.9	12	4.5	2.0	4.8	8.5	102	492	132	117	38	46
28	13	11	4.5	2.0	4.8	9.0	96	382	107	113	40	41
29	12	10	4.0	2.0	-----	9.5	95	331	108	112	39	43
30	12	10	4.0	2.0	-----	10	-----	84	110	100	34	45
31	12	-----	4.0	2.0	-----	12	-----	293	-----	90	30	-----
TOTAL	532.3	373.9	204.1	62.5	99.4	192.5	7,611	7,207	8,778	9,237	1,862	1,404
MEAN	17.2	12.5	6.58	2.02	3.55	6.21	254	232	293	298	60.1	46.8
MAX	48	16	10	3.5	5.2	12	647	845	615	1,310	110	68
MIN	6.9	9.9	4.0	1.0	2.0	4.8	14	38	107	86	30	27
AC-FT	1,060	742	405	124	197	382	15,100	14,290	17,410	18,320	3,690	2,780

CAL YR 1961: TOTAL 7,599.6 MEAN 20.8 MAX 125 MIN 4.0

WAT YR 1962: TOTAL 37,563.7 MEAN 103 MAX 1,310 MIN 1.0

AC-FT 15,070

AC-FT 74,510

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	44	25	26	16	4.8	3.4	105	51	76	33	16	14
2	41	25	26	16	4.8	3.2	100	55	81	30	15	13
3	39	24	24	16	4.8	3.0	95	52	88	28	15	12
4	41	25	20	16	5.0	3.0	100	51	85	26	15	12
5	40	28	20	16	5.5	8.0	110	46	79	26	14	12
6	39	32	14	17	6.0	10	155	46	72	25	13	11
7	38	33	26	17	6.0	9.5	265	46	65	24	12	11
8	42	35	24	17	6.0	9.0	210	46	63	22	12	11
9	46	35	20	15	6.0	9.0	180	47	56	20	12	11
10	40	37	16	15	5.5	8.5	125	45	88	22	12	10
11	38	38	14	12	5.5	12	108	46	81	40	11	10
12	38	42	12	8.0	5.5	18	98	45	72	137	12	11
13	38	45	14	8.0	5.5	16	90	44	61	102	11	11
14	37	38	14	7.5	5.0	22	84	46	57	69	11	12
15	38	24	15	7.5	5.0	26	82	46	53	51	11	11
16	37	30	15	7.0	5.0	32	80	47	52	37	11	10
17	37	38	16	7.0	5.5	30	75	46	49	54	11	10
18	37	40	16	6.0	5.5	36	70	53	46	40	11	10
19	36	38	16	5.0	5.5	34	63	52	46	29	11	10
20	36	36	16	5.0	5.0	32	63	51	44	25	11	9.5
21	38	30	16	4.8	5.0	30	63	49	41	22	10	10
22	34	22	16	4.8	4.5	35	63	49	38	20	10	10
23	32	25	16	4.8	4.0	40	59	45	39	19	9.5	9.5
24	32	36	16	4.8	3.5	75	56	43	40	18	10	9.5
25	29	34	16	4.8	3.5	94	57	42	42	16	9.5	10
26	30	36	16	4.8	3.5	82	57	43	42	15	10	9.1
27	35	16	4.8	3.2	80	54	45	46	16	12	9.5	9.5
28	29	30	16	4.8	3.4	85	55	40	47	19	12	9.5
29	29	27	16	4.8	-----	100	54	39	41	18	12	10
30	27	28	16	4.8	-----	105	55	40	36	16	17	9.5
31	27	-----	16	4.8	-----	110	-----	69	-----	16	15	-----
TOTAL	1,116	971	540	286.8	138.2	1,160.6	2,831	1,462	1,725	1,035	374.0	318.1
MEAN	36.0	32.4	17.4	9.25	4.94	37.4	94.4	47.2	57.5	33.4	12.1	10.6
MAX	44	45	26	17	6.0	110	265	69	88	137	17	14
MIN	27	22	12	4.8	3.4	3.0	54	39	36	15	9.5	9.1
AC-FT	2,210	1,930	1,070	569	274	2,300	5,620	2,900	3,420	2,050	742	631

CAL YR 1962: TOTAL 39,080.4 MEAN 107 MAX 1,310 MIN 1.0

WAT YR 1963: TOTAL 11,957.7 MEAN 32.8 MAX 265 MIN 3.0

AC-FT 77,510

AC-FT 23,720

## RED RIVER OF THE NORTH BASIN

5-0690. Sandhill River at Climax, Minn.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	9.5	11	6.5	6.0	7.6	11	14	160	26	51	20	107
2	10	11	6.0	6.0	7.8	11	18	141	23	147	18	76
3	9.5	12	6.0	6.0	8.2	11	25	132	23	44	18	46
4	9.1	11	6.0	6.0	8.2	11	30	119	22	39	16	29
5	9.3	12	5.5	6.2	8.4	11	50	133	24	36	16	23
6	9.5	12	5.5	6.2	8.6	11	70	262	24	37	15	24
7	9.8	12	5.0	6.2	8.6	11	80	219	23	41	15	24
8	9.8	11	4.0	6.2	8.8	12	90	168	25	45	15	25
9	10	11	3.6	6.2	9.2	12	100	119	30	47	14	27
10	10	11	3.6	6.4	9.2	12	140	114	41	430	14	27
11	10	10	4.0	6.4	9.5	12	190	114	38	415	14	30
12	9.5	8.9	4.5	6.4	10	12	210	100	49	212	15	29
13	10	8.9	4.5	6.6	10	12	212	102	54	97	15	31
14	10	9.0	4.6	6.6	10	12	213	93	80	75	14	27
15	10	9.0	4.6	6.6	10	12	333	75	49	49	14	26
16	11	8.0	4.6	6.6	10	12	573	64	39	38	14	27
17	12	8.0	4.6	6.6	10	12	477	62	38	32	14	21
18	11	8.0	4.6	6.8	10	12	302	59	46	29	13	20
19	12	7.5	5.0	6.8	10	12	282	57	77	28	13	20
20	12	7.5	5.0	6.8	10	12	348	52	80	37	13	18
21	12	7.0	5.0	6.8	10	12	480	49	69	35	17	19
22	12	6.5	5.2	6.8	10	12	547	45	63	33	17	22
23	12	7.0	5.2	7.0	10	12	364	43	62	28	16	36
24	12	7.0	5.2	7.0	10	12	296	39	68	27	17	32
25	12	7.0	5.4	7.0	10	12	273	38	70	24	17	31
26	12	7.0	5.4	7.0	11	12	239	37	66	21	17	46
27	12	6.5	5.6	7.0	11	12	230	34	64	21	17	63
28	12	6.5	5.8	7.0	11	12	224	34	61	23	18	55
29	12	6.5	5.8	7.0	11	12	204	34	59	25	17	40
30	11	6.5	6.0	7.0	-----	12	173	29	56	24	19	39
31	11	-----	6.0	7.3	-----	12	-----	27	-----	22	73	-----
TOTAL	334.0	266.3	158.3	204.5	278.1	365	6,787	2,754	1,444	2,112	547	1,036
MEAN	10.8	8.88	5.11	6.60	9.59	11.8	226	88.8	48.3	68.0	17.6	34.5
MAX	12	12	6.5	7.3	12	573	262	262	60	410	73	107
MIN	9.1	6.5	3.6	6.0	7.6	11	14	27	22	21	13	18
AC-FT	662	528	314	406	552	724	13,460	5,460	2,870	4,190	1,080	2,050

CAL YR 1963: TOTAL 10,089.3

MEAN 27.6

MAX 265

MIN 3.0

AC-FT 20,010

WAT YR 1964: TOTAL 16,291.2

MEAN 44.5

MAX 573

MIN 3.6

AC-FT 32,310

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	35	19	13	12	8.8	8.2	22	181	122	81	34	21
2	32	20	13	12	8.6	8.3	29	172	136	77	32	20
3	34	19	12	12	8.5	8.4	52	174	276	70	29	19
4	38	19	12	12	8.6	8.4	90	163	223	64	27	20
5	36	18	12	12	8.8	8.6	140	156	150	60	29	24
6	34	18	12	12	8.8	9.2	200	160	134	54	38	26
7	32	18	12	12	8.7	9.8	316	139	153	52	38	22
8	30	18	12	11	8.5	10	436	132	215	50	29	22
9	30	18	12	11	8.4	10	475	128	201	43	25	22
10	28	19	12	11	8.4	10	620	132	163	41	22	21
11	27	24	12	11	8.3	10	1,200	132	138	40	22	20
12	26	33	12	11	8.2	10	2,590	121	124	38	22	21
13	26	30	12	11	8.2	11	3,200	118	120	90	21	23
14	23	27	12	11	8.2	11	4,360	116	120	106	20	24
15	22	25	11	11	8.2	12	3,700	134	119	85	20	26
16	23	23	11	11	8.2	12	2,290	160	117	67	23	27
17	24	24	11	11	8.3	11	1,370	154	106	58	28	30
18	22	22	11	11	8.4	11	1,050	153	100	50	30	34
19	22	19	11	11	8.5	11	882	143	89	45	29	32
20	20	14	11	11	8.4	11	771	134	89	44	26	29
21	19	16	11	11	8.2	10	676	131	84	45	25	27
22	20	18	11	11	8.0	10	600	132	81	46	22	30
23	19	18	11	10	8.0	10	462	124	75	51	21	40
24	20	18	11	10	8.0	10	442	123	72	53	22	46
25	19	17	11	10	8.0	10	392	120	67	51	23	44
26	18	17	11	9.8	8.0	10	276	115	63	48	22	44
27	18	16	11	9.5	8.2	11	242	115	92	43	22	43
28	19	15	11	9.3	8.2	12	220	114	144	39	20	43
29	18	14	11	9.1	-----	13	205	110	116	36	21	49
30	18	13	11	9.0	-----	14	194	108	92	38	24	71
31	18	-----	11	8.8	-----	17	-----	108	-----	37	22	-----
TOTAL	770	589	357	334.5	233.6	327.9	27,502	4,202	3,781	1,702	788	920
MEAN	24.8	19.6	11.5	10.8	8.34	10.6	917	136	126	54.9	25.4	30.7
MAX	38	33	13	12	8.8	17	4,360	181	276	106	38	71
MIN	18	13	8.1	8.0	8.2	10	600	108	63	36	20	19
AC-FT	1,530	1,170	708	663	463	650	54,550	8,330	7,500	3,380	1,560	1,820

CAL YR 1964: TOTAL 17,246.6

MEAN 47.1

MAX 573

MIN 6.0

AC-FT 34,210

WAT YR 1965: TOTAL 41,507.0

MEAN 114

MAX 4,360

MIN 8.0

AC-FT 82,330

5-0740. Lower Red Lake near Red Lake, Minn.

Location.--Lat 47°57', long 95°17', in NW $\frac{1}{4}$  sec.28, T.152 N., R.36 W., on left bank just upstream from dam at outlet, 13 miles northwest of village of Red Lake.

Drainage area.--1,950 sq mi, approximately.

Records available.--June 1930 to November 1932 (published as Red Lake at Redby), May 1933 to September 1965 (published as Red Lake near Red Lake 1933-40); records on Upper Red Lake published as Red Lake at Waskish, April 1930 to September 1933, all in reports of Geological Survey. October 1921 to September 1929, gage heights at Redby and on Upper Red Lake at Waskish in files of Minnesota Department of Conservation (fragmentary).

Gage.--Water-stage recorder. Datum of gage is 1,169.00 ft above mean sea level, adjustment of 1912 (levels by Corps of Engineers). May 1933 to Sept. 6, 1934, staff gage at same site and datum. Staff gages at Waskish and Redby at datum 69.00 ft lower.

Extremes.--Maximum and minimum gage heights, in feet, for the water years 1961-65 are contained in the following table:

Water year	Maximum		Minimum	
	Date	Gage height	Date	Gage height
1961	May 25, 1961.....	5.83	Sept. 3, 1961.....	3.60
1962	July 10, 1962.....	7.52	Nov. 4, 1961.....	3.46
1963	Oct. 1, 1962.....	6.70	Sept. 29, 1963.....	4.69
1964	Sept. 26, 1964.....	6.33	Oct. 25, 1963.....	4.00
1965	June 27, 1965.....	6.73	Nov. 22, 1964.....	3.04

1930-65: Maximum gage height, 9.53 ft June 25, 1950; minimum recorded, 0.80 ft Nov. 20, 1936.

Remarks.--Water level subject to fluctuation caused by change in direction and velocity of wind and by seiches. Records of chemical analyses for the water years 1962 and 1964-65 are published in reports of the Geological Survey.

Month-end gage height, in feet, water years October 1960 to September 1965

Oct. 31, 1960..... 4.40	Jan. 31, 1962..... 4.56	Apr. 30, 1963..... 5.75	July 31, 1964..... 5.28
Nov. 30..... 4.41	Feb. 28..... 4.67	May 31..... 5.91	Aug. 31..... 5.17
Dec. 19..... 4.50	Mar. 31..... 4.70	June 30..... 5.99	Sept. 30..... 5.44
Jan. 31, 1961..... 4.55	Apr. 30..... 5.04	July 31..... 5.80	Oct. 31..... 5.14
Feb. 28..... 4.56	May 31..... 6.49	Aug. 31..... 5.36	Nov. 30..... 4.99
Mar. 31..... 4.62	June 30..... 6.81	Sept. 30..... 4.80	Dec. 31..... 4.90
Apr. 30..... 4.98	July 31..... 6.81	Oct. 31..... 4.49	Jan. 31, 1965..... 4.78
May 31..... 5.27	Aug. 31..... 6.98	Nov. 30..... 4.39	Feb. 28..... 4.71
June 30..... 4.91	Sept. 30..... 6.70	Dec. 31..... 4.38	Mar. 31..... 4.71
July 31..... 4.77	Oct. 31..... 6.23	Jan. 31, 1964..... 4.26	Apr. 30..... 5.39
Aug. 31..... 4.55	Nov. 30..... 6.06	Feb. 29..... 4.25	May 31..... 6.05
Sept. 30..... 4.43	Dec. 31..... 5.95	Mar. 31..... 4.30	June 30..... 6.28
Oct. 31..... 4.29	Jan. 31, 1963..... 5.74	Apr. 30..... 4.92	July 31..... 5.82
Dec. 1..... 4.46	Feb. 28..... 5.60	May 31..... 5.11	Aug. 31..... 5.24
31..... 4.47	Mar. 31..... 5.62	June 30..... 5.59	Sept. 30..... 5.39

Note.--Mean daily gage heights are available.

5-0745. Red Lake River near Red Lake, Minn.

Location.--Lat 47°57', long 95°17', in NW $\frac{1}{4}$  sec.28, T.152 N., R.36 W., on left bank 50 ft downstream from dam at outlet of Lower Red Lake and 13 miles northwest of village of Red Lake.

Drainage area.--1,950 sq mi, approximately.

Records available.--May 1933 to September 1965. Monthly discharge only for May 1933, published in WSP 1308.

Gage.--Water-stage recorder. Datum of gage is 1,167.00 ft above mean sea level, adjustment of 1912 (levels by Corps of Engineers). Prior to Sept. 7, 1934, staff gage at site 50 ft upstream at datum 2.00 ft higher. Sept. 7, 1934, to Nov. 26, 1951, water-stage recorder at present site at datum 2.00 ft higher.

Average discharge.--32 years, 404 cfs (292,500 acre-ft per year).

Extremes.--Maximum and minimum discharges for the water years 1961-65 are contained in the following table:

Water year	Maximum daily			Minimum		
	Date	Discharge (cfs)	Gage height (feet)	Date	Discharge (cfs)	Gage height (feet)
1961	June 24-25, 1961	240	-	June 7-15, 1961	a 13	-
1962	Aug. 23, 1962	1,260	-	June 1-3, 1962	a 42	-
1963	Oct. 3-7, 10-12, 1962	1,250	-	Sept. 11, 12, 13, 17	b 0	c 3.03
1964	Oct. 22-25, 1963	1,030	-	May 12-14, 1964	a 6.5	-
1965	July 21-24, 1965	848	-	Apr. 11-21, 1965	a 9.0	-

a Minimum daily.

b Part of each day, caused by regulation.

c Occurred Nov. 6, 1962.

1933-65: Maximum discharge, 3,600 cfs June 25, 1950 (gage height, 11.19 ft, affected by seiches and backwater from aquatic vegetation, present datum), from rating curve extended above 1,400 cfs; no flow at times.

Remarks.--Records fair. Flow completely regulated by outlet dam of Lower Red Lake (see station 5-0740). Records of chemical analyses for the water year 1965 are published in reports of the Geological Survey.

Revisions (water years).--WSP 1308: 1934(M), 1943(M). WSP 1438: 1950(M).

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	32	130	35	35	35	35	35	30	16	50	46	30
2	32	130	35	35	35	35	35	30	16	50	46	30
3	31	130	35	35	35	35	35	29	14	48	46	30
4	31	130	35	35	35	35	35	28	14	48	46	28
5	31	130	35	35	35	35	35	28	14	48	44	28
6	31	130	35	35	35	35	35	27	14	48	44	28
7	30	128	35	35	35	35	35	27	13	48	42	28
8	30	128	35	35	35	35	35	27	13	48	40	41
9	30	128	35	35	35	35	35	26	13	48	40	50
10	76	128	35	35	35	35	35	25	13	46	40	50
11	136	128	35	35	35	35	35	25	13	46	40	48
12	136	128	35	35	35	35	35	24	13	46	38	48
13	136	128	35	35	35	35	35	24	13	46	38	46
14	136	128	35	35	35	35	35	22	13	48	38	46
15	136	128	35	35	35	35	35	22	13	50	38	93
16	136	127	35	35	35	35	35	22	29	50	38	130
17	134	126	35	35	35	35	35	20	36	48	38	130
18	134	126	35	35	35	35	35	20	34	48	38	130
19	134	126	35	35	35	35	35	20	32	48	36	129
20	134	126	35	35	35	35	35	20	30	48	36	128
21	134	126	35	35	35	35	35	18	29	48	36	128
22	134	126	35	35	35	35	35	18	28	48	36	128
23	134	126	35	35	35	35	34	18	169	48	34	128
24	132	126	35	35	35	35	34	18	240	48	34	128
25	132	88	35	35	35	35	33	18	240	48	34	128
26	132	35	35	35	35	35	33	18	117	48	34	128
27	132	35	35	35	35	35	33	16	50	48	32	128
28	132	35	35	35	35	35	32	16	50	46	32	126
29	130	35	35	35	35	35	32	16	50	46	32	126
30	130	35	35	35	35	35	30	16	50	46	32	126
31	130	35	35	35	35	35	35	16	50	46	30	126
TOTAL	3,158	3,330	1,085	1,085	980	1,085	1,031	684	1,389	1,480	1,178	2,545
MEAN	102	111	35.0	35.0	31.0	35.0	34.4	22.1	46.3	47.7	38.0	84.8
MAX	136	130	35	35	35	35	35	30	240	50	46	130
MIN	30	35	35	35	35	35	30	16	13	46	30	28
AC-FT	6,260	6,600	2,150	2,150	1,940	2,150	2,040	1,360	2,760	2,940	2,340	5,050

CAL YR 1960: TOTAL 24,939.3 MEAN 68.1 MAX 136 MIN 5.0 AC-FT 49,470  
WAT YR 1961: TOTAL 19,030 MEAN 52.1 MAX 240 MIN 13 AC-FT 37,750

Note.--Stage-discharge relation indefinite Oct. 1 to Nov. 9, Apr. 2 to Sept. 30.

## 5-0745. Red Lake River near Red Lake, Minn.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	126	105	56	56	56	56	54	52	42	1,210	1,120	1,200
2	126	105	56	56	56	56	54	52	42	1,210	1,120	1,200
3	125	105	56	56	56	56	52	50	42	1,210	1,120	1,200
4	125	105	56	56	56	56	52	50	242	1,210	1,120	1,200
5	125	105	56	56	56	56	50	50	750	1,210	1,120	1,200
6	125	105	56	56	56	56	50	50	1,040	1,030	1,120	1,180
7	124	105	56	56	56	56	48	55	1,040	813	1,120	1,180
8	124	105	56	56	56	56	48	56	1,040	813	1,120	1,180
9	122	105	56	56	56	56	48	54	1,040	824	1,120	1,180
10	120	105	56	56	56	56	48	54	1,040	824	1,120	1,180
11	120	105	56	56	56	56	48	52	1,040	824	1,120	1,160
12	118	105	56	56	56	56	48	52	1,040	824	1,120	1,160
13	118	105	56	56	56	56	48	52	587	993	1,120	1,160
14	116	105	56	56	56	56	48	50	56	1,120	1,120	1,160
15	114	105	56	56	56	56	48	50	56	1,120	1,120	1,160
16	112	106	56	56	56	56	48	50	57	1,120	1,120	1,140
17	112	65	56	56	56	56	48	48	83	1,120	1,120	1,140
18	110	65	56	56	56	56	48	48	83	1,120	1,120	1,190
19	109	65	56	56	56	56	48	48	296	1,120	1,120	1,240
20	108	65	56	56	56	56	48	48	634	1,120	1,120	1,240
21	108	65	56	56	56	56	48	46	684	1,120	1,120	1,240
22	108	65	56	56	56	56	48	46	752	1,120	1,200	1,240
23	108	65	56	56	56	56	48	46	752	1,120	1,260	1,240
24	108	65	56	56	56	56	48	46	752	1,120	1,260	1,240
25	108	65	56	56	56	56	48	46	874	1,120	1,220	1,240
26	105	65	56	56	56	56	48	46	1,080	1,120	1,220	1,240
27	105	65	56	56	56	56	50	44	1,080	1,120	1,220	1,240
28	105	65	56	56	56	56	50	44	1,120	1,120	1,220	1,240
29	105	65	56	56	56	56	50	44	1,120	1,120	1,220	1,240
30	105	60	56	56	56	56	52	44	1,210	1,120	1,220	1,240
31	105	-----	56	56	56	56	-----	44	-----	1,120	1,220	-----
TOTAL	3,549	2,586	1,736	1,736	1,568	1,734	1,474	1,517	19,747	33,155	35,760	36,050
MEAN	114	86.2	56.0	56.0	50.0	55.9	49.1	48.9	658	1,070	1,154	1,202
MAX	126	106	56	56	56	56	54	56	1,210	1,210	1,260	1,240
MIN	105	60	56	56	56	54	48	44	42	813	1,120	1,140
AC-FT	7,040	5,130	3,440	3,440	3,110	3,440	2,920	3,010	39,170	65,760	70,930	71,500
CAL YR 1961: TOTAL	19,328								38,340			
MAT YR 1962: TOTAL	140,612								AC-FT 278,900			

Note.--Stage-discharge relation indefinite Oct. 1 to Nov. 2, Apr. 24 to Sept. 30.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	1,240	1,230	1,170	910	870	875	715	995	1,050	865	490	700
2	1,240	1,230	1,170	840	870	875	910	995	1,060	890	555	710
3	1,250	855	1,170	915	870	880	920	995	1,060	890	650	720
4	1,250	40	1,160	925	880	875	920	995	1,070	860	650	720
5	1,250	39	1,160	935	870	875	920	995	1,070	810	620	700
6	1,250	730	1,030	950	880	875	920	995	1,080	790	630	700
7	1,250	1,220	635	960	890	870	920	995	1,080	785	640	690
8	1,240	1,220	635	965	900	865	920	990	1,080	780	620	690
9	1,240	1,220	635	975	885	870	920	1,000	1,080	750	660	680
10	1,250	1,230	630	935	885	875	920	1,000	1,090	730	620	680
11	1,250	1,230	625	920	885	875	920	1,010	1,070	710	620	300
12	1,250	1,230	625	900	885	865	915	1,020	1,040	700	600	315
13	1,240	1,230	625	900	885	860	915	1,000	1,040	700	670	635
14	1,240	1,230	630	900	880	870	910	1,010	1,040	700	580	720
15	1,240	1,230	630	900	880	875	910	1,010	1,040	710	630	710
16	1,220	1,230	630	900	880	865	905	1,010	1,040	690	680	770
17	1,230	1,220	710	900	880	865	905	1,010	1,040	670	580	820
18	1,230	1,220	930	900	880	870	900	1,010	1,040	680	570	1,070
19	1,230	1,220	930	900	875	865	905	1,010	1,050	670	570	1,060
20	1,230	1,210	930	895	860	840	905	1,010	1,010	660	630	1,060
21	1,230	1,200	930	895	850	870	915	1,010	1,000	640	650	1,060
22	1,230	1,220	920	890	865	865	925	1,020	990	660	660	1,050
23	1,230	1,220	900	890	870	860	935	1,020	970	560	680	1,050
24	1,230	1,210	905	885	875	855	935	1,020	960	500	700	1,030
25	1,230	1,160	905	885	875	685	940	1,030	940	490	670	1,020
26	1,230	1,160	910	880	880	405	940	1,030	940	490	680	1,020
27	1,230	1,160	910	880	880	405	940	1,050	940	490	660	1,020
28	1,230	1,160	905	875	880	405	940	1,010	940	480	670	1,000
29	1,230	1,160	905	875	875	405	970	1,050	950	490	650	1,000
30	1,230	1,160	910	870	-----	405	995	1,040	900	490	680	1,000
31	1,230	-----	910	870	-----	405	-----	1,050	-----	480	670	-----
TOTAL	38,350	33,074	26,670	28,090	24,535	23,955	27,520	31,385	30,660	20,810	19,635	24,700
MEAN	1,237	1,102	860	906	876	773	917	1,012	1,022	671	633	823
MAX	1,250	1,230	1,170	975	900	880	995	1,050	1,090	890	700	1,070
MIN	1,220	39	625	870	840	405	715	990	900	480	490	300
AC-FT	76,070	65,600	52,900	55,720	48,660	47,510	54,590	62,250	60,810	41,280	38,950	48,990
CAL YR 1962: TOTAL	230,835								457,900			
MAT YR 1963: TOTAL	329,384								AC-FT 653,300			

Note.--Stage-discharge relation indefinite Oct. 1 to Dec. 9, Mar. 26 to Sept. 30.

## 5-0745. Red Lake River near Red Lake, Minn.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	1,000	540	535	525	515	345	115	10	30	75	99	50
2	1,000	540	525	525	515	350	115	9.0	28	75	99	50
3	1,000	540	535	525	515	350	115	8.0	26	75	99	51
4	1,000	535	535	525	515	350	116	7.0	24	75	99	52
5	1,000	535	533	520	515	350	116	7.0	23	75	99	52
6	1,000	534	530	520	515	350	116	7.0	23	75	99	52
7	960	530	530	520	515	350	116	6.8	22	75	99	52
8	940	530	540	520	515	350	116	6.8	22	75	100	52
9	930	530	545	520	515	355	116	6.8	22	75	100	52
10	930	525	545	520	515	355	116	6.8	22	90	100	52
11	940	525	545	520	515	355	118	6.8	22	100	100	55
12	940	525	545	520	515	305	118	6.5	20	100	100	55
13	950	520	545	520	515	225	120	6.5	20	100	100	55
14	950	515	545	516	515	225	120	6.5	20	100	100	55
15	960	515	545	515	515	225	120	33	40	100	100	55
16	960	515	545	515	515	225	115	55	50	100	100	55
17	960	515	544	515	515	225	100	55	50	100	100	55
18	960	515	545	515	515	225	100	55	50	100	100	55
19	980	515	545	515	515	225	100	55	45	100	100	55
20	1,000	512	545	515	455	225	100	55	45	98	100	60
21	1,020	512	545	515	345	225	55	55	40	98	100	60
22	1,030	515	545	515	345	225	20	55	35	98	100	60
23	1,030	530	545	515	345	225	20	56	31	98	100	60
24	1,030	530	540	515	345	225	20	57	30	98	100	60
25	1,030	530	535	515	345	225	18	58	30	98	100	60
26	1,020	530	530	515	345	165	18	55	55	98	65	60
27	1,020	530	530	515	345	115	16	50	75	98	50	60
28	860	530	530	515	345	115	14	45	75	98	50	60
29	630	530	515	515	12	115	12	40	75	50	60	60
30	580	530	530	515	-----	115	10	35	75	99	50	60
31	540	-----	530	515	-----	115	-----	35	-----	99	50	-----
TOTAL	29,150	15,778	16,702	16,051	13,345	7,830	2,471	950.5	1,125	2,843	2,808	1,670
MEAN	540	526	530	518	440	253	82.4	30.7	37.5	90.6	90.6	55.7
MAX	1,030	540	545	525	515	355	120	58	75	100	100	60
MIN	540	512	530	515	345	115	10	6.5	20	75	50	50
AC-FT	57,820	31,300	33,130	31,840	26,470	15,530	4,900	1,890	2,230	5,640	5,570	3,310

CAL YR 1963: TOTAL 292,920

MEAN 803

MAX 1,090

MIN 300

AC-FT 591,000

WAT YR 1964: TOTAL 110,723.5

MEAN 303

MAX 1,030

MIN 6.5

AC-FT 219,600

Note.--Stage-discharge relation indefinite Oct. 1 to Nov. 25, Apr. 5 to Sept. 30.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	60	519	565	540	615	625	635	360	314	662	815	770
2	62	519	565	540	615	625	635	372	325	655	811	778
3	60	522	560	540	620	625	625	372	360	662	811	778
4	56	522	560	545	620	625	620	369	375	673	811	782
5	55	519	560	545	620	630	620	337	381	673	808	796
6	53	519	560	545	620	630	620	337	416	684	815	804
7	51	519	560	550	620	630	620	345	432	687	811	796
8	53	515	560	550	620	630	610	348	461	698	805	789
9	53	515	555	555	620	630	420	348	458	734	793	808
10	51	508	555	555	620	635	170	354	441	755	789	830
11	53	512	550	560	620	635	9.0	357	438	767	789	830
12	55	512	550	565	620	635	9.0	351	409	793	793	830
13	55	512	545	570	625	635	9.0	351	406	808	785	826
14	53	498	545	580	625	635	9.0	357	403	811	756	844
15	53	508	545	590	625	635	9.0	375	403	815	763	830
16	53	491	540	595	625	640	9.0	378	406	826	759	830
17	53	502	540	600	625	640	9.0	372	416	830	767	830
18	53	488	535	600	625	640	9.0	384	432	837	756	837
19	121	478	535	605	625	640	9.0	378	454	837	756	837
20	298	490	535	605	625	640	9.0	366	464	841	745	837
21	478	490	530	610	625	640	9.0	375	454	846	752	837
22	546	540	530	610	625	640	150	372	448	848	734	837
23	539	580	530	610	625	640	357	372	444	848	720	837
24	542	580	530	610	625	640	366	372	546	848	720	826
25	546	580	530	610	625	640	366	372	684	844	720	833
26	539	580	535	610	625	640	375	372	680	837	723	826
27	542	575	535	610	625	640	372	394	676	837	741	826
28	546	575	540	610	625	640	375	397	673	832	752	830
29	532	570	540	610	-----	640	384	384	669	832	752	833
30	525	570	540	615	-----	635	366	372	666	826	763	833
31	525	-----	540	615	-----	635	-----	345	-----	815	770	-----
TOTAL	7,261	15,808	16,905	18,055	17,430	19,690	8,785.0	11,338	14,154	24,277	23,865	24,580
MEAN	234	527	545	582	623	635	293	366	472	783	770	819
MAX	540	580	565	615	625	640	635	397	684	848	815	844
MIN	51	478	530	610	615	625	9.0	337	314	655	720	770
AC-FT	14,400	31,350	33,530	35,810	34,570	39,050	17,420	22,490	28,070	48,150	47,340	48,750

CAL YR 1964: TOTAL 89,067.5

MEAN 243

MAX 580

MIN 6.5

AC-FT 176,700

WAT YR 1965: TOTAL 202,148.0

MEAN 554

MAX 848

MIN 9.0

AC-FT 401,000

5-0750. Red Lake River at High Landing, near Goodridge, Minn.

Location--Lat 48°03', long 95°48', on line between secs.28 and 29, T.153 N., R.40 W., on left bank at upstream side of highway bridge at High Landing, 7 miles south of Goodridge and 33 miles upstream from Thief River.

Drainage area--2,300 sq mi. approximately.

Records available--September 1929 to September 1965. Prior to October 1930, published as "at Krapka."

Gage--Water-stage recorder. Datum of gage is 1,141.57 ft above mean sea level, adjustment of 1912 (levels by Corps of Engineers). Prior to Oct. 1, 1930, staff gage at site 10 miles downstream at different datum. Oct. 1, 1930, to Sept. 30, 1932, staff gage at datum 5.00 ft higher and Oct. 1, 1932, to Dec. 8, 1938, at datum 4.00 ft higher at site 50 ft downstream. Dec. 9, 1938, to Sept. 30, 1949, water-stage recorder at present site at datum 4.00 ft higher.

Average discharge--36 years, 425 cfs (307,700 acre-ft per year).

Extremes--Maximum and minimum discharges for the water years 1961-65 are contained in the following table:

Water year	Maximum			Minimum		
	Date	Discharge (cfs)	Gage height (feet)	Date	Discharge (cfs)	Gage height (feet)
1961	Apr. 20, 1961	282	a 2.92	Oct. 1, 1960	b 4.2	-
1962	June 11, 1962	3,060	12.10	Dec. 6, 8, 1961	b 4.0	-
1963	Apr. 6, 1963	1,600	c 8.31	Aug. 3, 4, 1963	524	d 4.75
1964	Oct. 22, 23, 24, 1963	1,170	e 7.32	June 6, 1964	52	.72
1965	Apr. 12, 1965	2,740	f 11.42	Oct. 20, 1964	91	1.75

a Maximum gage height for year, 4.49 ft Mar. 25, 1961, backwater from ice.

b Minimum daily.

c Maximum gage height recorded for year, 10.12 ft Mar. 22, 1963, backwater from ice.

d Occurred Nov. 7, 1962.

e Maximum gage height for year, 7.59 ft Apr. 16, 1964, backwater from ice.

f Maximum gage height for year, 12.15 ft Apr. 12, 1965, backwater from ice.

1929-65: Maximum discharge, 3,720 cfs May 11, 1950 (gage height, 13.42 ft); no flow during infrequent periods in 1931-37.

Remarks--Records good except those for periods of backwater from aquatic vegetation and those for winter periods, which are fair. Flow regulated by outlet dam on Lower Red Lake (see station 5-0740).

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	4.2	119	38	38	33	33	75	63	16	66	50	23
2	8.5	117	32	38	33	33	68	51	15	53	44	23
3	22	117	34	38	33	33	62	45	16	45	42	22
4	36	116	34	38	33	33	65	45	14	47	41	21
5	37	116	38	38	32	33	60	44	12	47	41	20
6	31	115	40	38	32	33	60	46	10	46	39	20
7	31	118	32	38	32	34	64	52	10	43	36	20
8	31	115	30	38	32	35	64	54	10	44	33	21
9	31	76	32	37	32	35	62	44	10	44	33	22
10	28	100	32	37	32	35	56	47	10	43	35	30
11	31	150	32	37	32	35	48	49	15	44	32	48
12	66	145	32	37	32	35	42	33	17	46	31	54
13	111	138	42	37	32	36	55	30	17	47	30	53
14	118	138	42	37	32	36	68	34	17	49	32	50
15	116	139	40	37	32	36	70	40	18	53	31	43
16	116	125	40	37	32	36	42	30	19	54	30	34
17	116	80	40	37	32	36	42	29	19	45	32	47
18	118	125	40	37	32	37	73	28	22	40	41	108
19	109	130	40	37	32	40	191	25	23	42	43	138
20	118	125	40	36	32	50	264	24	23	42	41	139
21	118	120	40	36	32	65	249	29	22	47	34	142
22	116	110	39	36	32	80	188	28	22	65	28	146
23	116	90	39	36	32	85	148	22	21	57	25	141
24	117	90	39	36	33	100	133	21	17	55	25	139
25	118	95	39	35	33	160	136	19	80	54	25	134
26	114	100	39	35	33	170	127	19	197	51	25	132
27	115	70	38	35	33	160	103	18	217	47	24	132
28	112	65	38	34	33	135	105	19	165	47	24	132
29	112	60	38	34	-----	100	87	19	103	47	23	137
30	129	48	38	34	-----	85	69	17	74	51	23	132
31	128	-----	38	34	-----	80	-----	16	-----	53	24	-----
TOTAL	2,573.7	3,252	1,155	1,132	905	1,934	2,876	1,040	1,231	1,514	1,017	2,303
MEAN	83.0	108	37.3	36.5	32.3	62.4	95.9	33.5	41.0	48.8	32.8	76.8
MAX	129	150	42	38	33	170	264	63	217	66	50	146
MIN	4.2	48	30	34	32	33	42	16	10	40	23	20
AC-FT	5,100	6,450	2,290	2,250	1,800	3,840	5,700	2,060	2,440	3,000	2,020	4,570

CAL YR 1960: TOTAL 31,827.6 MEAN 87.0 MAX 510 MIN 4.2 AC-FT 63,130  
 MAY 1961: TOTAL 20,932.7 MEAN 57.3 MAX 264 MIN 4.2 AC-FT 41,520

5-0750. Red Lake River at High Landing, near Goodridge, Minn.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	128	103	50	46	48	48	50	76	802	1,160	1,000	1,100
2	129	114	48	46	48	48	50	75	709	1,180	993	1,110
3	130	59	46	46	48	48	50	68	619	1,180	996	1,130
4	130	109	46	48	50	48	60	63	551	1,200	996	1,130
5	128	109	44	48	50	48	90	61	595	1,210	1,010	1,130
6	126	110	40	48	48	48	250	51	850	1,210	1,000	1,130
7	127	140	42	48	48	46	260	59	1,090	1,290	991	1,130
8	126	130	40	48	48	46	250	65	2,380	1,460	978	1,140
9	132	100	42	48	48	46	160	62	2,950	1,350	978	1,230
10	137	85	44	48	48	46	110	68	3,000	1,340	972	1,250
11	142	95	45	48	50	46	110	67	3,050	1,330	983	1,270
12	133	110	46	48	50	46	120	70	3,010	1,210	1,010	1,270
13	134	100	46	48	50	46	180	68	2,860	1,100	1,010	1,260
14	133	110	46	48	50	46	200	87	2,940	1,040	1,010	1,250
15	129	135	46	48	50	46	200	97	1,840	1,040	1,010	1,250
16	128	132	46	48	50	46	200	176	1,190	1,060	1,000	1,250
17	124	110	46	48	50	46	300	375	1,230	1,060	996	1,240
18	116	100	46	48	50	46	580	519	1,310	1,070	1,000	1,230
19	123	75	46	48	50	46	550	554	1,060	1,060	1,000	1,230
20	123	65	46	48	50	46	420	553	957	1,060	1,000	1,240
21	120	60	46	48	50	46	382	438	1,080	1,050	1,010	1,260
22	119	55	48	48	48	48	321	499	1,150	1,060	1,020	1,270
23	113	50	48	48	48	48	268	1,620	1,190	1,080	1,020	1,290
24	103	45	48	48	48	48	250	1,920	1,220	1,090	1,020	1,310
25	112	45	48	48	48	48	194	1,640	1,170	1,080	1,040	1,310
26	108	55	48	48	48	48	159	1,310	1,120	1,060	1,050	1,310
27	113	55	46	48	48	50	122	1,080	1,130	1,050	1,070	1,320
28	112	50	46	48	48	55	102	892	1,130	1,050	1,090	1,330
29	104	50	46	48	-----	55	93	737	1,140	1,050	1,090	1,330
30	105	50	46	48	-----	50	84	716	1,150	1,030	1,090	1,340
31	100	-----	46	48	-----	50	-----	845	-----	1,020	1,090	-----
TOTAL	3,787	2,606	1,417	1,482	1,370	1,478	6,165	15,111	44,073	35,230	31,523	37,400
MEAN	122	86.9	45.7	47.8	48.9	47.7	206	487	1,469	1,136	1,017	1,235
MAX	142	140	50	48	50	55	580	1,920	3,050	1,460	1,090	1,340
MIN	100	45	40	46	48	46	50	51	551	1,020	972	1,100
AC-FT	7,510	5,170	2,810	2,940	2,720	2,930	12,230	29,970	87,420	69,880	62,520	73,470
CAL YR 1961: TOTAL	21,762								43,160			
WAT YR 1962: TOTAL	181,282								359,600			

Note.--Backwater from aquatic vegetation Oct. 1 to Nov. 5, June 19 to Sept. 30.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	1,340	1,360	1,230	920	880	880	646	1,030	1,040	860	537	739
2	1,330	1,360	1,210	920	880	880	633	1,020	1,040	831	536	756
3	1,340	1,360	1,200	920	880	880	991	1,010	1,040	814	526	750
4	1,350	1,330	1,180	940	890	880	1,010	1,010	1,050	800	528	757
5	1,370	1,120	1,130	950	890	880	1,090	1,010	1,040	780	530	769
6	1,390	778	824	950	900	890	1,280	1,010	1,040	764	539	766
7	1,410	603	625	960	900	900	1,280	1,010	1,040	739	547	766
8	1,440	836	620	960	900	900	1,540	1,000	1,040	720	556	764
9	1,450	1,010	620	970	900	890	1,250	1,000	1,040	700	562	769
10	1,450	1,110	630	920	900	890	1,110	1,020	1,040	683	570	771
11	1,460	1,190	640	910	900	900	1,060	1,030	1,040	696	577	778
12	1,460	1,240	640	910	900	900	1,020	1,030	1,040	855	587	785
13	1,470	1,270	650	910	900	900	1,010	1,030	1,040	792	595	739
14	1,470	1,290	650	900	890	900	1,000	1,020	1,040	723	599	700
15	1,480	1,290	660	900	900	910	1,000	1,020	1,020	683	603	700
16	1,440	1,300	660	900	890	910	1,030	1,020	1,010	665	621	718
17	1,410	1,310	680	900	900	920	1,050	1,010	996	672	640	755
18	1,400	1,310	700	900	900	940	1,050	998	998	654	646	766
19	1,390	1,310	880	860	890	950	1,030	1,010	1,010	638	648	795
20	1,390	1,310	960	860	850	1,000	1,010	1,020	1,040	625	648	838
21	1,390	1,270	970	860	860	1,100	983	1,020	996	611	648	884
22	1,400	1,040	980	860	870	1,200	991	1,020	978	599	648	919
23	1,400	1,000	950	860	880	1,250	985	1,020	957	595	657	952
24	1,390	1,180	940	860	880	1,200	983	1,010	936	585	659	978
25	1,380	1,370	940	870	880	1,180	975	1,010	949	575	665	988
26	1,380	1,490	940	870	880	830	967	1,000	985	574	678	996
27	1,380	1,420	940	870	880	730	959	1,010	949	560	702	996
28	1,370	1,310	940	880	880	678	972	1,010	919	560	720	1,000
29	1,370	1,270	930	880	-----	720	983	1,010	899	551	732	1,010
30	1,370	1,250	920	880	-----	741	998	1,000	879	547	737	1,010
31	1,360	-----	920	880	-----	650	-----	1,010	-----	537	737	-----
TOTAL	43,430	36,287	26,759	27,920	24,830	28,379	31,086	31,428	30,091	20,988	19,178	24,902
MEAN	1,401	1,210	863	901	887	915	1,026	1,014	1,003	677	619	830
MAX	1,480	1,490	1,230	970	900	1,250	1,540	1,030	1,050	860	737	1,010
MIN	1,330	603	620	860	850	650	646	998	879	537	526	700
AC-FT	86,140	71,970	53,080	55,380	49,250	56,290	61,660	62,340	59,680	41,630	38,040	49,390
CAL YR 1962: TOTAL	279,948								555,300			
WAT YR 1963: TOTAL	345,278								684,800			

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DISCHARGE, IN CUBIC FEET PER SECONO, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965												
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	163	553	580	590	590	595	630	562	553	778	683	716
2	168	549	580	595	590	600	640	545	595	757	674	709
3	169	543	590	595	585	600	650	583	972	750	667	702
4	177	521	590	595	585	600	670	579	954	741	661	716
5	180	532	600	595	585	600	710	575	867	732	657	711
6	172	528	600	595	590	605	780	589	1,030	723	663	711
7	168	524	600	590	595	605	850	560	1,310	709	685	720
8	160	521	605	590	595	610	950	534	1,270	698	691	718
9	153	524	610	585	595	610	1,150	526	1,170	694	694	723
10	150	526	610	585	600	615	1,400	575	1,070	700	691	723
11	141	537	610	585	600	615	1,800	595	991	748	689	727
12	132	543	605	585	600	620	2,370	575	919	826	687	746
13	127	536	600	585	600	625	2,680	562	852	886	687	762
14	124	537	600	585	595	625	2,340	539	783	906	683	785
15	116	539	600	585	595	630	1,670	646	716	904	667	826
16	112	519	595	585	595	620	1,140	807	667	892	667	838
17	107	504	590	590	595	630	942	773	625	876	669	857
18	103	510	590	590	595	615	852	725	589	862	667	852
19	98	515	590	595	595	630	788	705	568	855	665	840
20	118	520	590	600	595	635	730	702	585	855	663	824
21	283	530	590	600	590	630	648	659	579	845	665	819
22	438	540	585	600	590	620	597	654	566	828	665	840
23	530	570	585	600	590	615	689	638	549	804	663	876
24	550	600	585	595	595	615	814	640	532	778	665	889
25	566	615	585	595	585	610	804	623	558	755	663	879
26	566	610	585	595	585	610	757	587	663	739	696	867
27	566	600	590	595	585	615	709	568	757	725	711	867
28	590	590	590	590	590	615	785	705	705	709	878	878
29	556	580	590	590	590	620	617	589	788	694	720	902
30	553	580	590	590	590	620	595	564	792	687	732	970
31	554	590	590	590	590	625	595	558	558	687	727	970
TOTAL	8,564	16,396	18,400	18,340	16,575	19,080	30,629	18,926	23,655	24,143	21,126	23,993
MEAN	276	547	594	592	592	615	1,021	611	789	779	681	800
MAX	566	615	610	600	600	635	2,680	807	1,310	906	732	970
MIN	98	504	580	585	585	595	595	526	532	687	657	702
AC-FT	16,990	32,520	36,500	36,380	32,880	37,840	60,750	37,540	46,920	47,890	41,900	47,590
CAL YR 1964:	TOTAL 111,846		MEAN 306		MAX 710		MIN 34		AC-FT 221,800			
CAL YR 1965:	TOTAL 239,827		MEAN 657		MAX 2,680		MIN 98		AC-FT 475,700			

5-0760. Thief River near Thief River Falls, Minn.

Location.--Lat 48°11', long 96°10', in sec.3, T.154 N., R.43 W., on right bank a quarter of a mile upstream from highway bridge, 5 miles north of city of Thief River Falls, 7 miles upstream from mouth, and 3 miles downstream from Mud Lake National Wild Life Refuge.

Drainage area.--959 sq mi.

Records available.--July 1909 to September 1917, April 1920 to September 1921, October 1922 to September 1924, October 1928 to September 1965. Monthly discharge only for some periods and annual maximums for water years 1919, 1922, 1925-26, published in WSP 1308.

Gage.--Water-stage recorder and control of grouted boulders. Datum of gage is 1,112.33 ft above mean sea level, datum of 1929 (levels by Minnesota Highway Department). Prior to May 4, 1939, staff or chain gage at same site and datum.

Average discharge.--48 years, 132 cfs (95,560 acre-ft per year).

Extremes.--Maximum and minimum discharges for the water years 1961-65 are contained in the following table:

Water year	Maximum			Minimum		
	Date	Discharge (cfs)	Gage height (feet)	Date	Discharge (cfs)	Gage height (feet)
1961	Mar. 24, 1961	441	a 7.49	Many days	0	-
1962	June 10, 1962	2,800	12.68	Long periods	0	-
1963	Apr. 8, 1963	2,180	11.43	do.	0	-
1964	Aug. 2, 1964	2,480	12.05	Many days	0	-
1965	Apr. 12, 1965	4,110	b 14.99	Jan. 22 to Feb. 8	c .10	-

a Backwater from ice.

b Maximum gage height for year, 15.70 ft Apr. 12, 1965, backwater from ice.

c Minimum daily.

1909-17, 1919-26, 1928-65: Maximum discharge, 5,610 cfs May 13, 1950 (gage height, 17.38 ft); no flow at times in some years.

Remarks.--Records good except those for winter periods, which are fair. Some regulation by Thief and Mud Lakes. Records of chemical analyses for the water years 1963-65 are published in reports of the Geological Survey.

Revisions (water years).--WSP 925: Drainage area. WSP 1308: 1917(M), 1924(M), 1923(M), 1931-33(M), 1935(M), 1937(M).

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	.20	6.0	.40	0	0	0	70	88	10	0	.10	0
2	.10	5.0	.30	0	0	0	75	83	9.1	0	0	0
3	.10	3.9	.30	0	0	0	71	79	8.3	0	0	0
4	.10	3.2	.30	0	0	0	54	75	7.6	0	0	.40
5	0	6.0	.20	0	0	0	34	69	7.2	0	0	.50
6	0	5.3	.20	0	0	0	27	69	6.0	0	0	.50
7	0	2.9	.20	0	0	0	31	71	5.3	0	0	.40
8	0	1.9	.20	0	0	0	31	73	5.3	0	0	6.0
9	0	1.4	.10	0	0	0	27	73	4.2	0	0	12
10	0	1.2	.10	0	0	0	25	71	3.9	0	0	13
11	0	1.5	.10	0	0	0	20	67	3.2	0	0	34
12	0	1.8	.10	0	0	0	22	97	2.4	0	0	36
13	0	1.8	0	0	0	0	22	102	1.9	0	0	35
14	0	1.8	0	0	0	0	22	102	1.2	0	0	31
15	0	1.8	0	0	0	0	14	99	.80	0	0	24
16	0	1.8	0	0	0	0	9.1	109	.50	0	0	15
17	0	1.8	0	0	0	0	12	112	.30	0	0	12
18	0	1.6	0	0	0	0	24	112	.20	0	0	9.1
19	0	1.6	0	0	0	0	61	106	.20	0	0	7.9
20	0	1.4	0	0	0	.10	95	75	.10	0	0	13
21	1.5	1.4	0	0	0	50	119	73	.10	0	.40	24
22	2.4	1.4	0	0	0	110	119	69	.10	0	.70	34
23	3.9	1.2	0	0	0	180	102	61	0	0	.50	32
24	1.6	1.2	0	0	0	400	102	59	0	0	.30	29
25	.80	1.2	0	0	0	350	106	58	0	.90	.30	20
26	.50	1.0	0	0	0	230	102	56	0	.80	.20	15
27	.40	.80	0	0	0	130	99	54	0	.60	.20	12
28	.30	.60	0	0	0	60	97	52	0	.60	.20	11
29	.30	.60	0	0	0	50	95	32	0	.30	.10	8.7
30	1.4	.60	0	0	0	60	92	13	0	.20	0	7.6
31	5.6	0	0	0	0	70	0	10	0	.20	0	0
TOTAL	19.20	63.70	2.50	0	0	1,690.10	1,779.1	2,269	77.90	3.40	3.00	443.10
MEAN	.62	2.12	.081	0	0	54.5	59.3	73.2	2.60	.11	.097	14.8
MAX	5.6	6.0	.40	0	0	400	110	112	10	.90	.70	36
MIN	0	.60	0	0	0	0	9.1	10	0	0	0	0
AC-FT	38	126	5.0	0	0	3,350	3,530	4,500	155	6.7	6.0	879
CAL YR 1960: TOTAL	38,140.60			MEAN 104		MAX 1,010	MIN 0		AC-FT 75,650			
WAT YR 1961: TOTAL	6,351.00			MEAN 17.4		MAX 400	MIN 0		AC-FT 12,600			

## 5-0760. Thief River near Thief River Falls, Minn.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	5.6	3.2	1.0	0	0	0	.4	603	1,900	1,030	519	178
2	4.7	3.2	1.0	0	0	0	.4	579	1,740	952	510	185
3	3.9	2.7	.80	0	0	0	.5	558	1,650	905	501	218
4	3.6	2.7	.80	0	0	0	.6	537	1,590	885	498	210
5	2.9	2.7	.80	0	0	0	1.4	522	1,550	862	501	198
6	2.2	2.7	.80	0	0	0	30	504	1,510	829	504	190
7	1.6	2.4	.60	0	0	0	120	501	1,470	830	498	182
8	1.1	1.9	.50	0	0	0	180	507	1,760	862	478	200
9	.90	1.6	.40	0	0	0	170	507	2,490	885	472	262
10	1.4	1.4	.40	0	0	0	175	510	2,710	954	460	231
11	3.6	1.4	.30	0	0	0	200	510	2,660	928	426	229
12	17	1.6	.20	0	0	0	220	507	2,380	846	418	221
13	25	1.9	.10	0	0	0	270	510	2,140	780	412	216
14	25	2.1	.20	0	0	0	350	561	1,970	729	406	208
15	23	2.4	.20	0	0	0	450	609	1,870	698	398	200
16	19	3.6	.10	0	0	0	600	673	1,840	676	335	193
17	16	3.9	.10	0	0	0	900	954	1,900	657	312	188
18	14	3.6	.10	0	0	0	1,500	1,050	1,890	648	312	185
19	12	3.2	.10	0	0	0	1,600	1,040	1,850	627	309	180
20	10	2.7	.10	0	0	0	1,660	1,230	1,780	606	304	178
21	11	2.2	.10	0	0	0	1,590	1,050	1,720	594	299	175
22	8.3	2.1	.10	0	0	0	1,400	1,040	1,680	588	299	172
23	6.0	1.9	.10	0	0	0	1,180	1,920	1,640	588	296	170
24	9.1	1.9	.10	0	0	0	1,000	2,460	1,590	585	291	170
25	5.6	1.8	.10	0	0	0	905	2,210	1,530	576	288	170
26	4.7	1.5	0	0	0	0	806	1,840	1,460	564	283	170
27	4.2	1.2	0	0	0	20	716	1,580	1,370	555	283	168
28	4.2	1.2	0	0	0	.30	654	1,430	1,260	549	270	150
29	4.2	1.1	0	0	-----	.30	630	1,390	1,190	543	195	64
30	4.2	1.0	0	0	-----	.30	624	1,460	1,140	519	180	21
31	3.6	-----	0	0	-----	.30	-----	2,010	-----	513	178	-----
TOTAL	257.60	66.8	9.10	0	0	1.40	17,933.3	31,542	53,230	22,363	11,435	5,442
MEAN	8.31	2.23	.29	0	0	.045	598	1,017	1,774	721	369	181
MAX	25	3.9	1.0	0	0	20	1,660	2,710	1,030	954	519	242
MIN	.90	1.0	0	0	0	0	.40	501	1,140	513	178	21
AC-FT	511	133	18	0	0	2.8	35,570	62,560	105,600	44,360	22,680	10,790

CAL YR 1961: TOTAL 8,599.10 MEAN 18.1 MAX 400 MIN 0 AC-FT 13,090  
 MAY YR 1962: TOTAL 142,280.20 MEAN 390 MAX 2,710 MIN 0 AC-FT 282,200

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	20	21	19	.40	0	0	220	636	516	255	37	3.6
2	20	12	18	.40	0	0	420	612	552	247	34	3.9
3	19	7.2	14	.40	0	0	550	600	564	239	31	1.9
4	17	5.3	17	.40	0	0	530	597	549	223	30	1.8
5	18	4.4	10	.30	0	0	612	585	534	216	27	1.4
6	17	5.3	7.5	.30	0	0	1,470	570	522	210	26	1.2
7	17	4.7	6.5	.30	0	0	1,600	564	507	208	24	1.1
8	18	5.3	6.4	.30	0	0	2,080	570	492	200	21	.90
9	19	6.8	5.5	.30	0	0	1,700	579	486	140	21	.80
10	18	7.9	3.5	.20	0	0	1,130	579	489	107	18	.60
11	18	8.3	1.6	.10	0	0	809	579	489	52	18	.60
12	18	8.7	1.0	.10	0	0	742	576	486	44	17	.60
13	19	9.1	1.0	.10	0	0	713	561	478	51	15	.60
14	19	9.5	.90	.10	0	0	915	564	469	65	14	.60
15	19	10	.80	.10	0	0	958	567	434	73	14	.60
16	18	11	.70	0	0	0	1,070	573	418	75	15	.60
17	17	9.5	.80	0	1.0	0	1,240	579	409	71	15	.60
18	17	8.7	1.0	0	1.6	0	1,300	591	452	63	14	1.0
19	17	8.3	1.2	0	1.2	0	1,220	600	452	59	13	1.6
20	15	8.7	1.0	0	1.0	0	1,140	609	446	52	13	2.4
21	14	8.3	.90	0	.80	.20	1,070	609	443	49	12	1.8
22	14	7.9	.80	0	.40	1.0	1,010	606	433	46	12	1.5
23	14	7.2	.80	0	.20	20	928	606	309	41	11	1.2
24	14	7.2	.70	0	.10	200	915	579	283	41	7.9	1.0
25	12	6.8	.60	0	.10	320	912	564	182	38	6.0	.90
26	12	6.4	.50	0	0	370	888	549	218	38	5.0	.80
27	13	7.9	.50	0	0	320	866	543	322	40	5.0	.50
28	13	14	.50	0	0	280	771	537	312	47	5.0	.40
29	13	17	.50	0	-----	250	752	528	288	38	4.7	.40
30	12	18	.50	0	-----	200	723	516	270	40	5.0	.40
31	11	-----	.50	0	-----	150	-----	510	-----	38	4.4	-----
TOTAL	503	272.4	124.20	3.80	6.40	2,111.20	29,234	17,838	12,704	3,106	495.0	35.30
MEAN	16.2	9.08	4.01	.12	.23	68.1	974	575	423	100	16.0	1.18
MAX	20	21	19	.40	1.6	370	2,080	636	564	255	37	3.9
MIN	11	4.4	.50	0	0	0	220	510	182	38	4.4	.40
AC-FT	998	540	246	7.5	13	4,190	57,980	35,380	25,200	6,160	982	70

CAL YR 1962: TOTAL 142,846.30 MEAN 391 MAX 2,710 MIN 0 AC-FT 283,300  
 MAY YR 1963: TOTAL 66,433.30 MEAN 182 MAX 2,080 MIN 0 AC-FT 131,800

## RED RIVER OF THE NORTH BASIN

5-0760. Thief River near Thief River Falls, Minn.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	.30	.10	0	0	0	0	0	212	232	1,21C	495	68
2	.40	.10	0	0	0	0	0	214	227	1,16C	2,480	76
3	.40	.10	0	0	0	0	.10	214	222	1,11C	2,260	65
4	.40	.10	0	0	0	0	.10	227	217	1,07C	1,550	53
5	.30	0	0	0	0	0	0	242	210	1,02C	1,090	47
6	.30	0	0	0	0	0	0	339	210	1,01C	740	44
7	.30	0	0	0	0	0	.50	423	214	963	585	41
8	.20	0	0	0	0	0	2.0	371	237	925	518	38
9	.20	0	0	0	0	0	10	331	1,150	901	484	38
10	.20	.10	0	0	0	0	50	312	1,180	784	467	47
11	.10	.10	0	0	0	0	180	296	1,650	74C	445	78
12	.10	.10	0	0	0	0	250	291	1,930	74C	434	82
13	.10	.10	0	0	0	0	293	286	1,880	721	423	80
14	.10	.10	0	0	0	0	220	272	1,650	672	412	76
15	.10	.10	0	0	0	0	379	265	1,430	594	409	74
16	.10	.10	0	0	0	0	600	262	1,240	576	401	72
17	.10	.10	0	0	0	0	573	260	1,140	558	393	72
18	.10	.10	0	0	0	0	420	474	1,200	536	382	70
19	.10	.10	0	0	0	0	306	573	1,780	532	377	67
20	.10	0	0	0	0	0	257	439	2,090	546	363	65
21	.10	0	0	0	0	0	280	479	1,870	544	275	63
22	.10	0	0	0	0	0	299	459	1,660	532	267	65
23	.10	0	0	0	0	0	288	431	1,650	529	260	108
24	.10	0	0	0	0	0	267	409	1,630	518	244	130
25	.10	0	0	0	0	0	252	390	1,590	504	108	110
26	.10	0	0	0	0	0	234	368	1,520	498	63	583
27	.10	0	0	0	0	0	220	355	1,470	490	60	1,080
28	.20	0	0	0	0	0	210	344	1,420	484	60	814
29	.10	0	0	0	0	0	212	333	1,350	479	62	663
30	.10	0	0	0	0	0	212	325	1,270	470	62	518
31	.10	-----	0	0	-----	0	0	252	-----	462	60	-----
TOTAL	5.20	1.40	0	0	0	0	6,014.70	10,451	36,199	21,892	16,229	5,387
MEAN	.17	.047	0	0	0	0	200	337	1,207	706	524	180
MAX	.40	.10	0	0	0	0	600	573	2,090	1,210	2,480	1,080
MIN	.10	0	0	0	0	0	0	212	210	462	60	38
AC-FT	10	2.8	0	0	0	0	11,930	20,730	71,800	43,420	32,190	10,680
CAL YR 1963	TOTAL 65,540.30			MEAN 180		MAX 2,080		MIN 0		AC-FT 130,000		
WAT YR 1964	TOTAL 96,179.30			MEAN 263		MAX 2,480		MIN 0		AC-FT 190,800		

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	481	475	18	6.2	.10	.20	1.6	1,630	885	657	124	4.4
2	564	472	17	5.8	.10	.30	1.8	1,590	971	660	119	3.6
3	648	463	17	5.4	.10	.30	2.2	1,640	1,630	657	114	2.4
4	618	454	17	5.0	.10	.30	4.0	1,630	1,650	627	79	7.2
5	579	446	17	4.5	.10	.40	9.0	1,680	1,370	594	59	14
6	549	412	16	3.9	.10	.40	23	2,050	1,460	561	57	14
7	531	270	16	3.3	.10	.50	50	1,930	1,890	481	52	11
8	516	260	16	2.8	.10	.50	115	1,700	1,840	446	49	8.3
9	522	255	16	2.4	.20	.60	320	1,570	1,640	296	46	7.9
10	519	239	16	2.1	.20	.70	1,100	1,600	1,420	229	42	7.9
11	510	239	16	1.7	.20	.70	2,400	1,620	1,300	216	38	9.1
12	507	242	16	1.2	.20	.90	3,600	1,530	1,200	803	36	9.5
13	507	239	16	.90	.20	1.0	3,840	1,470	1,120	935	33	9.5
14	501	239	15	.70	.20	1.1	3,620	1,400	1,060	809	31	14
15	489	239	15	.50	.20	1.2	3,450	1,430	994	657	30	37
16	478	208	14	.30	.20	1.3	3,360	1,600	941	588	28	81
17	472	120	14	.30	.20	1.3	3,200	1,550	892	561	26	119
18	463	66	14	.20	.20	1.4	2,950	1,460	836	525	25	124
19	457	47	13	.20	.20	1.4	2,720	1,390	796	495	24	116
20	449	36	13	.20	.20	1.4	2,600	1,320	761	352	20	104
21	446	32	13	.20	.20	1.4	2,520	1,280	732	301	20	95
22	478	30	13	.10	.20	1.4	2,440	1,250	710	291	19	95
23	537	28	13	.10	.20	1.3	2,330	1,190	694	278	18	140
24	540	26	12	.10	.20	1.3	2,240	1,150	676	270	19	188
25	537	24	11	.10	.20	1.3	2,160	1,110	667	257	13	262
26	525	23	10	.10	.20	1.3	2,070	1,050	654	247	5.3	260
27	513	21	9.0	.10	.20	1.4	2,000	1,010	682	229	4.2	249
28	501	20	8.3	.10	.20	1.4	1,910	978	745	79	2.9	239
29	492	19	7.6	.10	-----	1.4	1,800	948	739	51	4.7	247
30	486	18	7.1	.10	-----	1.4	1,710	908	691	81	5.6	426
31	478	-----	6.6	.10	-----	1.5	-----	892	-----	124	5.0	-----
TOTAL	15,893	5,662	422.6	48.80	4.80	31.00	54,566.6	43,556	31,646	13,357	1,148.7	2,904.8
MEAN	513	189	13.6	1.57	.17	1.00	1,818	1,405	1,055	431	37.1	96.8
MAX	648	475	18	6.2	.20	1.5	3,840	2,050	1,890	935	124	426
MIN	446	18	6.6	.10	.10	.20	1.6	892	654	51	2.9	2.4
AC-FT	31,520	11,230	838	97	9.5	61	108,200	86,390	62,770	26,490	2,280	5,760
CAL YR 1964	TOTAL 118,150.30			MEAN 323								
WAT YR 1965	TOTAL 169,221.30			MEAN 464								
MAX	3,840			1.5								
MIN	.10											
AC-FT	234,300											
AC-FT	335,600											

5-0777. Ruffy Brook near Gonvick, Minn.

Location.--Lat 47°44'50", long 95°24'45", on line between secs.5 and 8, T.149 N., R.37 W., on downstream side of bridge on County Highway 17, 4 miles upstream from mouth and  $4\frac{1}{2}$  miles east of Gonvick.

Drainage area.--45.2 sq mi.

Records available.--April 1960 to September 1965.

Gage.--Wire-weight gage read once daily. Datum of gage is 1,227.93 ft above mean sea level, adjustment of 1912 (levels by Corps of Engineers). Prior to Sept. 9, 1960, reference point at same site and datum.

Average discharge.--5 years, 14.7 cfs.

Extremes.--Maximums and minimums (discharge in cubic feet per second, gage height in feet).

Annual maximum discharge (*) and peak discharges above base (65 cfs), April 1960 to September 1965											
Date	Time	Discharge	Gage height	Date	Time	Discharge	Gage height	Date	Time	Discharge	Gage height
Apr. 7, 1960	-	a 74	b 4.45	June 8, 1962	1600	110	4.10	Apr. 13, 1964	1430	-	b 5.37
Apr. 20, 1961	0400	* 66	b 3.74	June 12, 1962	0200	166	4.82	Apr. 16, 1964	1400	* 134	b 4.45
				July 7, 1962	1800	* 364	6.70				
Apr. 22, 1962	0600	145	b 4.90	Apr. 8, 1963	0600	73	3.21	Apr. 13, 1965	0400	* 412	6.58
May 18, 1962	1800	274	6.05	May 28, 1963	0715	* 225	5.48	May 16, 1965	0300	188	4.58
May 23, 1962	0820	337	6.50	June 11, 1963	1200	196	5.15	June 6, 1965	2000	233	4.83
June 1, 1962	0600	130	4.38	June 15, 1963	1300	111	3.98				

a Not previously published.

b Backwater from ice.

Annual minimum discharge, April 1960 to September 1965							
Water year	Date	Discharge	Gage height	Water year	Date	Discharge	Gage height
1960	Aug. 1, 1960	a 1.0	1.28	1963	Feb. 18-26, 1963	b 0.70	-
1961	Sept. 5, 1961	.60	1.29	1964	Aug. 20, 1964	.90	1.09
1962	Jan. 14-20, 1962	b 1.1	-	1965	Feb. 24 to Mar. 1	b 1.5	-

a Not previously published.

b Minimum daily.

1960-65: Maximum discharge, 412 cfs Apr. 13, 1965 (gage height, 6.38 ft); minimum, 0.60 cfs Sept. 5, 1961; minimum gage height, 1.09 ft Aug. 20, 1964.

Remarks.--Records good except those for periods of no gage-height record and those for winter periods, which are fair.

Cooperation.--Gage-height record for April to June 1960 furnished by Corps of Engineers.

DISCHARGE, IN CUBIC FEET PER SECOND, APRIL TO SEPTEMBER 1960												
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1							19	22	21	22	1.2	5.9
2							18	22	12	19	1.2	8.8
3							18	19	6.5	12	1.2	4.3
4							18	19	5.1	11	1.6	3.8
5							18	18	4.1	11	1.2	3.0
6							35	15	4.1	7.2	1.2	2.5
7							65	13	3.6	6.5	1.9	2.5
8							64	12	3.4	4.1	1.8	2.5
9							58	12	3.4	3.4	1.6	2.5
10							45	11	28	3.0	1.4	2.1
11							35	9.5	21	2.5	1.3	1.9
12							31	9.5	17	2.5	1.2	1.8
13							45	8.8	13	2.5	1.1	1.7
14							40	7.2	13	2.2	1.1	1.4
15	† 2.6						37	7.2	26	2.2	1.1	1.3
16							35	7.6	19	1.1	1.1	1.8
17							32	7.6	15	3.4	1.1	1.8
18							30	6.9	54	2.5	1.2	1.9
19							27	9.5	46	4.6	1.6	1.4
20							26	9.5	38	3.0	1.8	1.4
21							24	6.9	47	2.5	1.4	1.4
22							22	5.9	35	2.2	1.2	1.2
23							21	4.8	63	2.1	1.2	1.2
24							23	4.6	54	1.8	2.5	1.3
25							24	4.6	43	2.5	9.5	1.3
26							28	5.1	41	2.2	13	1.3
27							30	12	38	2.1	16	1.3
28							26	9.5	34	1.8	13	1.3
29							26	7.6	24	1.2	9.5	1.3
30						† 20	24	7.6	24	1.2	4.1	1.6
31		-----			-----		-----	5.9	-----	1.4	3.4	-----
TOTAL							944	320.8	756.2	146.7	101.7	67.5
MEAN							31.5	10.3	25.2	4.73	3.28	2.25
MAX							65	22	63	22	16	8.8
MIN							18	4.6	4.1	1.1	1.1	1.2
AC-FT							1,872	636	1,500	291	202	134

† Result of discharge measurement.

## 5-0777. Ruffy Brook near Gonvick, Minn.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	1.6	3.2	2.2	1.2	.80	1.2	11	28	7.1	.80	1.3	.90
2	1.6	3.0	2.2	1.2	.80	1.2	10	24	7.1	.80	3.4	.90
3	1.6	2.7	2.2	1.2	.80	1.2	9.0	22	6.7	.90	2.6	.70
4	1.2	2.5	2.2	1.2	.80	1.2	8.7	19	3.8	.80	1.7	.70
5	1.2	2.5	2.2	1.2	.80	1.4	8.0	19	3.2	.90	.90	.60
6	1.4	2.5	2.0	1.2	.80	1.6	6.0	39	3.2	.90	.90	.70
7	1.6	2.5	2.0	1.2	.80	2.0	7.0	56	3.4	.80	.70	.80
8	1.8	2.5	2.0	1.0	.80	2.0	7.0	53	2.8	1.0	1.0	1.4
9	1.7	2.5	2.0	1.0	.80	2.0	6.0	17	2.6	.90	1.0	1.8
10	1.7	2.4	2.0	1.0	.80	3.8	5.0	11	2.1	.80	1.0	3.2
11	1.8	2.4	2.0	.90	.80	4.0	5.0	11	1.9	.90	1.0	3.6
12	1.8	2.4	1.8	.90	.80	4.0	6.0	13	1.8	1.8	1.0	3.6
13	1.7	2.4	1.8	.90	.80	4.5	7.0	31	1.7	1.8	.90	17
14	1.8	2.5	1.8	.90	.80	4.5	7.0	32	1.3	11	.70	17
15	1.9	2.5	1.8	.90	.80	4.7	8.0	45	1.3	6.7	.70	12
16	1.7	2.6	1.8	.90	.80	4.5	10	49	1.5	4.3	.70	7.1
17	1.6	2.6	1.8	.90	.80	4.5	20	46	1.5	3.4	.70	6.1
18	1.3	2.6	1.8	.80	.80	4.8	30	43	1.4	2.6	1.3	4.0
19	1.3	2.4	1.6	.80	.80	5.5	50	40	1.4	2.6	2.1	3.4
20	1.3	2.4	1.6	.80	.80	5.0	60	37	1.3	1.9	1.4	2.6
21	1.2	2.4	1.6	.80	.80	6.0	60	31	1.2	1.9	1.4	3.4
22	1.1	2.4	1.6	.80	1.5	8.0	60	27	1.3	1.8	1.3	3.8
23	1.2	2.2	1.4	.80	1.0	57	25	1.3	1.3	1.9	1.3	4.3
24	1.3	2.4	1.6	.80	1.0	12	93	23	1.2	1.7	1.1	4.3
25	1.3	2.5	1.4	.80	1.0	14	61	20	1.3	1.7	.90	3.4
26	1.3	2.4	1.4	.80	1.2	15	57	17	1.3	1.2	.90	3.4
27	1.3	2.4	1.4	.80	1.2	16	47	14	1.2	1.3	.90	2.8
28	2.2	2.3	1.4	.80	1.2	18	53	11	1.1	1.0	1.0	2.8
29	1.2	2.2	1.4	.80	-----	13	38	10	.80	2.6	.90	3.4
30	2.4	1.8	1.2	.80	-----	14	33	9.8	.90	2.6	.70	3.4
31	4.3	-----	1.2	.80	-----	12	-----	8.6	-----	1.9	.80	-----
TOTAL	49.5	74.0	54.2	28.90	24.90	199.6	789.7	831.4	68.60	65.20	36.20	123.10
MEAN	1.60	2.47	1.75	.93	.89	6.44	26.3	26.8	2.29	2.10	1.17	4.10
MAX	4.3	3.2	2.2	1.2	1.5	16	61	56	7.1	11	3.4	17
MIN	1.1	1.8	1.2	.80	.80	1.2	5.0	8.6	.80	.80	.70	.60
AC-FT	98	147	108	57	49	396	1,570	1,650	136	122	77	244

CAL YR 1960: TOTAL

MEAN

MAX

MIN

AC-FT

WAT YR 1961: TOTAL 2,345.30

MEAN 6.43

MAX 61

MIN .60

AC-FT 4,650

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	3.4	2.8	2.8	1.2	1.2	1.8	5.0	50	122	11	4.2	1.8
2	3.2	2.8	2.6	1.2	1.2	1.8	5.0	42	90	9.6	3.9	1.8
3	2.6	3.0	2.6	1.2	1.4	1.8	5.0	35	73	9.4	3.9	2.4
4	2.4	3.0	2.6	1.4	1.4	1.8	10	31	61	15	3.8	2.4
5	2.4	3.0	2.4	1.4	1.6	1.8	60	26	54	13	3.8	2.1
6	2.4	4.5	2.4	1.2	1.6	1.8	100	23	47	15	3.8	2.0
7	4.4	4.5	2.2	1.2	1.6	1.8	90	21	44	264	3.6	2.0
8	2.2	4.0	2.2	1.2	1.6	1.8	70	21	94	300	3.3	2.4
9	3.4	3.8	2.0	1.2	1.6	1.8	60	16	75	236	3.0	34
10	3.8	3.8	2.0	1.2	1.6	2.0	60	21	96	212	2.9	29
11	4.6	3.6	1.8	1.2	1.6	2.0	50	17	150	166	6.1	21
12	5.2	3.8	1.8	1.2	1.8	2.0	40	28	150	104	5.6	15
13	4.9	3.8	1.8	1.2	1.8	2.0	30	80	102	72	4.6	12
14	4.0	4.8	1.8	1.1	1.9	2.0	25	111	73	63	4.4	10
15	3.8	5.0	1.6	1.1	1.9	2.0	20	116	50	46	4.2	10
16	3.6	4.8	1.6	1.1	1.9	2.0	20	150	48	38	3.6	10
17	3.4	4.7	1.6	1.1	1.8	2.2	20	216	46	33	3.6	8.4
18	3.2	4.0	1.4	1.1	1.8	2.2	50	254	41	28	3.5	7.4
19	3.0	3.5	1.4	1.1	1.8	2.2	80	156	33	18	3.3	6.0
20	3.0	3.0	1.4	1.1	1.8	2.4	80	109	28	18	3.4	5.8
21	3.0	3.0	1.4	1.2	1.8	2.4	120	98	23	16	3.0	3.8
22	2.8	3.0	1.4	1.2	1.8	2.4	140	102	26	16	3.1	3.5
23	2.8	3.0	1.4	1.2	1.8	2.4	120	301	20	14	2.9	3.5
24	4.6	2.8	1.4	1.2	1.8	2.6	110	293	16	12	2.8	3.5
25	3.0	2.8	1.4	1.4	1.8	2.6	100	243	13	10	2.4	3.4
26	3.0	3.5	1.4	1.4	1.8	2.8	87	193	12	9.4	2.2	3.4
27	2.8	3.0	1.4	1.4	1.8	2.8	78	152	12	7.2	2.3	2.9
28	2.8	3.0	1.2	1.2	1.8	8.0	74	92	8.8	6.5	2.0	2.9
29	2.8	2.8	1.2	1.2	-----	7.0	63	70	14	5.4	1.9	3.0
30	2.6	2.8	1.2	1.2	-----	6.0	56	74	11	5.4	1.9	3.0
31	2.8	-----	1.2	1.2	-----	5.0	-----	109	-----	4.8	1.8	-----
TOTAL	99.9	105.9	54.6	37.5	47.3	83.2	1,828.0	3,250	1,632.8	1,777.7	104.8	218.4
MEAN	3.22	3.53	1.76	1.21	1.69	2.68	60.9	105	54.6	57.3	3.38	7.28
MAX	5.2	5.0	1.8	1.4	1.9	8.0	140	301	150	300	6.1	34
MIN	2.2	2.8	1.2	1.1	1.2	1.8	5.0	16	8.8	4.8	1.8	1.8
AC-FT	198	210	108	74	94	165	3,630	6,450	3,240	3,530	201	433

CAL YR 1961: TOTAL 2,428.00

MEAN 6.65

MAX 61

MIN .60

AC-FT 4,820

WAT YR 1962: TOTAL 9,240.1

MEAN 25.3

MAX 301

MIN 1.1

AC-FT 18,330

## 5-0777. Ruffy Brook near Gonvick, Minn.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	4.4	4.1	6.8	2.2	1.6	.80	37	17	84	9.4	15	2.9
2	4.5	3.9	7.0	2.2	1.4	.80	36	16	70	8.1	14	2.7
3	4.8	3.8	6.6	2.2	1.4	.80	35	16	58	6.8	13	2.7
4	5.1	3.8	6.3	2.2	1.4	.80	40	15	55	5.3	12	2.2
5	4.4	3.4	4.6	2.2	1.4	.80	54	14	48	5.3	9.2	2.2
6	4.2	3.8	4.8	2.2	1.6	.80	46	14	42	5.3	8.9	2.2
7	3.6	3.9	4.0	2.2	1.6	1.0	46	18	37	4.8	8.7	2.2
8	6.0	3.8	4.0	2.2	1.4	1.2	67	18	39	4.3	8.7	2.2
9	4.5	4.1	3.0	2.2	1.2	1.2	54	19	62	4.1	7.1	1.9
10	3.9	3.9	3.2	2.0	1.2	1.2	50	17	163	3.6	8.1	1.7
11	3.9	6.3	3.0	2.0	1.2	1.2	42	16	189	4.3	7.6	1.9
12	3.9	6.6	3.0	1.8	1.0	1.4	39	15	148	8.7	7.1	1.8
13	4.1	6.8	3.0	1.8	1.0	1.4	33	17	110	7.1	6.6	1.7
14	3.8	6.8	3.0	1.8	.80	1.4	29	18	80	6.3	6.8	1.7
15	3.9	6.1	3.2	1.8	.80	1.4	28	18	97	5.8	6.8	1.6
16	3.8	6.1	3.2	1.8	.80	1.4	29	16	52	5.8	7.4	1.6
17	4.2	5.8	4.0	1.8	.80	1.2	28	17	38	6.0	6.8	3.1
18	3.9	5.8	4.4	1.8	.70	1.2	28	18	33	6.0	6.3	3.1
19	3.9	5.6	4.4	1.8	.70	2.2	23	18	27	5.6	6.3	2.7
20	3.9	6.0	4.0	1.7	.70	3.0	20	19	22	5.6	4.8	2.4
21	4.1	6.6	4.0	1.7	.70	3.5	19	20	19	5.3	3.4	2.0
22	4.9	6.8	3.8	1.7	.70	10	19	18	15	5.6	4.8	1.7
23	4.9	6.8	3.4	1.7	.70	20	19	13	13	5.8	5.1	1.9
24	4.8	6.8	3.4	1.7	.70	25	18	18	12	6.0	3.6	2.1
25	4.8	6.8	3.4	1.6	.70	30	18	17	12	8.4	3.1	2.1
26	4.2	6.0	3.4	1.6	.70	35	24	20	20	14	3.6	2.1
27	4.2	6.6	3.0	1.6	.80	38	19	111	16	17	3.6	2.2
28	3.8	6.6	3.0	1.6	.80	38	18	214	12	18	3.6	2.2
29	3.8	6.3	3.0	1.6	-----	38	24	176	12	17	4.1	2.2
30	4.1	6.3	2.6	1.6	-----	37	20	136	10	15	4.1	2.2
31	3.8	-----	2.2	1.6	-----	37	-----	99	-----	17	3.4	-----
TOTAL	132.1	165.8	120.7	57.9	28.70	336.70	958	1,184	1,595	247.3	213.6	65.2
MEAN	4.26	5.33	3.89	1.87	1.03	10.9	31.9	38.2	53.2	7.98	6.89	2.17
MAX	6.0	6.8	7.0	2.2	1.6	38	67	214	189	18	15	3.1
MIN	3.6	3.4	2.2	1.6	.70	.80	16	14	10	3.6	3.1	1.6
AC-FT	262	329	239	115	57	668	1,900	2,350	3,160	491	424	129

CAL YR 1962: TOTAL 9,988.3

MEAN 25.7

MAX 301

MIN 1.1

AC-FT 18,640

WAT YR 1963: TOTAL 5,105.00

MEAN 14.0

MAX 214

MIN .70

AC-FT 10,130

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	2.0	2.0	1.8	1.2	1.3	1.4	3.0	35	6.3	10	1.6	5.3
2	2.0	2.1	1.8	1.2	1.3	1.4	3.0	32	5.6	14	1.6	5.8
3	2.0	2.0	1.8	1.2	1.3	1.4	6.0	33	5.1	10	2.0	3.6
4	2.0	2.0	1.6	1.2	1.3	1.4	14	44	4.3	8.4	1.4	2.6
5	2.1	2.1	1.6	1.2	1.3	1.4	16	40	4.1	7.1	1.5	2.1
6	2.0	2.0	1.6	1.2	1.3	1.6	16	39	4.3	9.2	1.2	2.1
7	2.0	2.0	1.6	1.2	1.3	1.6	14	42	6.3	7.9	1.2	2.2
8	2.2	2.4	1.6	1.2	1.3	1.6	12	36	9.2	6.6	1.1	2.2
9	2.1	2.4	1.4	1.2	1.3	1.6	13	35	13	4.6	1.1	2.0
10	2.1	2.4	1.4	1.2	1.3	1.6	16	32	11	5.1	1.3	1.9
11	2.1	2.2	1.4	1.2	1.4	1.6	20	33	10	4.3	1.3	1.8
12	2.1	2.2	1.4	1.2	1.4	1.8	30	35	12	4.1	1.2	1.7
13	2.1	2.2	1.4	1.2	1.4	1.8	90	23	14	3.8	1.2	1.6
14	2.1	2.2	1.2	1.2	1.4	2.0	100	22	14	3.1	1.1	1.6
15	1.9	2.2	1.2	1.2	1.4	2.0	114	18	13	3.1	1.2	1.6
16	1.9	2.2	1.2	1.2	1.4	1.8	131	17	13	2.9	1.1	1.6
17	1.8	2.2	1.2	1.2	1.4	2.5	108	17	14	2.4	1.1	1.4
18	1.9	2.2	1.2	1.2	1.4	2.5	91	14	16	2.0	1.1	1.3
19	1.9	2.2	1.2	1.2	1.4	4.0	101	13	21	1.8	1.0	1.3
20	2.0	2.2	1.2	1.2	1.4	6.0	64	13	20	4.8	.90	1.8
21	2.0	2.1	1.2	1.2	1.4	3.0	65	14	18	2.9	2.0	1.9
22	1.9	2.1	1.2	1.2	1.4	3.0	76	14	17	2.2	1.9	2.2
23	1.8	2.1	1.2	1.2	1.4	3.0	70	14	20	2.0	1.6	1.2
24	1.8	2.1	1.2	1.2	1.4	3.0	62	14	21	2.0	1.7	1.7
25	1.8	2.1	1.2	1.2	1.4	3.0	55	14	18	1.9	1.5	1.4
26	1.9	2.0	1.2	1.2	1.4	3.0	49	9.2	16	1.9	1.5	1.4
27	1.8	2.0	1.2	1.3	1.4	3.0	42	8.4	16	2.1	3.1	1.6
28	1.8	2.0	1.2	1.3	1.4	3.0	40	7.9	15	2.0	2.4	1.6
29	1.8	2.0	1.2	1.3	1.4	3.0	43	8.9	14	1.9	2.2	1.6
30	2.0	1.8	1.2	1.3	-----	3.0	39	8.7	10	1.9	3.1	1.5
31	2.2	-----	1.2	1.3	-----	3.0	-----	8.7	-----	1.9	2.9	-----
TOTAL	61.1	63.7	42.0	37.7	39.6	72.0	1,503.0	694.8	381.2	137.9	49.10	170.0
MEAN	1.97	2.12	1.35	1.22	1.37	2.32	50.1	22.4	12.7	4.45	1.58	5.67
MAX	2.2	2.4	1.8	1.3	1.6	4.0	131	44	21	14	3.1	1.7
MIN	1.8	1.8	1.2	1.2	1.3	1.4	3.0	7.9	4.1	1.8	.90	1.3
AC-FT	121	126	83	75	79	143	2,980	1,380	756	274	97	337

CAL YR 1963: TOTAL 4,853.20

MEAN 13.3

MAX 214

MIN .70

AC-FT 9,630

WAT YR 1964: TOTAL 3,252.10

MEAN 8.89

MAX 131

MIN .90

AC-FT 6,450

5-0777. Ruffy Brook near Govick, Minn.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	14	3.2	3.1	2.6	1.9	1.5	3.0	21	10	3.8	1.8	3.0
2	13	6.5	3.1	2.6	1.9	1.6	3.1	27	41	3.8	2.1	2.5
3	12	3.8	3.1	2.6	1.8	1.6	3.3	34	93	3.4	1.9	2.2
4	11	2.9	3.0	2.6	1.8	1.7	3.6	29	139	3.2	2.0	2.5
5	10	2.3	3.0	2.6	1.8	1.7	7.0	27	163	2.9	2.0	2.2
6	9.7	2.5	3.0	2.5	1.8	1.8	17	27	200	2.6	7.3	2.4
7	8.9	2.6	3.0	2.5	1.8	2.0	26	28	187	2.6	3.8	2.7
8	7.8	2.6	3.0	2.5	1.8	2.1	20	28	167	2.6	2.7	2.5
9	7.3	3.0	3.1	2.5	1.9	2.2	22	28	108	2.5	2.4	2.5
10	6.5	3.0	3.1	2.5	1.9	2.2	55	48	83	2.5	2.2	2.5
11	5.5	5.2	3.2	2.5	1.9	2.3	150	47	64	2.4	1.9	2.6
12	5.0	6.0	3.2	2.6	1.9	2.5	270	38	49	44	1.8	2.5
13	4.3	5.2	3.1	2.7	1.8	2.7	398	36	36	23	1.8	3.0
14	4.3	4.3	3.1	2.8	1.8	3.0	359	30	23	7.8	1.8	5.0
15	3.6	4.3	3.1	2.8	1.8	3.2	313	102	18	6.5	1.6	6.2
16	3.8	4.0	3.0	2.8	1.7	3.2	248	167	14	4.5	1.6	4.8
17	4.0	3.6	3.0	2.8	1.7	3.2	177	139	12	4.5	2.6	6.5
18	4.5	3.4	3.0	2.7	1.7	3.1	131	127	11	5.8	2.1	5.8
19	4.5	3.3	2.9	2.7	1.7	3.1	101	110	10	3.6	2.0	4.8
20	4.5	3.3	2.8	2.6	1.6	3.0	77	99	10	3.2	1.8	4.0
21	4.3	3.2	2.8	2.6	1.6	3.0	59	83	8.1	3.4	1.8	4.0
22	4.0	3.2	2.7	2.5	1.6	2.9	56	54	7.8	3.2	1.7	6.0
23	4.0	3.2	2.7	2.4	1.6	2.9	52	43	6.5	2.9	1.7	9.5
24	3.8	3.3	2.7	2.4	1.5	2.9	47	39	5.2	2.6	1.8	8.7
25	3.8	3.4	2.7	2.4	1.5	2.9	44	36	4.5	2.4	2.1	7.8
26	3.6	3.4	2.6	2.3	1.5	2.9	38	28	4.5	2.4	4.0	7.0
27	3.4	3.3	2.6	2.2	1.5	2.8	31	27	3.8	2.2	3.4	6.2
28	3.2	3.3	2.6	2.2	1.5	2.8	29	30	7.0	2.2	2.9	6.2
29	3.2	3.2	2.6	2.1	-----	2.8	26	25	6.2	2.2	2.9	5.8
30	3.0	3.2	2.6	2.0	-----	2.8	21	22	4.8	2.2	3.4	11
31	3.0	-----	2.6	2.0	-----	2.9	-----	20	-----	2.2	3.0	-----
TOTAL	183.5	108.3	90.1	77.6	48.3	79.3	2,787.0	1,599	1,476.4	163.1	75.9	142.4
MEAN	5.92	3.61	2.91	2.50	1.73	2.56	92.9	51.6	49.2	5.26	2.45	4.75
MAX	14	6.5	3.2	2.8	1.9	3.2	398	167	200	44	7.3	11
MIN	3.0	2.5	2.6	2.0	1.5	1.5	3.0	20	3.6	2.2	1.6	2.2
AC-FT	364	215	179	154	96	157	5,530	3,170	2,930	324	151	282
CAL YR 1964: TOTAL	3,467.20											
MEAN	9.47											
MAX	131											
MIN	.90											
AC-FT	6,880											
CAL YR 1965: TOTAL	6,830.9											
MEAN	18.7											
MAX	398											
MIN	1.5											
AC-FT	13,550											

Note.--No gage-height record Feb. 18 to Mar. 24.

5-0780. Clearwater River at Plummer, Minn.

Location.--Lat 47°55', long 96°03', in SE¼SW¼ sec.4, T.151 N., R.42 W.. on right bank 200 ft downstream from Soo Line Railroad bridge, 300 ft downstream from bridge on U.S. Highway 59, 0.9 mile northwest of railroad depot in Plummer, and 8 miles upstream from Hill River.

Drainage area.--512 sq mi.

Records available.--April 1939 to September 1965.

Gage.--Water-stage recorder. Datum of gage is 1,099.12 ft above mean sea level, adjustment of 1912 (levels by Corps of Engineers). Prior to Nov. 10, 1939, staff gage at site 100 ft upstream at same datum.

Average discharge.--26 years, 169 cfs (122,400 acre-ft per year).

Extremes.--Maximums and minimums (discharge in cubic feet per second, gage height in feet).

Annual maximum discharge (*) and peak discharges above base (500 cfs), water years 1961-65											
Date	Time	Discharge	Gage height	Date	Time	Discharge	Gage height	Date	Time	Discharge	Gage height
Apr. 25, 1961	2330	* 461	4.88	Apr. 4, 1963	0500	* 966	a 7.54	June 20, 1964	0715	772	6.14
Apr. 21, 1962	0630	894	a 6.64	June 2, 1963	1430	660	5.74				
May 25, 1962	0100	* 3,170	11.24	June 13, 1963	1630	573	5.41	Apr. 11, 1965	-	-	a 11.97
June 9, 1962	1800	* 3,640	11.90	Apr. 16, 1964	-	-	a 8.78	Apr. 12, 1965	0630	* 3 620	11.88
July 12, 1962	0100	2,100	9.53	Apr. 17, 1964	1130	* 1,640	8.57	May 19, 1965	1300	658	6.43
Mar. 29, 1963	1430	580	a 6.73	May 7, 1964	0215	818	6.30	June 8, 1965	1200	1,390	8.00
				June 10, 1964	0515	912	6.62				

a Backwater from ice.

Annual minimum discharge, water years 1961-65							
Water year	Date	Discharge	Gage height	Water year	Date	Discharge	Gage height
1961	Aug. 17, 1961	14	2.20	1963	Jan. 19 to Feb. 1	a 22	-
1962	Feb. 28 to Mar. 7, 1962	a 26	-	1964	Aug. 19, 1964	a 22	-
				1965	Aug. 21, 22, 1965	30	-

a Minimum daily.

1939-65: Maximum discharge, 3,640 cfs June 9, 1962 (gage height, 11.90 ft); maximum gage height, 11.97 ft Apr. 11, 1965 (backwater from ice); minimum discharge, 7.9 cfs July 8, 1940.

Remarks.--Records good except those for winter periods, which are fair. Slight regulation by Clearwater Lake. Records of chemical analyses for the water year 1963 are published in reports of the Geological Survey.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	34	57	30	40	24	34	150	328	98	21	41	30
2	33	60	54	38	24	36	135	295	95	20	38	30
3	32	61	54	38	24	36	125	269	92	21	36	29
4	31	60	54	38	24	36	120	246	87	24	34	30
5	31	57	54	38	24	38	115	220	80	23	30	30
6	31	55	52	38	25	38	115	213	72	21	30	29
7	31	53	52	38	25	38	115	222	69	19	26	26
8	30	55	52	36	25	40	120	209	66	18	25	30
9	30	36	50	36	25	40	120	205	58	18	23	34
10	31	44	50	36	25	40	111	190	54	18	23	50
11	31	56	48	36	25	40	92	179	53	20	20	81
12	36	40	48	36	26	40	90	174	50	25	20	86
13	40	60	48	36	26	42	86	167	45	25	22	90
14	46	56	48	34	26	42	90	202	42	30	21	98
15	50	56	48	32	26	42	80	230	41	53	18	134
16	50	75	48	32	26	44	68	273	40	81	17	129
17	50	75	48	32	26	44	66	293	37	83	17	112
18	47	65	48	33	26	46	170	304	34	75	20	101
19	44	40	48	33	26	55	154	302	30	68	18	95
20	43	50	46	28	26	70	202	291	30	64	34	92
21	41	55	44	28	28	95	323	278	30	62	44	95
22	39	54	44	28	28	110	390	256	28	62	43	107
23	39	54	44	28	28	125	380	234	25	56	40	122
24	39	52	44	26	28	140	372	209	25	51	38	117
25	38	50	44	26	28	160	421	187	25	53	36	102
26	37	48	44	26	30	190	450	170	23	50	35	91
27	37	48	42	24	10	210	442	151	22	45	33	84
28	36	40	40	24	12	200	429	137	21	42	31	80
29	39	35	38	24	-----	200	403	125	21	44	30	83
30	48	35	40	24	-----	170	375	116	20	40	30	78
31	50	-----	40	24	-----	155	-----	105	-----	41	29	-----
TOTAL	1,194	1,582	1,444	990	736	2,596	6,309	6,780	1,413	1,273	902	2,295
MEAN	38.5	52.7	46.6	31.9	26.3	83.7	210	219	47.1	41.1	27.1	76.5
MAX	50	75	54	40	32	210	450	328	98	83	44	134
MIN	30	35	30	24	24	34	66	105	20	16	17	26
AC-FT	2,370	3,140	2,860	1,960	1,460	5,150	12,510	13,450	2,800	2,520	1,790	4,550
CAL YR 1960-61	TOTAL 31,232			MEAN 85.3		MAX 620	MIN 21	AC-FT 61,950				
WAT YR 1961-62	TOTAL 27,514			MEAN 75.4		MAX 450	MIN 17	AC-FT 54,570				

## RED RIVER OF THE NORTH BASIN

5-0780. Clearwater River at Plummer, Minn.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DAY	DCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	76	53	48	34	28	26	50	568	1,600	160	161	53
2	76	53	45	34	28	26	50	515	1,410	147	144	53
3	71	33	45	34	28	26	55	463	1,230	145	139	52
4	70	42	44	34	30	26	60	421	1,070	155	150	51
5	70	50	42	34	30	26	140	377	942	219	212	55
6	69	56	40	32	30	26	400	340	847	228	234	52
7	66	62	38	32	30	26	470	305	738	251	212	49
8	63	55	38	32	30	28	580	283	1,630	657	176	53
9	63	55	38	32	30	28	520	273	3,490	1,050	155	70
10	65	50	38	32	30	28	430	275	3,330	1,390	144	197
11	76	60	38	30	30	30	385	287	2,540	1,940	139	271
12	77	60	38	30	30	30	380	291	2,430	2,000	169	287
13	82	60	38	30	30	40	410	332	1,880	1,630	196	261
14	85	38	30	30	30	40	440	384	1,550	1,390	234	174
15	76	63	38	30	30	30	430	622	1,200	1,220	163	215
16	72	63	36	30	30	30	395	749	982	1,090	166	197
17	70	62	36	30	28	30	460	972	957	972	152	185
18	66	36	30	28	30	30	700	1,600	1,140	879	137	173
19	66	60	36	28	28	32	720	1,530	1,090	795	126	164
20	63	50	36	28	28	34	770	1,570	841	682	116	148
21	61	60	36	28	28	36	860	1,390	580	591	104	132
22	61	60	36	28	28	36	795	1,940	474	528	99	120
23	58	58	34	28	28	38	789	1,940	424	508	92	109
24	56	55	34	30	28	38	769	3,040	385	435	86	100
25	55	50	34	30	28	38	752	3,100	325	355	84	97
26	54	48	34	30	28	40	721	2,920	271	293	79	95
27	57	50	34	30	28	42	679	2,610	230	244	72	89
28	56	45	34	30	26	44	644	2,090	197	227	71	85
29	56	40	34	28	-----	46	625	1,630	178	223	65	80
30	55	50	34	28	-----	48	601	1,560	176	212	58	76
31	53	-----	34	28	-----	50	-----	1,740	-----	185	55	-----
TOTAL	2,038	1,638	1,164	944	808	1,030	15,080	35,667	34,187	20,801	4,130	3,803
MEAN	65.7	54.6	37.5	30.5	28.9	33.2	503	1,541	1,140	671	133	127
MAX	82	70	48	34	30	40	860	3,100	3,490	2,000	234	287
MIN	53	33	34	26	26	26	273	176	145	55	49	51
AC-FT	4,040	3,250	2,310	1,870	1,600	2,040	29,910	70,740	67,810	41,760	8,190	7,540
CAL YR 1961: TOTAL 28,134 MEAN 77.1 MAX 450 MIN 17												
WAT YR 1962: TOTAL 121,290 MEAN 332 MAX 3,490 MIN 26 AC-FT 55,800 AC-FT 240,600												

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	74	68	98	46	22	26	480	225	649	127	89	59
2	72	68	110	44	24	26	420	213	657	117	101	54
3	72	72	105	44	24	26	520	203	646	106	107	51
4	70	76	95	42	24	26	750	188	619	96	89	48
5	70	71	80	42	24	26	340	176	604	89	75	48
6	69	68	75	42	26	26	479	171	578	84	69	47
7	69	66	80	42	26	28	520	165	540	77	62	45
8	70	66	75	44	26	28	704	160	486	72	60	43
9	71	85	80	46	26	28	654	158	444	69	53	41
10	72	100	78	42	26	28	508	157	438	67	45	40
11	71	94	76	38	26	30	433	160	466	84	53	40
12	69	92	74	36	25	32	394	152	525	303	53	38
13	71	91	74	34	26	32	359	150	565	179	49	38
14	71	91	72	32	26	34	330	160	568	191	40	40
15	71	91	70	30	26	34	303	167	479	142	44	40
16	69	91	70	28	26	34	291	169	414	122	45	39
17	84	72	84	26	32	32	169	169	353	127	38	46
18	68	88	72	24	26	34	311	173	309	117	54	39
19	63	90	70	22	26	40	289	178	277	100	53	43
20	64	100	68	22	26	40	275	182	249	87	52	51
21	65	90	64	22	26	38	259	184	217	87	49	52
22	69	70	62	22	26	45	241	195	173	86	46	50
23	70	75	58	22	26	90	223	193	152	58	46	49
24	74	85	56	22	26	250	211	184	138	54	52	48
25	71	90	54	22	26	290	203	174	138	53	52	48
26	71	95	52	22	26	310	207	167	167	55	51	47
27	70	100	52	22	26	420	207	164	184	56	50	47
28	70	110	52	22	26	470	209	277	165	67	53	47
29	69	101	50	22	-----	540	221	472	146	76	58	46
30	97	67	46	22	-----	550	523	526	137	65	67	45
31	68	-----	46	22	-----	520	-----	646	-----	80	63	-----
TOTAL	2,617	2,565	2,188	968	715	4,133	10,895	6,273	11,463	3,215	1,833	1,363
MEAN	69.2	85.5	70.6	31.2	25.5	133	363	217	382	104	59.1	45.4
MAX	74	110	110	46	46	750	750	646	565	303	107	59
MIN	63	66	46	22	22	26	203	150	137	53	44	38
AC-FT	4,290	5,090	4,340	1,920	1,420	8,200	21,610	13,350	22,740	6,380	3,640	2,700
CAL YR 1962:	TOTAL 123,365				MEAN 338	MAX 3,490	MIN 26	AC-FT 244,700				
CAL YR 1963:	TOTAL 48,233				MEAN 132	MAX 750	MIN 22	AC-FT 95,670				

## 5-0780. Clearwater River at Plummer, Minn.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	48	43	44	34	30	32	42	472	81	164	52	90
2	47	43	42	34	30	32	44	442	77	159	48	93
3	46	43	40	34	32	32	47	412	72	144	32	89
4	46	43	42	32	32	32	50	421	69	129	26	70
5	45	43	42	32	32	32	55	484	68	116	36	70
6	45	43	42	32	32	32	65	735	66	100	45	70
7	44	44	40	32	32	32	75	769	70	96	27	68
8	43	45	40	32	32	32	75	614	173	95	29	65
9	43	45	40	32	32	32	80	503	743	151	37	62
10	43	46	38	32	32	34	120	449	824	297	33	49
11	42	48	40	30	32	35	180	410	477	160	32	49
12	41	49	40	30	32	35	220	383	403	115	31	50
13	42	38	40	30	32	35	280	348	351	96	30	48
14	42	44	40	30	32	35	390	317	271	85	28	45
15	42	49	40	30	32	36	500	289	208	82	28	44
16	41	55	39	30	32	36	1,000	269	168	84	29	46
17	43	48	39	30	32	35	1,490	255	160	71	27	44
18	44	48	38	30	32	35	1,140	244	183	55	25	42
19	44	46	38	30	32	34	918	232	503	45	22	41
20	43	54	38	30	32	35	835	212	735	65	26	41
21	44	46	38	30	32	36	785	192	522	72	28	41
22	46	30	38	30	32	36	838	180	374	89	30	43
23	49	40	36	30	32	36	948	168	328	85	34	56
24	46	45	36	30	32	38	894	159	361	70	38	74
25	46	50	36	30	32	38	740	147	370	72	38	121
26	46	50	36	30	32	38	679	131	351	64	38	196
27	46	50	36	30	32	38	596	123	301	64	43	255
28	46	48	36	30	32	38	540	110	249	58	45	230
29	44	46	34	30	32	38	515	102	188	44	79	199
30	44	44	34	30	-----	38	513	93	174	55	79	178
31	43	-----	34	30	-----	40	-----	86	-----	53	76	-----
TOTAL	1,374	1,366	1,196	956	924	1,087	14,694	9,750	8,920	3,034	1,171	2,569
MEAN	44.3	45.5	38.6	30.8	31.9	35.1	490	315	297	97.9	37.8	85.6
MAX	49	55	44	34	32	40	1,490	769	824	287	79	225
MIN	41	30	34	30	30	32	42	86	66	44	22	41
AC-FT	2,730	2,710	2,370	1,900	1,830	2,160	29,150	19,340	17,690	6,020	2,320	5,100
CAL YR 1963: TOTAL	45,254			MEAN 124		MAX 750	MIN 22	AC-FT 89,760				
WAT YR 1964: TOTAL	47,041			MEAN 129		MAX 1,490	MIN 22	AC-FT 93,300				

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	174	70	57	46	39	39	48	390	311	150	56	61
2	185	69	56	45	39	40	50	372	587	142	54	62
3	176	70	56	45	39	40	51	414	1,010	123	52	60
4	188	71	56	45	39	41	53	426	1,090	108	49	69
5	160	70	56	44	40	41	57	412	906	96	48	69
6	153	68	56	44	40	42	90	477	835	89	48	66
7	144	66	56	44	40	43	210	433	1,080	88	48	62
8	131	65	56	43	40	44	370	381	1,370	82	51	60
9	123	65	56	43	41	44	520	344	1,340	79	60	57
10	115	66	56	42	41	45	1,000	414	1,290	74	42	55
11	108	71	55	42	41	45	2,250	494	1,170	69	38	55
12	104	76	54	42	41	45	3,480	444	1,050	92	37	54
13	97	84	53	41	42	45	3,040	392	988	187	46	53
14	93	85	52	42	42	44	2,760	348	906	271	41	65
15	90	84	52	42	41	44	2,750	525	789	228	41	93
16	86	84	52	42	41	44	2,370	760	662	174	35	103
17	85	74	51	43	40	44	2,000	830	550	150	37	132
18	85	60	50	42	40	44	1,840	835	449	129	34	140
19	84	46	50	42	40	44	1,740	856	377	114	49	116
20	82	52	50	42	40	43	1,600	809	325	109	46	102
21	81	59	50	41	39	43	1,430	752	277	100	32	90
22	81	62	49	41	39	43	1,250	698	223	96	32	90
23	79	64	49	41	39	43	1,080	622	190	90	32	136
24	76	64	49	41	38	44	954	560	163	85	31	167
25	75	64	49	41	38	44	832	513	147	82	33	164
26	74	64	48	41	38	45	715	460	136	74	44	144
27	74	48	40	38	45	48	601	412	144	68	129	129
28	71	60	47	40	39	46	518	396	178	62	76	121
29	71	59	47	40	-----	46	463	374	188	60	69	142
30	71	58	46	40	-----	47	424	346	158	60	64	295
31	70	-----	46	40	-----	47	-----	321	-----	64	64	-----
TOTAL	3,286	2,010	1,608	1,307	1,114	1,354	34,546	15,810	18,889	3,396	1,457	3,012
MEAN	106	67.0	51.9	42.2	39.8	43.7	1,152	510	630	110	47.0	100
MAX	188	85	57	46	42	47	3,480	856	1,370	271	76	295
MIN	70	44	46	40	38	39	48	321	136	60	31	53
AC-FT	6,520	3,990	3,190	2,590	2,210	2,690	68,520	31,360	37,470	6,740	2,890	5,970
CAL YR 1964: TOTAL	50,009			MEAN 137		MAX 1,490	MIN 22	AC-FT 99,190				
WAT YR 1965: TOTAL	87,789			MEAN 241		MAX 3,480	MIN 31	AC-FT 174,100				

5-0782.3. Lost River at Oklee, Minn.

Location--Lat 47°50'35", long 95°51'30", on west edge of sec.1, T.150 N., R.41 W., on upstream side of bridge on State Highway 222 at northwest edge of Oklee, 12 miles upstream from mouth.

Drainage area--266 sq mi.

Records available--July 1960 to September 1965.

Gage--Wire-weight gage read once daily. Datum of gage is 1,126.94 ft above mean sea level, adjustment of 1912 (levels by Corps of Engineers). Prior to Sept. 9, 1960, reference points at same site at datum 8.00 ft higher. Sept. 9, 1960, to Sept. 30, 1964, wire-weight gage at same site at datum 8.00 ft higher.

Average discharge--5 years, 76.2 cfs (55,170 acre-ft per year).

Extremes--Maximum and minimum discharges for July 1960 to September 1965 are contained in the following table:

Water year	Maximum			Minimum		
	Date	Discharge (cfs)	Gage height (feet)	Date	Discharge (cfs)	Gage height (feet)
1960	July 2, 1960	480	6.15	(a)	0.10	-
1961	Apr. 23, 1961	279	4.34	(b)	.10	c 1.29
1962	May 24, 1962	1,490	8.72	Feb. 27 to Mar. 8	1.8	d 1.65
1963	June 4, 1963	355	5.15	Feb. 16 to Mar. 21	0	-
1964	Apr. 16, 1964	472	6.07	Feb. 15 to Mar. 2	0	-
1965	Apr. 12, 1965	1,780	e 11.12	Aug. 22, 1965	1.4	1.94

a Aug. 7, 20-24, Sept. 26, 27, 1960.

b July 7-13, 15-17, Aug. 14-17, Aug. 29 to Sept. 9, 1961.

c Occurred Aug. 30 to Sept. 8, 1961.

d Occurred Jan. 3, 4, 1962.

e Maximum gage height for year, 11.53 ft Apr. 11, 1965, from floodmark, backwater from ice.

1960-65: Maximum discharge, 1,780 cfs Apr. 12, 1965 (gage height, 11.12 ft); maximum gage height, 11.53 ft Apr. 11, 1965 (from floodmark, backwater from ice); no flow Feb. 16 to Mar. 21, 1963, Feb. 15 to Mar. 2, 1964.

Maximum stage known since 1897, 18.39 ft Apr. 21, 1950 (present datum) from floodmarks (discharge, 2,790 cfs).

Remarks--Records good except those for winter periods, which are poor.

Cooperation--Gage-height record for April to June 1960 furnished by Corps of Engineers.

DISCHARGE, IN CUBIC FEET PER SECOND, JULY TO SEPTEMBER 1960

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1							† 145		† 190	366	4.7	0.60
2										436	3.6	.60
3										400	3.1	.60
4										225	1.8	.60
5							† 199			144	.90	.60
6										41	.30	1.1
7							† 434			84	.10	2.6
8										68	.90	1.5
9										57	2.2	4.1
10										49	2.6	3.6
11										43	6.0	4.1
12										40	6.6	3.6
13										36	3.6	2.6
14							† 195			33	2.6	2.2
15										32	3.1	2.2
16										32	2.6	1.5
17										33	2.2	1.5
18										36	1.1	1.5
19								† 39		38	.40	1.5
20							† 103			33	.10	1.5
21										32	.10	1.1
22										29	.10	2.6
23										28	.10	1.5
24										26	.10	.60
25										24	1.1	.30
26										19	1.8	.10
27										18	1.1	.10
28										16	1.5	.30
29										15	1.1	.60
30									† 399	14	1.1	.30
31	† 16	-----			-----		-----		-----	8.6	.60	-----
TOTAL										2,455.6	57.20	45.60
MEAN										79.2	1.85	1.52
MAX										436	6.6	4.1
MIN										8.6	.10	.10
AC-FT										4 870	113	90

† Result of discharge measurement.

5-0782.3. Lost River at Oklee, Minn.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	.30	11	8.4	4.5	.50	.50	50	113	29	.60	2.6	.10
2	.30	11	8.2	4.0	.50	.50	43	93	28	.60	2.2	.10
3	.40	12	8.0	4.0	.50	.60	40	78	27	.60	2.6	.10
4	.40	11	7.8	3.5	.50	1.0	32	72	25	.60	9.3	.10
5	.40	11	7.8	3.0	.50	5.0	32	64	20	.40	1.8	.10
6	.40	11	8.0	3.0	.40	8.0	32	66	18	.30	1.5	.10
7	.30	10	8.0	3.0	.40	7.5	31	89	17	.10	1.8	.10
8	.30	10	8.0	2.5	.40	7.0	30	97	17	.10	2.2	.10
9	.30	7.3	8.0	2.5	.40	7.5	30	90	18	.10	2.2	.10
10	.30	6.0	8.0	2.5	.40	8.0	29	74	19	.10	1.8	.30
11	.30	6.0	8.0	2.5	.30	8.5	28	76	18	.10	1.5	6.0
12	.30	6.6	8.0	2.0	.30	9.0	28	72	12	.10	.90	16
13	.30	6.6	8.0	2.0	.30	10	28	70	9.3	.10	.30	24
14	.40	7.3	8.0	2.0	.30	10	32	79	8.6	.60	.10	32
15	1.6	8.6	8.0	1.5	.30	12	35	92	8.6	.10	.10	41
16	1.1	7.9	8.0	1.5	.30	18	44	92	7.9	.10	.10	42
17	1.1	7.9	8.0	1.2	.30	20	106	92	6.1	.10	.10	35
18	.90	7.9	7.8	1.1	.30	22	66	95	5.3	2.2	1.1	26
19	4.7	7.9	7.8	1.0	.30	28	92	88	3.6	1.5	.60	22
20	4.7	8.6	7.8	1.0	.30	28	182	74	1.8	1.5	.40	18
21	4.7	8.6	7.5	1.0	.30	32	253	67	3.1	1.8	.40	19
22	4.7	8.6	7.5	1.0	.40	38	276	53	2.6	4.1	.40	27
23	4.7	8.6	7.0	.80	.40	55	277	48	2.6	6.0	.40	32
24	4.7	9.3	6.5	.80	.40	65	263	48	2.2	6.6	.40	33
25	4.7	9.3	6.5	.80	.40	80	243	43	1.8	6.6	.30	28
26	6.0	9.3	6.0	.80	.50	90	244	38	1.5	6.0	.30	25
27	7.3	9.0	5.5	.60	.50	110	232	34	1.5	5.3	.30	22
28	7.3	9.0	5.5	.60	.50	100	200	32	1.1	4.1	.30	19
29	8.6	8.8	5.0	.50	-----	100	170	30	.90	4.1	.10	16
30	9.3	8.6	5.0	.50	-----	70	140	28	.90	3.1	.10	14
31	10	5.0	.50	.50	-----	55	-----	26	-----	3.6	.10	-----
TOTAL	90.80	264.7	226.6	56.20	10.90	1,006.10	3,288	2,116	317.90	61.80	36.30	498.20
MEAN	2.93	8.82	7.31	1.81	.39	32.5	110	68.3	10.6	1.99	1.17	16.6
MAX	10	12	8.4	4.5	.50	110	277	113	29	6.6	9.3	42
MIN	.30	6.0	5.0	.50	.30	5.0	28	28	.90	.10	.10	.10
AC-FT	180	525	449	111	22	2,000	6,520	4,200	631	123	72	988

CAL YR 1960: TOTAL

MEAN

MIN

AC-FT

WAT YR 1961: TOTAL 7,973.50

MEAN 21.8

MAX 277

MIN .10

AC-FT 15,820

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	14	9.5	7.5	3.2	2.2	1.8	35	255	926	93	55	12
2	14	10	7.5	3.2	2.4	1.8	40	239	597	86	48	14
3	13	10	7.5	3.2	2.4	1.8	60	252	513	84	46	12
4	12	10	6.3	3.2	2.2	1.8	120	213	455	152	49	12
5	11	9.5	6.3	3.2	2.2	1.8	200	177	430	179	67	12
6	8.9	9.5	6.0	3.2	2.2	1.8	350	159	406	187	92	12
7	7.5	9.5	5.5	3.2	2.0	1.8	490	141	384	287	85	12
8	7.5	9.5	5.5	3.2	2.0	1.8	390	127	858	483	63	24
9	7.5	10	5.0	3.0	2.0	2.0	311	129	1,360	657	49	64
10	16	10	5.0	3.0	2.0	2.0	276	133	1,460	738	37	123
11	17	7.5	4.8	2.8	2.0	2.2	253	138	1,460	890	39	141
12	23	14	4.6	2.8	1.9	2.6	255	160	1,390	1,150	54	146
13	32	25	4.6	2.8	1.9	2.6	266	201	1,200	1,240	62	136
14	31	24	4.4	2.6	1.9	2.6	269	261	958	1,140	57	101
15	28	20	4.2	2.6	1.9	2.6	269	296	734	1,020	49	71
16	26	19	4.2	2.6	1.9	2.6	224	328	672	834	44	60
17	24	22	4.0	2.6	1.9	2.6	209	586	744	715	37	47
18	19	19	4.0	2.6	1.9	2.8	227	919	744	577	36	40
19	16	19	4.0	2.6	1.9	2.8	257	1,000	651	478	32	36
20	12	19	3.8	2.6	1.9	3.0	280	977	577	412	29	34
21	11	17	3.8	2.4	1.9	8.0	314	904	523	347	25	30
22	9.5	17	3.8	2.4	1.9	7.0	340	926	464	324	22	30
23	11	16	3.8	2.4	1.9	9.0	337	1,210	421	303	20	28
24	12	14	3.6	2.4	1.9	8.0	340	1,440	283	283	20	28
25	12	14	3.6	2.4	1.9	10	343	1,400	323	244	19	27
26	11	10	3.6	2.4	1.9	12	332	1,390	297	217	18	26
27	10	8.9	3.4	2.4	1.8	20	317	1,320	262	186	12	24
28	9.5	7.5	3.4	2.4	1.8	30	300	1,130	232	143	14	22
29	9.5	6.3	3.4	2.2	-----	35	284	940	186	114	14	18
30	9.5	6.3	3.4	2.2	-----	35	272	937	130	85	13	20
31	9.5	-----	3.2	2.2	-----	30	-----	995	-----	63	12	-----
TOTAL	453.9	405.0	143.7	83.8	55.7	248.8	7,960	19,283	19,707	13,711	1,219	1,362
MEAN	14.6	13.5	4.64	2.70	1.99	8.03	265	622	657	442	39.3	45.4
MAX	32	25	7.5	3.2	2.4	35	490	1,440	1,460	1,240	92	146
MIN	7.5	6.3	3.2	2.2	1.8	1.8	35	127	130	63	12	12
AC-FT	900	803	285	166	110	493	15,790	38,250	39,090	27,200	2,420	2,700

CAL YR 1961: TOTAL 8,394.00

MEAN 23.0

MAX 277

MIN .10

AC-FT 16,650

WAT YR 1962: TOTAL 64,632.9

MEAN 177

MAX 1,460

MIN 1.8

AC-FT 128,200

## 5-0782.3. Lost River at Oklee, Minn.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	23	20	28	5.5	.40	0	124	114	229	43	16	12
2	23	19	31	5.5	.40	0	89	99	252	38	16	11
3	21	19	29	5.0	.40	0	77	93	271	32	12	11
4	22	19	25	5.0	.20	0	79	81	335	29	11	9.3
5	22	17	22	4.5	.20	0	123	74	318	23	6.6	9.3
6	22	16	20	4.5	.20	0	161	69	200	19	3.1	7.9
7	22	15	18	4.0	.20	0	202	68	134	17	2.2	4.1
8	18	18	16	4.0	.20	0	277	65	119	18	1.5	3.1
9	20	20	14	3.5	.10	0	305	63	113	16	1.5	2.6
10	20	23	13	3.5	.10	0	296	64	133	14	1.5	2.6
11	18	24	12	3.0	.10	0	272	65	155	19	1.5	2.2
12	16	33	11	2.5	.10	0	216	65	171	225	.90	.90
13	15	32	10	2.5	.10	0	160	68	182	237	.90	1.1
14	15	30	9.5	2.0	.10	0	132	77	192	163	.90	1.5
15	21	30	9.5	2.0	.10	0	120	77	198	99	.40	1.5
16	16	29	9.5	2.0	0	0	134	77	199	62	.40	1.5
17	16	28	9.0	1.6	0	0	173	77	170	50	1.8	1.5
18	16	26	9.0	1.4	0	0	177	75	100	40	.90	1.5
19	16	27	9.0	1.2	0	0	155	74	70	28	.90	1.8
20	16	26	8.5	1.2	0	0	138	75	60	24	1.1	1.8
21	16	28	8.5	1.1	0	0	124	81	50	21	1.1	1.8
22	15	28	8.5	1.0	0	2.0	101	86	44	18	1.1	7.9
23	17	22	8.0	1.0	0	30	93	79	39	11	1.1	10
24	20	21	8.0	1.0	0	80	89	73	33	9.3	1.5	12
25	20	20	7.5	.80	0	90	90	66	47	6.0	1.8	8.6
26	20	22	7.5	.80	0	110	90	66	94	2.2	2.2	14
27	19	27	7.0	.80	0	115	88	68	116	2.2	1.8	16
28	19	27	7.0	.80	0	130	94	112	97	3.6	1.8	16
29	27	26	6.5	.60	-----	140	122	158	66	4.7	1.3	36
30	20	27	6.5	.60	-----	150	131	186	48	6.6	14	20
31	20	-----	6.0	.60	-----	145	-----	208	-----	16	14	-----
TOTAL	584	720	394.0	73.50	2.90	992.0	4,432	2,703	4,235	1,296.6	137.50	212.50
MEAN	18.8	24.0	12.7	2.37	.10	32.0	148	87.2	148	41.8	4.46	7.08
MAX	23	33	31	5.5	.40	150	305	208	335	237	16	20
MIN	15	15	6.0	.60	0	0	77	63	33	2.2	.40	.90
AC-FT	1,160	1,430	781	146	5.8	1,970	8,790	5,360	8,400	2,570	273	421

CAL YR 1962: TOTAL 65,328.3 MEAN 179 MAX 1,460 MIN 1.8 AC-FT 129,600

WAT YR 1963: TOTAL 15,783.00 MEAN 43.2 MAX 335 MIN 0 AC-FT 31,310

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	20	1.5	1.8	.40	.10	0	.80	201	37	36	7.9	25
2	10	1.5	1.8	.40	.10	0	1.0	195	37	35	7.9	32
3	4.0	1.5	1.6	.40	.10	.10	3.0	195	36	29	7.0	33
4	2.2	1.5	1.6	.40	.10	.10	5.0	194	32	27	6.3	25
5	1.8	1.5	1.6	.40	.10	.10	6.5	207	31	24	6.0	33
6	1.8	1.5	1.6	.30	.10	.10	30	235	31	23	5.3	32
7	1.6	1.1	1.6	.30	.10	.10	30	256	38	21	4.1	41
8	1.8	1.1	1.6	.30	.10	.10	30	250	64	17	3.6	23
9	2.0	1.1	1.6	.30	.10	.10	35	250	135	16	3.1	13
10	1.8	1.1	1.6	.30	.10	.10	50	230	163	64	2.6	17
11	2.2	1.1	1.4	.30	.10	.10	100	217	148	92	2.2	22
12	2.4	1.1	1.4	.20	.10	.10	180	185	129	70	1.8	21
13	2.4	1.1	1.4	.20	.10	.10	217	148	103	61	.90	16
14	2.4	.90	1.4	.20	.10	.10	245	113	78	36	.60	12
15	2.2	2.2	1.4	.20	0	.10	295	99	64	23	.40	11
16	2.2	2.2	1.4	.20	0	.10	421	98	56	12	.30	18.6
17	2.0	3.6	1.4	.10	0	.10	460	94	51	22	.30	8.5
18	1.8	3.6	1.3	.10	0	.10	446	91	64	14	.30	2.6
19	2.4	3.1	1.3	.10	0	.10	418	83	97	17	.10	2.6
20	2.2	3.1	1.2	.10	0	.10	408	78	185	11	.30	7.9
21	2.0	2.2	1.2	.10	0	.10	414	72	212	11	.40	7.9
22	2.0	2.0	1.2	.10	0	.20	436	62	205	4.1	.30	8.6
23	2.6	2.0	1.2	.10	0	.20	436	57	187	5.3	.30	14
24	2.2	1.8	1.0	.10	0	.40	393	53	153	1.5	.90	77
25	1.1	1.8	1.0	.10	0	.40	347	50	129	1.5	.90	160
26	.60	1.8	.80	.10	0	.40	315	47	107	.90	4.1	150
27	.60	1.8	.60	.10	0	.40	277	42	86	2.2	4.7	120
28	.60	1.8	.40	.10	0	.40	252	39	68	4.1	14	100
29	.60	1.8	.40	.10	0	.40	234	37	52	4.1	14	85
30	1.5	1.8	.40	.10	-----	.60	219	37	48	4.1	18	80
31	.90	-----	.40	.10	-----	.60	-----	37	-----	2.2	19	-----
TOTAL	83.90	54.20	38.60	6.30	1.40	5.90	6,704.30	3,956	2,826	691.00	138.90	1,191.8
MEAN	2.71	1.81	1.25	.20	.048	.19	223	128	94.2	22.3	4.48	39.7
MAX	20	3.6	1.8	.40	.10	.60	460	254	212	92	19	160
MIN	.60	.90	.40	.10	0	0	80	37	31	.90	10	2.6
AC-FT	166	108	77	13	2.8	12	13,300	7,850	5,610	1,370	276	2,360

CAL YR 1963: TOTAL 14,261.70 MEAN 39.1 MAX 335 MIN 0 AC-FT 28,290

WAT YR 1964: TOTAL 15,698.30 MEAN 42.9 MAX 460 MIN 0 AC-FT 31,140

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	76	20	6.7	4.8	4.3	2.7	2.6	209	102	62	16	7.0
2	68	19	6.5	4.9	4.2	2.7	2.8	229	165	95	13	8.6
3	62	21	6.2	5.0	4.1	2.8	3.2	242	443	50	9.8	7.0
4	46	27	6.0	5.1	3.9	2.8	4.0	224	426	41	8.6	8.0
5	33	20	5.9	5.2	3.8	2.9	8.0	233	483	38	8.0	8.0
6	41	19	5.7	5.4	3.7	3.0	20	300	495	38	13	8.0
7	34	19	5.6	5.4	3.7	3.1	38	246	513	35	12	6.0
8	25	19	5.5	5.4	3.7	3.2	76	197	542	29	12	4.2
9	26	19	5.5	5.3	3.6	3.3	160	231	507	26	10	5.6
10	22	20	5.5	5.3	3.6	3.4	325	263	487	24	9.2	6.5
11	22	17	5.5	5.2	3.6	3.5	700	264	478	22	8.0	6.5
12	20	19	5.5	5.1	3.6	3.5	1,530	234	327	72	7.0	4.6
13	22	22	5.5	5.1	3.5	3.7	1,430	191	379	62	6.0	6.0
14	22	33	5.4	5.0	3.5	3.7	1,600	179	327	115	6.5	17
15	24	33	5.3	4.9	3.4	3.7	1,490	327	290	117	6.5	13
16	26	32	5.2	4.9	3.4	3.6	1,360	390	220	74	27	16
17	28	33	5.1	5.0	3.3	3.2	1,190	342	162	56	29	18
18	25	24	5.1	5.0	3.3	3.2	1,010	344	123	41	9.2	21
19	26	18	5.0	5.1	3.2	3.0	804	314	111	33	5.6	19
20	25	15	4.9	5.2	3.1	2.8	666	292	109	31	3.8	17
21	27	13	4.8	5.4	2.9	2.6	571	277	98	30	2.9	23
22	12	12	4.8	5.4	2.8	2.4	499	267	30	30	1.6	28
23	26	12	4.8	5.4	2.6	2.3	446	488	78	32	1.7	38
24	26	11	4.7	5.4	2.5	2.2	408	236	64	32	2.9	39
25	26	10	4.7	5.3	2.5	2.2	375	233	56	27	3.8	32
26	25	9.8	4.7	5.2	2.5	2.2	343	210	53	21	3.8	33
27	21	9.1	4.7	5.1	2.6	2.2	310	166	62	21	4.6	28
28	20	8.4	4.7	4.9	2.6	2.2	272	115	81	18	2.9	26
29	21	7.6	4.7	4.8	-----	2.2	258	111	72	16	4.2	31
30	20	7.0	4.7	4.7	-----	2.3	234	104	71	16	6.0	60
31	21	-----	4.7	4.5	-----	2.4	-----	109	-----	18	7.0	-----
TOTAL	933	568.9	163.6	158.3	93.5	89.4	16,135.6	7,350	7,498	1,242	261.4	565.0
MEAN	30.1	18.3	5.28	5.11	3.34	2.88	538	237	250	40.1	8.43	18.2
MAX	76	33	6.7	5.4	4.3	3.7	1,600	390	542	117	29	60
MIN	20	7.0	4.7	4.5	2.5	2.2	2.6	104	53	16	1.4	4.2
AC-FT	1,850	1,090	325	314	185	177	32,000	14,580	14,870	2,460	518	1,080
CAL YR 1964: TOTAL 17,167.10 MEAN 46.9 MAX 460 MIN 0 AC-FT 34,050												
MAY YR 1955: TOTAL 35,018.7 MEAN 95.9 MAX 1,600 MIN 1.4 AC-FT 69,460												

5-0785. Clearwater River at Red Lake Falls, Minn.

Location.--Lat 47°53'15", long 96°16'25", in NW¼NE¼ sec.22, T.151 N., R.44 W., on left bank 40 ft downstream from Great Northern Railroad bridge in Red Lake Falls, 1.4 miles upstream from mouth, and 3 miles downstream from Badger Creek.

Drainage area.--1,370 sq mi, approximately.

Records available.--June 1909 to September 1917, October 1934 to September 1965. Monthly discharge only for October and November 1934, published in WSP 1308.

Gage.--Water-stage recorder. Datum of gage is 949.49 ft above mean sea level, adjustment of 1912 (levels by Corps of Engineers). Prior to Sept. 12, 1911, staff gage at site half a mile upstream and Sept. 12, 1911, to Sept. 30, 1917, staff gage at site 40 ft upstream at different datum.

Average discharge.--39 years, 290 cfs (210,000 acre-ft per year).

Extremes.--Maximum and minimum discharges for the water years 1961-65 are contained in the following table:

Water year	Maximum			Minimum		
	Date	Discharge (cfs)	Gage height (feet)	Date	Discharge (cfs)	Gage height (feet)
1961	Apr. 26, 1961	884	3.97	June 10, 1961	3.1	1.41
1962	June 10, 1962	8,600	10.96	Feb. 26 to Mar. 10	a 40	-
1963	July 13, 1963	2,300	b 6.15	Feb. 21, 22, 1963	a 29	-
1964	Apr. 17, 1964	3,050	c 6.58	Nov. 19, 1964	18	1.59
1965	Apr. 13, 1965	8,680	d 10.86	Feb. 25-26, 1965	a 45	-

a Minimum daily.

b Maximum gage height for year, 6.35 ft Mar. 30, 1963, from floodmarks, backwater from ice.

c Maximum gage height for year, 7.56 ft Apr. 16, 1964, backwater from ice.

d From floodmark.

1909-17, 1934-65: Maximum discharge, 9,310 cfs May 6, 1950 (gage height, 11.28 ft); maximum gage height observed, 17.5 ft Apr. 5, 1913, site and datum then in use (backwater from ice); no flow Sept. 15, 1936, Sept. 14, 1939, Aug. 19-22, 1940.

Remarks.--Records good except those for periods of no gage-height record and those for winter periods, which are poor. Slight regulation by Clearwater Lake and several smaller lakes. Records of chemical analyses for the water years 1964-65 are published in reports of the Geological Survey.

Revisions (water years).--WSP 355: 1911-12. WSP 1438: 1910-11, 1917(M).

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	38	87	45	40	25	34	332	654	164	27	44	29
2	38	93	35	40	25	36	344	534	156	24	43	31
3	38	100	25	40	25	40	278	479	152	22	40	30
4	37	100	45	40	25	40	249	426	144	20	36	29
5	38	95	65	40	25	45	243	390	135	21	33	28
6	36	89	70	38	25	45	215	381	125	22	29	29
7	36	87	70	38	25	45	215	408	114	21	27	31
8	36	84	65	38	25	50	210	431	109	20	27	36
9	36	72	65	38	25	45	214	403	107	18	27	46
10	34	70	65	38	25	48	222	399	82	19	28	68
11	34	60	65	36	26	50	170	368	95	19	23	82
12	38	75	62	34	26	50	169	340	87	24	20	104
13	44	70	64	36	26	55	166	324	58	27	19	116
14	44	75	60	36	26	60	166	317	60	29	17	123
15	47	80	55	34	26	70	150	360	60	30	17	137
16	50	72	55	34	26	90	110	403	57	36	17	174
17	54	72	60	32	26	100	116	450	54	72	19	169
18	54	80	60	30	26	110	184	464	50	82	24	154
19	55	82	60	30	26	140	302	464	46	78	21	149
20	55	75	55	30	26	160	421	445	43	74	19	142
21	54	76	50	28	26	170	632	421	40	76	19	139
22	50	85	45	26	28	190	766	386	38	80	30	139
23	50	76	40	28	30	220	783	348	34	68	37	149
24	49	80	42	28	30	250	772	317	33	60	37	164
25	43	78	45	26	30	300	812	288	33	54	37	159
26	41	60	50	26	32	386	878	265	30	52	36	152
27	44	45	70	45	26	440	842	240	29	50	34	139
28	43	68	45	26	34	421	801	217	27	49	33	125
29	49	64	40	25	-----	399	754	203	26	44	31	118
30	68	60	38	25	-----	454	670	184	26	44	30	118
31	76	-----	35	25	-----	364	-----	174	-----	44	29	-----
TOTAL	1,409	2,335	1,621	1,011	752	4,907	12,186	11,483	2,214	1,306	883	3,109
MEAN	45.5	77.8	52.3	32.6	26.9	158	406	370	73.8	42.1	28.5	104
MAX	76	100	70	40	34	454	878	654	164	82	44	174
MIN	34	60	25	25	25	34	110	174	26	18	17	28
AC-FT	2,790	4,630	3,220	2,010	1,490	9,730	24,170	22,780	4,390	2,590	1,750	6,170
CAL YR 1960: TOTAL	64,773			MEAN 177		MAX 1,600		MIN 24		AC-FT 128,500		
WAT YR 1961: TOTAL	43,216			MEAN 118		MAX 878		MIN 17		AC-FT 85,720		

5-0785. Clearwater River at Red Lake Falls, Minn.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	116	80	50	46	42	40	80	1,010	3,940	503	403	118
2	114	78	60	46	42	40	90	952	3,180	436	364	114
3	114	62	55	44	42	40	100	860	2,580	426	426	111
4	107	50	50	44	42	40	160	783	2,110	431	417	109
5	104	60	50	44	42	40	500	715	1,890	576	620	107
6	100	70	50	44	42	40	1,600	642	1,710	659	687	109
7	91	80	50	44	42	40	1,640	576	1,540	1,100	610	104
8	87	85	48	44	42	40	1,890	518	4,090	2,040	479	123
9	89	80	48	44	42	40	1,640	493	7,670	2,410	386	156
10	89	80	48	44	42	40	1,320	493	8,300	3,000	344	291
11	116	70	48	44	42	42	1,110	508	8,020	3,710	328	484
12	116	80	48	44	42	42	1,040	550	6,470	4,030	352	555
13	118	80	46	44	42	42	1,120	593	5,260	3,860	386	529
14	130	85	46	44	42	42	1,180	927	4,260	3,470	386	484
15	152	90	46	44	42	42	1,130	1,140	3,390	3,050	352	440
16	127	85	46	44	42	42	959	1,410	2,950	2,690	328	390
17	118	85	46	44	42	42	984	2,090	3,160	2,350	310	352
18	111	85	46	44	42	42	1,200	2,480	3,220	2,020	281	321
19	107	75	46	44	42	42	1,460	3,170	4,960	1,520	1,230	192
20	104	85	46	44	42	42	1,390	3,490	2,590	1,590	240	271
21	95	70	46	44	42	44	1,460	3,180	2,080	1,400	225	243
22	89	70	46	44	42	46	1,410	3,220	1,720	1,300	211	222
23	84	65	46	44	42	46	1,380	4,960	1,520	1,230	192	208
24	80	65	46	44	42	48	1,350	6,750	1,350	1,130	182	197
25	80	65	46	44	42	50	1,330	6,470	1,200	978	174	187
26	80	65	46	44	40	55	1,280	5,710	1,040	860	164	182
27	76	60	46	44	40	60	1,230	5,220	900	749	154	177
28	78	65	46	42	40	65	1,150	4,720	783	654	149	166
29	80	60	46	42	-----	70	1,110	3,860	681	593	139	159
30	82	50	46	42	-----	70	1,070	3,990	576	529	135	154
31	78	-----	46	42	-----	75	-----	4,810	-----	464	125	-----
TOTAL	3,112	2,180	1,679	1,360	1,170	1,449	33,363	76,230	91,262	50,018	9,807	7,354
MEAN	100	72.7	47.7	43.9	41.8	46.7	1,112	2,459	3,042	1,613	316	245
MAX	152	90	60	46	42	75	1,890	6,750	8,300	4,030	687	555
MIN	76	50	46	42	40	40	80	493	576	426	125	104
AC-FT	6,170	4,320	2,930	2,700	2,320	2,870	66,170	151,200	181,000	99,210	19,450	14,590
CAL YR 1961: TOTAL	44,622			MEAN 122		MAX 878	MIN 17	AC-FT 88,510				
WAT YR 1962: TOTAL	278,784			MEAN 764		MAX 8,300	MIN 40	AC-FT 553,000				

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	141	119	176	78	30	30	600	468	896	300	134	80
2	139	121	178	78	30	30	600	451	926	280	141	80
3	139	121	196	78	30	33	556	413	920	260	141	76
4	139	126	186	76	30	32	363	396	938	240	148	74
5	134	117	146	76	30	32	542	363	908	210	128	71
6	132	128	145	76	32	35	962	343	861	190	113	67
7	132	143	145	78	30	35	1,160	332	820	170	100	65
8	139	130	140	78	30	35	1,360	324	769	160	90	57
9	137	141	135	78	30	35	1,320	324	735	140	84	54
10	134	146	130	76	30	36	1,120	335	713	125	78	49
11	134	196	130	70	30	40	974	308	758	400	69	47
12	134	164	125	65	30	40	861	320	803	900	62	44
13	132	164	120	60	30	40	747	308	861	1,500	64	43
14	132	181	115	50	30	45	645	312	878	1,300	58	41
15	132	171	110	48	30	50	579	332	832	900	57	41
16	132	171	105	45	30	55	547	351	763	550	58	40
17	128	152	102	42	30	60	542	355	702	580	57	38
18	130	137	100	40	30	70	611	367	631	500	57	40
19	123	169	100	38	30	80	583	363	538	350	64	40
20	119	176	98	38	30	100	547	359	476	250	64	40
21	119	146	96	36	29	150	511	359	417	230	60	44
22	121	126	96	36	29	200	480	367	355	210	58	49
23	121	130	90	34	30	250	438	380	294	164	57	49
24	121	159	96	34	30	300	413	363	260	132	52	49
25	123	191	95	32	30	350	392	343	290	123	52	47
26	121	176	85	32	30	430	392	324	343	123	57	47
27	121	176	90	30	30	450	392	316	451	119	60	47
28	121	194	90	30	30	500	400	328	451	115	62	47
29	121	199	85	30	-----	530	417	565	376	119	62	47
30	119	181	85	30	-----	850	447	758	350	137	67	47
31	119	-----	80	30	-----	700	-----	895	-----	141	76	-----
TOTAL	3,989	4,651	3,670	1,622	840	5,622	19,481	12,082	19,345	10,918	2,430	1,560
MEAN	129	155	118	52.3	30.0	181	649	390	645	352	78.4	52.0
MAX	141	199	196	78	32	850	1,340	855	950	1,500	148	80
MIN	119	117	80	30	29	30	363	308	260	115	52	38
AC-FT	7,910	9,230	7,280	3,220	1,670	11,150	38,640	23,960	38,370	21,660	4,820	3,090
CAL YR 1962: TOTAL	284,223			MEAN 779		MAX 8,300	MIN 40	AC-FT 563,900				
WAT YR 1963: TOTAL	86,210			MEAN 236		MAX 1,500	MIN 29	AC-FT 171,000				

Note.--No gage-height record Jan. 29 to Mar. 4, June 30 to July 22.

5-0785. Clearwater River at Red Lake Falls, Minn.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	46	54	78	44	44	48	72	1,010	157	305	92	111
2	46	54	62	44	44	48	74	956	150	301	86	139
3	44	52	58	44	45	50	76	890	143	264	84	130
4	44	54	43	44	45	50	80	908	134	239	71	119
5	43	55	40	42	45	50	90	968	119	213	57	108
6	43	54	48	42	45	50	100	1,370	126	202	52	117
7	43	54	48	42	45	50	120	1,720	126	174	57	111
8	41	54	52	42	45	50	140	1,400	478	166	52	111
9	40	57	56	42	45	52	160	1,140	1,740	191	44	111
10	40	57	57	42	45	54	180	1,020	1,580	890	49	98
11	40	57	55	40	45	56	660	914	1,110	606	49	84
12	40	57	54	40	45	58	740	832	896	388	44	80
13	40	57	52	40	45	60	820	758	763	290	43	80
14	41	47	52	40	46	62	867	660	583	222	40	76
15	43	36	52	39	46	64	1,120	597	451	176	38	74
16	43	52	50	40	46	64	1,850	547	335	152	36	74
17	44	62	50	40	46	64	2,690	516	308	143	36	74
18	44	40	50	40	46	65	2,330	498	320	123	34	71
19	44	40	50	40	46	65	1,820	494	894	104	31	69
20	46	54	50	40	46	65	1,650	463	1,540	121	29	69
21	46	37	48	42	46	66	1,710	417	1,260	123	30	67
22	49	38	48	42	46	66	2,030	388	950	130	37	69
23	49	52	48	42	46	66	1,960	355	798	159	38	90
24	48	38	48	42	46	66	1,860	316	763	137	40	102
25	50	37	48	42	46	66	1,610	283	735	121	43	128
26	54	55	46	44	46	66	1,420	257	676	119	43	308
27	54	67	46	44	46	68	1,270	233	583	113	44	588
28	54	67	46	44	46	68	1,170	219	507	108	50	54
29	55	76	46	44	46	70	1,110	191	392	100	50	463
30	54	76	46	44	-----	70	1,070	178	328	88	84	392
31	54	-----	46	44	-----	72	-----	169	-----	90	94	-----
TOTAL	1,423	1,590	1,573	1,301	1,320	1,869	30,829	20,667	18,945	6,558	1,577	4,655
MEAN	45.9	53.0	50.7	42.0	45.5	60.3	1,028	627	632	212	50.9	155
MAX	55	76	78	44	46	72	2,690	1,720	1,740	890	94	588
MIN	40	36	40	39	44	48	72	169	119	88	29	67
AC-FT	2,820	3,150	3,120	2,580	2,620	3,710	61,150	40,990	37,580	13,010	3,130	9,230

CAL YR 1963: TOTAL 78,486

MEAN 215

MAX 1,500

MIN 29

AC-FT 155,700

WAT YR 1964: TOTAL 92,307

MEAN 252

MAX 2,690

MIN 29

AC-FT 183,100

Note.--No gage-height record Feb. 11 to Mar. 17.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	351	126	80	58	50	46	68	1,070	713	359	169	106
2	351	123	78	58	49	47	74	1,120	1,690	339	150	104
3	332	123	79	49	47	47	81	1,170	2,740	301	134	100
4	312	121	77	60	48	48	95	1,180	2,620	270	123	111
5	294	119	76	60	48	48	170	1,130	2,080	236	117	152
6	273	128	75	60	49	49	350	1,260	2,010	222	119	141
7	254	126	75	49	53	53	175	1,220	2,677	205	113	126
8	242	121	74	60	50	51	1,300	1,070	2,990	199	111	113
9	233	119	72	59	50	52	1,600	956	2,890	188	108	106
10	210	117	70	59	50	53	2,750	1,070	2,650	176	113	100
11	196	126	68	58	49	54	5,800	1,270	2,460	171	98	96
12	181	130	66	58	49	55	7,500	1,160	2,220	378	94	96
13	178	146	65	58	48	55	7,860	1,020	1,990	803	90	98
14	171	157	64	57	48	55	6,650	1,230	1,790	719	86	106
15	166	157	62	57	48	55	6,000	1,380	1,580	611	82	157
16	159	155	61	57	48	55	5,590	2,110	1,370	476	80	213
17	159	146	60	56	48	54	4,920	2,020	1,180	396	108	236
18	169	95	59	56	47	54	4,380	1,810	993	359	113	294
19	159	80	58	56	47	54	3,920	1,690	843	339	73	260
20	157	90	58	56	47	54	3,480	1,600	741	324	74	216
21	152	98	58	56	46	54	3,190	1,510	660	270	80	191
22	148	98	58	56	46	54	2,840	1,400	588	245	65	178
23	146	97	57	55	45	54	2,470	1,290	516	222	57	225
24	139	96	57	55	45	54	2,180	1,190	442	208	55	355
25	134	94	57	54	45	55	1,950	1,100	400	196	55	347
26	134	92	57	53	45	55	1,760	993	359	186	55	312
27	132	90	57	52	46	56	1,620	896	392	171	57	264
28	130	86	58	52	46	57	1,450	849	611	159	117	239
29	128	84	58	52	-----	59	1,220	872	480	152	123	242
30	126	81	58	51	-----	61	1,110	815	434	146	111	564
31	126	-----	58	51	-----	65	-----	724	-----	152	106	-----
TOTAL	6,042	3,421	2,009	1,749	1,335	1,660	83,353	38,175	43,122	9,178	3,036	5,848
MEAN	195	114	64.8	56.4	47.7	53.5	2,778	1,231	1,437	296	97.9	195
MAX	351	157	80	60	50	65	7,860	2,110	2,990	803	169	564
MIN	126	80	57	51	45	46	68	724	359	146	55	96
AC-FT	11,980	6,790	3,980	3,470	2,650	3,290	165,300	75,720	85,530	18,200	6,020	11,600

CAL YR 1964: TOTAL 99,193

MEAN 271

MAX 2,690

MIN 29

AC-FT 196,700

WAT YR 1965: TOTAL 198,928

MEAN 545

MAX 7,860

MIN 45

AC-FT 394,600



5-0790. Red Lake River at Crookston, Minn.--Continued

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	209	174	70	72	80	80	181	2,030	9,030	2,840	2,150	1,440
2	195	166	65	72	80	80	230	1,940	7,500	2,620	2,100	1,430
3	191	142	65	72	80	80	280	1,840	6,220	2,520	2,230	1,470
4	213	78	70	76	80	80	500	1,730	5,280	2,540	2,250	1,610
5	184	166	70	80	84	80	1,000	1,610	4,870	2,510	2,680	1,540
6	177	103	70	80	84	80	2,500	1,480	4,480	2,620	2,710	1,500
7	184	130	70	80	84	80	4,100	1,360	4,330	2,820	2,600	1,470
8	141	80	70	80	84	80	3,700	1,290	4,970	4,030	2,380	1,610
9	149	190	70	80	84	80	3,900	1,240	10,500	5,320	2,110	1,800
10	163	180	70	80	84	80	2,900	1,240	14,900	5,750	2,000	1,910
11	246	220	70	80	82	80	2,430	1,240	16,300	7,420	1,990	2,040
12	394	190	68	79	82	78	2,240	1,300	16,100	7,520	2,000	2,140
13	371	140	68	79	82	81	2,170	1,340	13,700	6,950	2,000	2,140
14	310	120	58	79	82	84	2,400	1,500	11,500	6,190	1,990	2,110
15	310	200	67	79	82	87	2,590	2,100	9,830	5,020	1,950	2,020
16	310	210	67	80	82	90	2,820	2,500	8,400	4,860	1,880	1,970
17	276	180	67	80	82	94	3,120	3,630	7,420	4,490	1,800	1,880
18	317	120	68	80	82	103	3,740	4,630	6,870	4,120	1,720	1,830
19	188	180	70	80	82	104	5,440	5,360	6,840	3,840	1,680	1,760
20	213	160	70	80	82	100	6,020	6,110	6,460	3,560	1,650	1,730
21	206	180	70	80	82	103	5,440	6,190	5,420	3,290	1,630	1,720
22	164	160	70	80	82	106	4,750	5,580	4,930	3,140	1,610	1,690
23	199	150	70	80	82	109	4,180	7,280	4,460	3,040	1,620	1,550
24	184	120	70	80	82	112	3,590	12,300	4,440	2,980	1,590	1,660
25	135	120	70	80	82	163	3,160	14,500	4,230	2,840	1,560	1,670
26	177	120	72	80	82	156	2,840	12,900	3,960	2,690	1,550	1,670
27	191	80	72	80	82	135	2,580	12,400	2,610	1,260	1,540	1,640
28	160	70	72	80	80	142	2,360	8,890	3,280	2,510	1,580	1,640
29	170	70	72	80	-----	146	2,200	7,490	3,120	2,410	1,580	1,640
30	170	70	72	80	-----	152	2,100	6,610	2,930	2,370	1,480	1,580
31	170	-----	72	80	-----	170	-----	8,500	-----	2,280	1,440	-----
TOTAL	6,727	4,279	2,155	2,448	2,296	3,194	85,461	146,310	216,150	117,670	59,060	51,990
MEAN	217	143	69.5	79.0	82.0	103	2,849	4,732	7,205	3,796	1,905	1,733
MAX	394	220	72	80	84	170	6,020	14,500	16,300	7,520	2,710	2,140
MIN	135	70	65	72	80	78	181	1,240	2,930	2,280	1,440	1,430
AC-FT	13,340	8,490	4,270	4,860	4,550	6,340	169,500	290,200	428,700	233,400	117,100	103,100
CAL YR 1961: TOTAL	79,892			219	MAX	1,310	MIN	30	AC-FT	158,500		
WAT YR 1962: TOTAL	697,740			MEAN 1,912	MAX	16,300	MIN	65	AC-FT	1,384,000		

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	1,450	1,470	1,550	980	890	870	1,930	2,360	2,350	1,470	704	767
2	1,350	1,470	1,510	1,000	890	870	2,610	2,610	2,610	1,470	677	776
3	1,430	1,500	1,510	1,010	890	870	2,180	2,230	2,660	1,280	672	772
4	1,420	1,510	1,500	1,020	890	870	2,830	2,130	2,710	1,220	686	758
5	1,470	1,480	1,320	1,020	890	870	2,910	2,120	2,680	1,170	654	772
6	1,450	1,450	898	1,040	890	880	4,120	2,060	2,640	1,100	622	767
7	1,480	1,300	610	1,060	890	900	5,840	2,040	2,550	1,080	610	762
8	1,540	1,000	610	1,080	890	920	5,980	2,010	2,500	1,040	598	812
9	1,550	682	700	1,070	890	920	6,640	1,990	2,450	1,000	598	704
10	1,560	1,040	680	1,080	880	910	5,380	1,990	2,400	950	594	744
11	1,580	1,230	710	1,080	880	910	4,060	2,010	2,380	1,340	590	754
12	1,580	1,330	740	1,050	880	920	3,360	1,990	2,450	2,500	582	758
13	1,570	1,380	760	1,040	880	920	2,990	2,020	2,520	3,570	586	754
14	1,590	1,450	780	1,020	880	920	2,740	2,010	2,560	2,640	590	762
15	1,600	1,480	780	1,010	880	920	2,770	2,010	2,540	1,950	594	731
16	1,600	1,500	800	1,000	880	920	2,780	2,030	2,420	1,540	618	700
17	1,580	1,520	800	990	880	920	2,870	2,050	2,300	1,350	626	690
18	1,550	1,500	780	980	880	910	3,100	2,040	2,200	1,200	630	713
19	1,530	1,500	770	970	880	920	3,220	2,030	2,150	1,140	654	762
20	1,510	1,560	750	960	880	920	3,080	2,040	2,040	1,020	672	776
21	1,500	1,530	780	950	880	930	2,920	2,080	1,970	945	664	790
22	1,530	1,120	900	940	880	950	2,730	2,090	1,910	870	668	839
23	1,520	906	1,000	930	880	1,050	2,650	2,080	1,700	852	672	866
24	1,540	848	990	920	880	1,600	2,510	2,070	1,610	808	659	898
25	1,530	857	980	910	880	2,300	2,460	2,020	1,580	776	664	935
26	1,510	1,190	970	900	870	2,700	2,450	1,990	1,630	776	682	945
27	1,510	1,710	990	900	870	2,600	2,410	1,960	1,680	785	713	965
28	1,510	2,090	990	900	870	2,400	2,400	1,920	1,880	740	713	740
29	1,510	1,880	990	890	-----	2,300	2,370	1,980	1,760	762	722	985
30	1,510	1,620	990	890	-----	2,200	2,330	2,230	1,590	614	744	980
31	1,470	-----	980	890	-----	2,050	-----	2,430	-----	749	718	-----
TOTAL	47,020	41,103	29,118	30,480	24,700	39,118	95,770	64,280	66,620	38,597	20,216	23,977
MEAN	1,517	1,330	939	983	882	1,263	3,192	2,074	2,221	1,245	652	799
MAX	1,510	2,090	990	1,080	890	2,700	6,640	2,430	2,710	3,570	758	985
MIN	1,350	682	610	890	870	870	1,760	1,920	1,580	614	582	690
AC-FT	93,260	81,530	57,750	60,460	48,990	77,630	190,000	127,500	132,100	76,560	40,100	47,560
CAL YR 1962: TOTAL	801,820			MEAN 2,197	MAX	16,300	MIN	72	AC-FT	1,590,000		
WAT YR 1963: TOTAL	521,021			MEAN 1,427	MAX	6,640	MIN	582	AC-FT	1,033,000		

## 5-0790. Red Lake River at Crookston, Minn.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	995	965	578	520	550	400	205	1,540	546	1,930	713	326
2	1,000	848	514	530	545	400	212	1,510	450	1,860	718	246
3	1,000	803	500	530	550	390	232	1,420	430	1,730	2,660	288
4	970	725	490	535	550	390	253	1,410	398	1,580	2,730	281
5	1,040	677	480	535	545	390	326	1,480	370	1,490	1,980	253
6	1,010	630	460	535	545	390	352	1,690	370	1,420	1,460	242
7	1,030	630	450	535	540	390	354	2,060	370	1,370	1,040	219
8	1,010	626	440	540	540	390	354	3,050	466	1,270	812	219
9	1,050	626	420	540	535	390	398	2,380	1,600	1,250	736	208
10	1,050	618	400	540	535	390	514	1,940	5,120	1,620	700	212
11	1,040	626	390	545	535	390	875	1,680	5,000	2,200	690	242
12	1,050	610	380	545	535	380	1,700	1,510	3,900	1,650	654	193
13	1,050	594	390	550	535	390	1,900	1,350	4,090	1,350	626	131
14	1,070	582	390	545	535	400	2,000	1,220	3,550	1,170	618	200
15	1,090	590	400	547	535	400	2,000	1,120	2,900	1,040	610	250
16	1,100	594	390	548	535	410	3,380	1,040	2,410	935	598	178
17	1,060	610	400	550	535	420	5,050	980	2,030	866	582	196
18	1,130	602	420	550	535	334	5,020	935	1,880	839	550	197
19	1,120	594	430	550	530	307	3,670	1,120	2,640	803	538	195
20	1,120	590	450	550	525	292	2,900	1,390	5,100	808	526	153
21	1,130	546	460	550	525	281	2,670	1,160	5,240	785	542	195
22	1,160	482	470	550	525	278	2,910	1,060	4,280	808	518	197
23	1,160	315	480	550	525	330	3,110	1,030	3,480	866	434	242
24	1,170	303	490	550	460	550	2,960	950	3,160	866	434	249
25	1,160	232	490	550	420	378	2,580	884	3,040	834	442	342
26	1,150	225	490	550	415	311	2,250	821	2,820	794	346	462
27	1,130	570	490	550	415	300	1,970	749	2,680	798	274	1,580
28	1,110	762	490	550	415	292	1,790	590	2,480	754	205	2,600
29	1,080	686	490	550	410	319	1,690	642	2,290	736	212	2,610
30	1,070	695	500	550	-----	292	1,610	606	2,070	731	208	1,620
31	1,040	-----	510	550	-----	236	-----	586	-----	700	232	-----
TOTAL	33,385	17,957	14,132	16,870	14,880	11,210	55,245	40,503	75,160	35,853	23,388	13,936
MEAN	1,077	599	456	544	513	362	1,842	1,307	2,505	1,157	754	465
MAX	1,170	965	578	550	550	550	5,050	3,050	5,240	2,200	2,730	2,600
MIN	970	225	380	520	410	236	205	586	370	700	205	131
AC-FT	66,220	35,620	28,030	33,460	29,510	22,230	109,600	80,340	149,100	71,110	46,390	27,640
CAL YR 1963: TOTAL	469,254				MEAN 1,285		MAX 6,640	MIN 225		AC-FT 930,800		
WAT YR 1964: TOTAL	352,519				MEAN 963		MAX 5,240	MIN 131		AC-FT 699,200		

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	1,290	1,160	610	600	610	630	710	3,900	2,570	2,120	1,000	848
2	1,130	1,180	610	600	610	620	730	3,740	3,130	1,980	966	839
3	1,180	1,170	620	600	620	620	770	3,740	5,590	1,880	923	821
4	1,250	1,160	630	600	620	620	850	3,990	7,370	1,820	915	866
5	1,200	1,140	640	610	630	630	1,200	3,990	6,410	1,720	861	960
6	1,140	1,130	640	610	640	630	2,000	4,530	5,350	1,630	816	930
7	1,060	1,120	650	620	640	640	3,300	5,110	6,030	1,570	689	906
8	1,020	960	650	620	640	640	4,000	4,480	7,290	1,480	800	888
9	950	906	650	630	650	640	4,700	3,910	7,560	1,400	815	888
10	916	898	640	630	650	640	5,900	3,660	6,560	1,220	827	880
11	898	935	640	620	660	640	10,000	3,960	5,700	1,120	811	848
12	857	920	630	620	650	640	17,000	4,070	5,130	1,240	796	884
13	844	945	620	620	650	640	18,400	3,640	4,640	3,560	788	893
14	821	965	620	620	640	640	18,700	3,460	4,250	4,390	764	920
15	798	965	610	620	640	640	18,600	3,520	3,910	3,550	760	1,000
16	880	960	610	620	640	630	15,700	4,580	3,540	2,910	752	1,100
17	772	945	610	620	640	630	12,900	5,310	3,210	2,460	752	1,200
18	658	884	610	620	640	620	10,800	4,880	2,860	2,260	763	1,340
19	740	510	610	620	640	620	9,340	4,480	2,570	2,070	763	1,380
20	718	280	600	630	640	620	8,240	4,190	2,370	1,890	731	1,300
21	704	185	600	630	640	620	7,540	4,010	2,180	1,720	736	1,230
22	686	270	600	640	630	620	7,000	3,840	2,080	1,560	740	1,180
23	621	575	600	640	620	620	6,290	3,660	1,990	1,500	708	1,200
24	1,100	620	590	640	620	630	5,810	3,490	1,840	1,390	708	1,370
25	1,210	560	590	640	620	630	5,600	3,340	1,730	1,320	731	1,590
26	1,230	670	590	640	620	640	5,310	3,180	1,650	1,260	722	1,650
27	1,230	590	600	630	640	640	5,030	3,010	1,720	1,190	764	1,600
28	1,220	620	590	630	630	650	4,700	2,850	2,050	1,150	749	1,530
29	1,190	610	600	630	-----	660	4,390	2,770	2,420	1,010	808	1,550
30	1,180	610	600	620	-----	670	4,110	2,730	2,280	903	857	1,600
31	1,180	-----	600	620	-----	690	-----	2,620	-----	915	848	-----
TOTAL	30,883	24,603	19,040	19,290	17,770	19,700	219,620	118,430	115,970	56,188	24,648	34,191
MEAN	996	820	614	622	635	635	7,321	3,820	3,866	1,813	795	1,140
MAX	1,290	1,180	650	640	660	690	18,700	5,110	7,560	4,390	1,000	1,650
MIN	668	185	590	600	610	620	710	2,620	1,650	903	689	821
AC-FT	61,260	48,800	37,770	38,260	35,250	39,070	435,600	234,900	230,000	111,400	48,890	67,820
CAL YR 1964: TOTAL	361,571				MEAN 988		MAX 5,240	MIN 131		AC-FT 717,200		
WAT YR 1965: TOTAL	700,333				MEAN 1,919		MAX 18,700	MIN 185		AC-FT 1,389,000		

5-0825. Red River of the North at Grand Forks, N. Dak.

Location.--Lat 47°56'34", long 97°03'10", in SW 1/4 NE 1/4 sec.33, T.152 N., R.50 W., on left bank on second floor of old sewage plant in Grand Forks, 2.3 miles downstream from Red Lake River and at mile 296.0.

Drainage area.--30,100 sq mi, approximately (includes 3,800 sq mi in closed basins).

Records available.--April 1882 to September 1965. Monthly discharge only prior to May 1901, published in WSP 1308.

Gage.--Water-stage recorder. Datum of gage is 778.35 ft above mean sea level, datum of 1929.

1882-92, gages near site of Northern Pacific Railway bridge, 1 1/2 miles upstream, datum unknown. 1892 to Oct. 15, 1926, staff and chain gages on Northern Pacific Railway bridge at datum about 5 1/2 ft higher, but published at datum only half a foot higher than present datum. Oct. 16, 1926, to Nov. 2, 1933, staff gages near present site, at datum 5 ft higher than present datum but published at present datum. Nov. 3, 1933, to Apr. 13, 1965, water-stage recorder 0.3 mile upstream at present datum.

Average discharge.--83 years, 2,333 cfs (1,689,000 acre-ft per year).

Extremes.--Maximum and minimum discharges for the water years 1961-65 are contained in the following table:

Water year	Maximum			Minimum		
	Date	Discharge (cfs)	Gage height (feet)	Date	Discharge (cfs)	Gage height (feet)
1961	Mar. 28, 1961	3,400	9.75	Sept. 8, 1961	110	1.50
1962	June 16, 1962	26,600	35.45	Dec. 16, 1961	170	2.11
1963	Apr. 11, 1963	10,800	21.23	Aug. 12, 1963	963	4.57
1964	Apr. 19, 1964	13,200	22.71	Sept. 15, 1964	371	2.96
1965	Apr. 17, 1965	52,000	44.92	Nov. 22, 1965	a 590	-

a Minimum daily.

1882-1965: Maximum discharge, about 80,000 cfs Apr. 10, 1897 (gage height, 50.2 ft, site and datum then in use), from rating curve extended above 54,000 cfs; minimum, 2.4 cfs Feb. 3-5, 12, 14, 16-19, 1937 (caused by unusual regulation during repair of dam at Grand Forks).

Remarks.--Records good except those for winter periods, which are fair. Flow regulated by many lakes and reservoirs on tributaries. Records of chemical analyses for the water years 1961-65 are published in reports of the Geological Survey.

Revisions (water years).--WSP 855: 1936(M). WSP 1115: 1942. WSP 1175: 1897(M). WSP 1388: 1904, 1914-15, 1917-19, 1921-22, 1927, 1950.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	322	560	260	280	280	420	2,660	2,520	1,470	518	348	196
2	315	560	260	290	280	450	2,200	2,400	1,380	518	350	146
3	312	596	270	290	280	500	2,020	2,300	1,280	518	352	135
4	302	589	300	290	280	530	1,950	2,160	1,190	503	335	135
5	275	592	360	290	290	560	1,870	2,020	1,120	464	318	119
6	270	603	360	290	290	630	1,680	1,950	1,070	392	290	122
7	278	603	300	300	290	770	1,560	1,880	1,030	338	261	119
8	272	572	280	300	290	970	1,440	1,840	999	305	253	123
9	278	560	290	300	300	1,180	1,380	1,840	975	275	241	119
10	280	430	310	300	300	1,360	1,350	1,870	967	298	229	145
11	298	380	350	310	300	1,500	1,300	1,880	991	345	215	199
12	308	390	380	310	310	1,600	1,260	1,880	1,170	362	209	233
13	310	440	380	320	320	1,650	1,210	1,860	1,180	365	201	350
14	308	470	370	320	330	1,650	1,160	1,790	1,060	407	197	458
15	310	500	370	310	340	1,620	1,120	1,780	967	440	194	446
16	308	470	360	310	340	1,600	1,060	1,920	891	437	190	407
17	315	420	350	310	340	1,580	1,070	2,200	830	428	190	392
18	312	380	340	300	340	1,660	1,060	2,600	785	401	201	401
19	358	420	340	300	340	1,740	1,050	2,840	760	377	194	434
20	383	480	340	310	340	1,760	1,020	2,880	729	380	181	458
21	392	500	340	310	350	1,800	1,100	2,840	712	419	182	467
22	392	490	330	310	350	1,900	1,310	2,750	701	437	182	449
23	392	420	320	300	360	2,000	1,840	2,620	666	437	173	461
24	401	360	310	300	370	2,100	2,240	2,460	638	434	165	503
25	377	380	300	290	350	2,300	2,390	2,300	631	416	156	542
26	389	440	290	290	370	2,800	2,420	2,140	614	383	158	536
27	380	420	290	280	390	3,240	2,480	2,010	563	362	153	533
28	374	420	270	270	400	3,320	2,580	1,870	497	360	155	503
29	395	410	270	270	-----	3,050	2,610	1,760	467	383	165	479
30	494	300	270	280	-----	2,940	2,600	1,660	488	368	161	467
31	539	-----	270	280	-----	2,810	-----	1,560	-----	358	163	-----
TOTAL	10,639	14,155	9,830	9,210	9,120	51,990	50,990	66,380	26,821	12,428	6,762	10,037
MEAN	343	472	317	297	326	1,677	1,700	2,141	894	401	218	335
MAX	539	603	380	320	400	3,320	2,660	2,880	1,470	518	352	542
MIN	270	300	260	270	280	420	1,020	1,560	467	275	153	119
AC-FT	21,100	28,080	19,500	18,270	18,090	103,100	101,100	131,700	53,200	24,650	13,410	19,910
CAL YR 1960: TOTAL	605,528			MEAN 1,654	MAX 17,000	MIN 260	AC-FT 1,201,000					
WAT YR 1961: TOTAL	278,362			MEAN 763	MAX 3,320	MIN 119	AC-FT 552,100					

5-0825. Red River of the North at Grand Forks, N. Dak.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	449	446	255	200	205	240	600	4,920	23,200	7,640	9,550	3,000
2	431	416	275	200	210	240	670	4,730	23,300	7,100	8,500	2,920
3	422	425	300	200	210	245	780	4,580	22,700	6,850	7,800	2,900
4	413	325	305	210	215	255	1,150	4,450	21,200	6,900	7,300	2,860
5	410	300	285	230	215	260	2,200	4,340	19,200	6,080	6,890	2,910
6	413	350	270	220	205	265	4,300	4,210	17,000	10,000	6,910	2,880
7	386	345	265	220	200	265	7,500	4,080	14,300	11,800	6,760	2,810
8	380	310	255	225	195	265	10,300	3,920	11,800	13,900	6,470	2,980
9	386	305	250	230	195	270	11,100	3,750	12,200	16,400	6,140	3,230
10	383	335	260	220	200	270	11,900	3,610	15,500	18,400	5,800	3,410
11	491	392	245	210	210	270	12,600	3,480	18,700	19,800	5,620	3,830
12	534	449	230	205	215	275	12,800	3,410	22,200	21,000	5,500	4,050
13	555	455	215	205	220	265	13,100	3,360	24,800	21,700	5,510	4,120
14	1,130	410	200	205	220	255	13,600	3,370	26,000	22,000	5,740	4,100
15	1,170	404	185	200	230	250	13,800	3,440	26,500	21,700	6,220	4,070
16	967	482	180	195	235	245	14,200	3,770	26,400	20,600	6,700	3,970
17	792	500	175	190	220	240	16,000	4,400	25,500	19,300	7,000	3,810
18	716	425	175	185	210	235	17,400	6,100	24,500	18,100	7,050	3,620
19	694	350	195	180	210	245	17,600	7,900	23,600	17,000	6,830	3,420
20	698	335	190	175	210	260	17,800	9,350	22,900	15,400	6,430	3,250
21	645	383	190	175	215	275	17,900	10,800	22,200	13,600	5,950	3,150
22	614	440	190	175	225	300	17,400	12,200	21,200	16,100	5,510	3,060
23	560	473	185	180	230	315	16,300	12,900	20,000	11,300	5,150	2,970
24	527	434	180	185	235	335	15,000	14,700	18,600	11,100	4,840	2,920
25	509	401	185	185	235	355	13,500	18,400	17,200	11,400	4,540	2,860
26	500	383	195	190	235	385	11,500	21,800	15,500	11,800	4,280	2,830
27	476	342	200	190	235	420	9,450	23,800	13,600	12,100	4,000	2,800
28	458	285	200	190	240	520	7,500	24,600	11,800	12,200	3,710	2,760
29	455	290	200	195	-----	570	6,050	24,700	10,000	12,000	3,440	2,730
30	446	290	200	200	-----	560	5,200	24,300	8,600	11,300	3,250	2,700
31	437	-----	200	200	-----	570	-----	23,200	-----	10,600	3,110	-----
TOTAL	17,849	11,489	6,835	6,170	6,080	9,720	319,200	302,370	580,200	433,170	182,500	95,920
MEAN	576	383	220	199	217	314	10,640	9,754	19,340	13,970	5,887	3,231
MAX	1,170	500	305	230	240	570	17,900	24,700	26,500	22,000	9,550	4,120
MIN	380	285	175	175	195	235	600	3,360	8,600	6,850	3,110	2,700
AC-FT	35,400	22,790	13,560	12,240	12,060	19,280	633,100	599,700	1,151M	859,200	362,000	192,200

CAL YR 1961: TOTAL 279,911 MEAN 767 MAX 3,320 MIN 119 AC-FT 555,200  
WAT YR 1962: TOTAL 1,972,503 MEAN 5,404 MAX 26,500 MIN 175 AC-FT 3,912,000

M Expressed in thousands.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	2,660	2,020	2,530	1,460	1,040	1,200	6,100	3,530	5,260	3,700	1,140	1,220
2	2,580	2,050	2,420	1,420	1,040	1,200	6,230	3,510	5,580	3,510	1,190	1,250
3	2,510	2,060	2,340	1,440	1,040	1,220	5,880	3,470	5,830	3,310	1,200	1,300
4	2,480	2,090	2,320	1,460	1,020	1,240	5,630	3,440	6,330	3,150	1,240	1,340
5	2,460	2,080	2,280	1,460	1,000	1,220	5,880	3,380	6,930	3,020	1,290	1,330
6	2,440	2,080	1,790	1,480	1,000	1,200	5,650	3,350	7,430	2,870	1,280	1,300
7	2,410	2,120	1,240	1,520	1,040	1,200	6,420	3,320	7,740	2,740	1,210	1,300
8	2,420	2,030	1,220	1,540	1,060	1,240	8,620	3,280	7,800	2,620	1,130	1,270
9	2,420	1,860	1,220	1,560	1,080	1,240	10,100	3,230	7,760	2,470	1,070	1,280
10	2,430	1,650	1,160	1,540	1,100	1,240	10,700	3,200	7,400	2,320	1,010	1,250
11	2,440	1,680	1,120	1,480	1,100	1,240	10,500	3,170	7,210	2,300	975	1,230
12	2,440	1,960	1,000	1,460	1,100	1,240	8,880	3,140	7,100	2,700	967	1,220
13	2,440	2,130	1,000	1,420	1,100	1,240	7,260	3,160	7,070	3,080	995	1,180
14	2,440	2,210	1,200	1,320	1,100	1,240	6,180	3,170	7,240	4,200	1,020	1,140
15	2,420	2,300	1,440	1,260	1,080	1,240	5,440	3,140	7,640	4,140	1,130	1,100
16	2,420	2,370	1,560	1,260	1,080	1,340	5,050	3,150	7,900	3,560	1,220	1,090
17	2,410	2,380	1,620	1,240	1,080	1,380	4,870	3,170	8,010	3,060	1,220	1,020
18	2,390	2,380	1,660	1,200	1,120	1,320	4,750	3,230	7,960	2,670	1,180	1,010
19	2,360	2,340	1,640	1,220	1,140	1,320	4,770	3,250	7,480	2,370	1,120	999
20	2,380	2,340	1,620	1,220	1,180	1,320	4,650	3,350	6,720	2,170	1,100	1,000
21	2,310	2,390	1,580	1,220	1,180	1,300	4,520	3,420	5,960	2,020	1,080	1,030
22	2,300	2,180	1,580	1,220	1,180	1,300	4,350	3,450	5,370	1,980	1,070	1,080
23	2,250	1,830	1,600	1,220	1,140	1,340	4,170	3,450	4,910	1,760	1,040	1,090
24	2,180	1,670	1,580	1,180	1,100	1,550	4,020	3,410	4,550	1,620	1,010	1,160
25	2,120	1,520	1,540	1,160	1,180	2,050	3,870	3,360	4,270	1,480	1,020	1,220
26	2,080	1,520	1,500	1,120	1,220	3,100	3,800	3,280	4,100	1,380	1,040	1,260
27	2,060	1,400	1,440	1,080	1,200	3,100	3,730	3,200	4,000	1,280	1,070	1,290
28	2,030	1,440	1,440	1,060	1,200	4,800	3,690	3,110	3,940	1,260	1,090	1,300
29	2,020	2,890	1,480	1,080	-----	5,300	3,680	3,080	3,940	1,230	1,100	1,300
30	2,020	2,820	1,480	1,080	-----	5,500	3,620	3,610	3,870	1,200	1,150	1,300
31	2,020	-----	1,480	1,060	-----	5,400	-----	4,630	-----	1,160	-----	-----
TOTAL	72,340	63,390	49,080	40,440	30,900	60,820	173,010	103,640	187,340	76,230	34,537	35,859
MEAN	2,334	2,113	1,583	1,305	1,104	1,962	5,767	3,343	6,245	2,459	1,114	1,195
MAX	2,660	2,890	2,530	1,560	1,220	5,500	10,700	4,630	8,010	4,200	1,290	1,340
MIN	2,020	1,520	1,000	1,060	1,000	1,200	3,620	3,080	3,870	1,160	967	999
AC-FT	143,500	125,700	97,350	80,210	61,290	120,600	343,200	205,600	371,600	151,200	68,500	71,130

CAL YR 1962: TOTAL 2,121,140 MEAN 5,811 MAX 26,500 MIN 175 AC-FT 4,207,000  
WAT YR 1963: TOTAL 927,586 MEAN 2,541 MAX 10,700 MIN 967 AC-FT 1,840,000

## 5-0825. Red River of the North at Grand Forks, N. Dak.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	1,320	1,410	1,000	780	770	620	820	5,400	1,970	4,070	1,180	614
2	1,320	1,360	970	780	770	620	800	5,080	1,890	3,760	1,170	874
3	1,310	1,260	920	780	770	620	800	4,860	1,780	3,540	1,150	839
4	1,310	1,180	840	770	770	630	800	4,680	1,680	3,370	1,190	740
5	1,270	1,120	840	770	780	630	830	4,530	1,600	3,180	2,680	669
6	1,270	1,070	830	770	780	630	980	4,550	1,580	3,020	2,420	592
7	1,290	1,020	820	770	780	620	1,000	5,400	1,550	2,870	1,960	522
8	1,280	999	810	770	770	610	1,080	6,160	1,700	2,760	1,540	475
9	1,270	995	800	780	760	600	1,350	6,320	1,980	2,680	1,260	450
10	1,260	979	770	780	760	590	1,850	5,900	2,440	2,640	1,080	432
11	1,310	968	760	780	740	590	2,800	5,550	4,460	3,160	976	430
12	1,330	964	750	770	730	590	3,700	5,380	6,200	3,450	929	413
13	1,340	972	740	750	730	610	5,180	5,020	6,150	3,180	870	410
14	1,340	944	750	720	723	630	6,230	4,630	5,970	2,740	816	396
15	1,360	913	760	720	725	630	7,430	4,280	5,890	2,450	755	380
16	1,380	917	750	720	725	670	10,500	4,000	5,440	2,200	732	403
17	1,400	929	740	730	740	720	12,500	3,740	4,880	2,000	711	442
18	1,400	936	740	750	760	680	13,100	3,550	4,460	1,800	682	420
19	1,400	952	760	750	750	660	13,200	3,380	4,350	1,690	669	427
20	1,440	933	780	750	750	670	11,800	3,310	5,050	1,680	639	481
21	1,460	878	790	760	740	670	10,700	3,420	7,350	1,620	642	489
22	1,470	725	780	760	750	680	10,300	3,290	8,700	1,620	672	452
23	1,470	611	790	760	760	740	10,800	3,100	8,460	1,520	679	494
24	1,490	574	790	775	750	1,000	11,200	2,960	7,540	1,480	675	527
25	1,500	620	790	775	710	940	11,000	2,800	6,880	1,470	672	545
26	1,520	649	790	775	660	900	10,100	2,670	6,300	1,420	675	773
27	1,510	611	800	775	640	870	9,750	2,570	5,750	1,380	642	929
28	1,530	630	800	773	632	880	7,430	2,410	5,250	1,350	598	1,420
29	1,510	800	800	773	630	880	6,500	2,230	4,840	1,310	536	2,500
30	1,470	980	800	770	-----	860	5,860	2,130	4,410	1,260	497	2,550
31	1,440	-----	790	770	-----	850	-----	2,050	-----	1,200	478	-----
TOTAL	42,970	27,899	24,860	23,656	21,345	21,870	188,840	125,220	136,500	71,870	30,775	21,098
MEAN	1,386	930	802	763	736	705	6,295	4,039	4,550	2,318	993	703
MAX	1,530	1,410	1,000	780	780	1,000	13,200	6,320	8,700	4,070	2,680	2,550
MIN	1,260	574	740	720	630	590	800	2,050	1,550	1,200	478	380
AC-FT	85,230	55,340	49,310	46,920	42,340	43,380	374,600	248,400	270,700	142,600	61,040	41,850

CAL YR 1963: TOTAL 838,505 MEAN 2,297 MAX 10,700 MIN 574 AC-FT 1,663,000  
 MAT YR 1964: TOTAL 736,903 MEAN 2,013 MAX 13,200 MIN 380 AC-FT 1,462,000

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	2,260	1,660	865	915	980	855	990	13,900	6,170	5,730	2,730	1,610
2	2,010	1,660	865	905	970	865	1,040	12,540	5,490	5,490	2,710	1,590
3	1,800	1,630	865	900	970	875	1,130	11,200	6,930	5,200	2,610	1,570
4	1,750	1,630	865	900	970	885	1,240	10,200	9,020	4,980	2,510	1,610
5	1,780	1,620	865	900	970	900	1,350	9,670	10,600	4,750	2,420	1,600
6	1,760	1,600	855	900	960	910	1,700	9,350	11,000	4,590	2,400	1,620
7	1,670	1,590	855	900	950	920	2,500	9,050	10,000	4,450	2,360	1,630
8	1,620	1,580	855	895	930	920	5,400	9,000	9,950	4,320	2,260	1,560
9	1,540	1,540	855	895	920	920	8,800	8,720	11,400	4,130	2,220	1,510
10	1,500	1,460	855	895	915	925	11,300	8,200	12,100	3,880	2,230	1,490
11	1,490	1,430	855	895	915	930	16,000	7,730	12,000	3,680	2,190	1,510
12	1,500	1,440	855	900	910	940	25,300	7,560	11,600	3,710	2,160	1,520
13	1,500	1,460	855	900	910	955	37,700	7,420	11,100	3,760	2,120	1,520
14	1,450	1,480	845	930	905	960	44,700	7,100	10,600	5,120	2,030	1,570
15	1,380	1,530	845	945	905	950	48,800	6,860	10,000	6,800	1,940	1,590
16	1,340	1,540	865	950	905	945	51,500	6,800	9,460	6,320	1,850	1,610
17	1,340	1,520	870	960	900	960	50,300	7,420	8,770	5,680	1,760	1,690
18	1,340	1,520	870	970	890	990	48,200	8,300	8,100	5,110	1,700	1,780
19	1,280	1,400	865	980	890	980	45,800	8,560	7,480	4,730	1,660	1,900
20	1,220	1,000	860	990	885	970	45,600	8,270	6,940	4,460	1,630	2,000
21	1,220	655	865	1,000	880	935	41,200	7,900	6,540	4,170	1,620	2,050
22	1,210	590	865	1,000	875	930	38,800	7,530	6,310	3,900	1,620	2,110
23	1,150	600	865	990	870	920	36,200	7,250	6,200	3,610	1,580	2,200
24	1,170	620	900	980	860	925	33,300	6,950	5,990	3,510	1,530	2,220
25	1,380	740	900	990	860	930	29,600	6,490	5,650	3,560	1,500	2,320
26	1,580	840	900	990	865	935	26,700	6,430	5,380	3,400	1,500	2,480
27	1,630	850	905	990	860	930	23,800	6,310	5,300	3,150	1,540	2,600
28	1,660	910	910	990	855	930	21,000	6,430	5,430	3,000	1,550	2,630
29	1,660	900	925	990	-----	935	18,400	6,190	5,660	2,930	1,540	2,620
30	1,660	900	930	980	-----	950	16,000	6,180	5,860	2,880	1,550	2,670
31	1,650	-----	925	980	-----	960	-----	6,210	-----	2,780	1,590	-----
TOTAL	47,510	37,855	27,045	29,315	25,475	28,835	734,350	251,400	247,840	133,780	60,610	56,380
MEAN	1,533	1,262	872	946	816	910	23,480	8,110	8,261	4,315	1,955	1,879
MAX	2,260	1,660	930	1,000	980	990	51,500	13,900	12,100	6,800	2,730	2,670
MIN	1,160	590	845	895	855	855	990	6,180	5,300	2,780	1,500	1,490
AC-FT	94,230	75,080	53,640	58,150	50,530	57,190	1,457M	498,600	491,600	265,300	120,200	111,800

CAL YR 1964: TOTAL 753,584 MEAN 2,059 MAX 13,200 MIN 380 AC-FT 1,495,000  
 MAT YR 1965: TOTAL 1,680,395 MEAN 4,604 MAX 51,500 MIN 590 AC-FT 3,333,000

M Expressed in thousands.

5-0830. Turtle River at Manvel, N. Dak.

Location.--Lat 48°05', long 97°11', in SE $\frac{1}{4}$  sec.10, T.153 N., R.51 W., on downstream side of bridge on State Highway 33, 0.3 mile west of Manvel and 10 miles upstream from mouth.

Drainage area.--613 sq mi, of which 57 sq mi is probably noncontributing.

Records available.--October 1945 to September 1965.

Gage.--Water-stage recorder. Datum of gage is 799.28 ft above mean sea level, datum of 1929. Prior to June 29, 1959, chain gage at same site and datum.

Average discharge.--20 years, 45.8 cfs (33,160 acre-ft per year); median of yearly mean discharges, 26 cfs (18,800 acre-ft per year).

Extremes.--Maximums and minimums (discharge in cubic feet per second, gage height in feet).

Annual maximum discharge (*) and peak discharges above base (200 cfs), water years 1961-65							
Date	Time	Discharge	Gage height	Date	Time	Discharge	Gage height
Mar. 14, 1961	1900	-	a 10.46	June 19, 1962	1630	413	9.81
Mar. 24, 1961	1730	* 110	9.53	June 15, 1964	0830	* 568	10.32
				June 23, 1964	1000	* 661	11.40
Apr. 11, 1962	0830	-	a 17.04	Mar. 26, 1963	1140	-	a 9.27
Apr. 14, 1962	0900	* 970	16.22	Apr. 6, 1963	1230	* 150	7.97
May 25, 1962	1000	510	10.28	Apr. 12, 1964	1400	-	a 12.61
June 1, 1962	0100	505	10.23	Apr. 15, 1964	-	500	-
				June 4, 1965	1100	-	-

a Backwater from ice.

Annual minimum discharge, water years 1961-65

Water year	Date	Discharge	Gage height	Water year	Date	Discharge	Gage height
1961	Many days	0	-	1964	Long periods	0	-
1962	Long periods	0	-	1965	Jan. 29 to Feb.4	.60	a 4.77
1963	Many days	0	-				

a Occurred Aug. 24, 25, 1965.

1945-65: Maximum discharge, 28,000 cfs Apr. 19, 1950 (gage height, 21.5 ft, from floodmarks), from rating curve extended above 4,300 cfs on basis of contracted-opening measurement of peak flow; no flow in fall or winter of some years.

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

Revisions (water years).--WSP 1438: 1947(M), 1948. WSP 1728: Drainage area.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	0	7.5	1.0	.60	.60	.50	45	20	8.0	1.0	1.5	0
2	0	7.5	.80	.60	.50	.60	40	20	7.0	1.0	1.5	0
3	0	7.5	.80	.80	.50	.60	40	19	6.0	1.0	1.5	0
4	0	8.0	.80	.80	.60	.60	38	19	5.0	.80	1.4	0
5	0	8.0	.80	1.0	.60	.60	35	18	5.0	.80	1.4	0
6	0	7.5	.60	1.1	.60	.70	25	18	4.4	.80	1.4	0
7	0	6.0	.60	1.1	.60	.60	40	20	3.8	.60	1.3	0
8	0	6.0	.60	1.0	.60	.80	35	20	4.0	.60	1.2	0
9	0	5.0	.60	1.0	.60	.90	25	18	3.8	.60	1.0	0
10	0	4.0	.60	1.0	.60	1.0	20	18	3.5	.60	.80	.10
11	0	3.0	.50	1.0	.60	1.0	20	18	3.5	.60	.80	.20
12	0	2.5	.50	.80	.60	20	22	18	3.5	.60	.80	.20
13	0	2.5	.60	.80	.60	35	22	16	3.5	.60	.60	.30
14	0	2.5	.60	.80	.60	50	24	16	3.5	.60	.60	.40
15	0	3.0	.60	.80	.50	50	20	16	3.5	.60	.60	.40
16	0	3.0	.60	.80	.50	35	18	16	3.4	.60	.60	.40
17	0	2.5	.60	.80	.50	30	22	14	3.4	.50	.40	.40
18	0	2.5	.60	.80	.50	35	22	14	3.4	.40	.40	.40
19	0	2.5	.60	.80	.50	40	24	13	3.2	.40	.40	.40
20	0	2.5	.60	.80	.50	45	24	13	3.0	.60	.30	.50
21	0	2.5	.60	.80	.50	40	22	12	3.0	1.0	.30	.60
22	0	3.0	.60	.80	.50	55	20	10	2.8	1.5	.30	1.0
23	0	3.0	.60	.80	.50	75	20	10	2.4	3.0	.20	1.5
24	0	3.0	.60	.80	.50	95	20	10	2.0	4.0	.20	3.0
25	0	3.0	.60	.60	.50	95	22	10	1.8	2.5	.20	4.8
26	0	3.0	.50	.60	.50	90	22	10	1.6	2.0	.20	4.5
27	.40	2.5	.50	.60	.50	85	24	10	1.4	1.8	.20	4.5
28	2.0	2.5	.50	.60	.50	60	24	10	1.2	1.8	.10	4.0
29	3.0	2.0	.50	.60	-----	60	22	10	1.2	1.6	.10	4.0
30	6.0	1.5	.50	.60	-----	55	20	9.0	1.0	1.5	.10	3.5
31	8.0	-----	.50	.60	-----	50	-----	8.0	-----	1.5	.10	-----
TOTAL	19.40	120.0	19.00	24.60	15.40	1,117.10	777	453.0	102.8	35.50	20.50	35.10
MEAN	.63	4.00	.61	.79	.55	36.0	25.9	14.6	3.43	1.15	.66	1.17
MAX	8.0	8.0	1.0	1.1	.60	95	45	20	8.0	4.0	1.5	4.8
MIN	0	1.5	.50	.60	.50	.50	18	8.0	1.0	.40	.10	0
AC-FT	38	238	38	49	31	2,220	1,540	899	204	70	41	70

CAL YR 1960: TOTAL 15,933.60 MEAN 43.5 MAX 1,060 MIN 0 AC-FT 31,600  
 WAT YR 1961: TOTAL 2,739.40 MEAN 7.51 MAX 95 MIN 0 AC-FT 5,430

## 5-0830. Turtle River at Marvel, N. Dak.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	3.1	2.3	3.1	0	0	0	0	70	482	31	5.7	.10
2	2.4	2.3	3.1	0	0	0	0	54	369	28	6.4	.10
3	2.1	2.1	3.1	0	0	0	0	46	242	26	6.7	.10
4	1.9	2.4	2.9	0	0	0	0	41	167	24	9.7	.70
5	1.2	2.1	3.1	0	0	0	0	39	126	23	8.5	2.4
6	.90	1.9	2.9	0	0	0	0	38	96	23	7.0	1.4
7	.40	1.5	2.9	0	0	0	0	42	78	32	5.2	.80
8	.30	1.2	2.8	0	0	0	0	70	42	32	4.7	1.9
9	.10	1.2	2.6	0	0	0	0	50	42	63	3.7	4.0
10	.10	1.2	2.3	0	0	0	410	43	67	29	2.9	22
11	.20	1.5	1.9	0	0	0	750	43	145	27	3.5	24
12	5.5	2.1	1.5	0	0	0	900	43	169	26	3.7	26
13	26	3.1	1.4	0	0	0	960	68	138	24	4.2	14
14	28	3.5	1.2	0	0	0	940	57	122	23	4.2	8.0
15	25	4.0	1.0	0	0	0	910	68	127	22	4.2	6.0
16	20	4.7	.80	0	0	0	875	88	142	21	4.9	4.0
17	12	4.9	.70	0	0	0	810	96	175	20	3.7	3.5
18	7.4	4.4	.50	0	0	0	755	112	332	19	3.5	3.1
19	6.7	4.4	.50	0	0	0	700	114	407	19	4.2	2.8
20	6.4	4.4	.40	0	0	0	625	96	380	18	2.6	2.4
21	5.2	4.2	.30	0	0	0	484	76	383	18	1.4	2.0
22	4.7	4.0	.30	0	0	0	352	68	214	17	1.7	1.5
23	3.7	4.0	.20	0	0	0	268	123	154	16	1.4	1.2
24	3.3	3.5	.10	0	0	0	228	401	115	14	1.0	1.2
25	2.9	4.2	.10	0	0	0	192	504	83	14	1.0	1.2
26	2.6	4.7	.10	0	0	0	154	449	65	13	1.0	1.2
27	2.4	4.7	.10	0	0	0	127	321	55	12	.50	1.2
28	2.3	4.2	.10	0	0	0	108	200	49	12	.20	1.2
29	2.3	3.7	0	0	0	0	94	143	43	9.7	.10	1.2
30	2.3	3.3	0	0	0	0	86	180	36	8.1	.10	1.2
31	2.1	-----	0	0	0	0	-----	439	-----	6.4	.10	-----
TOTAL	183.50	95.7	40.00	0	0	0	10,778	4,126	5,094	637.2	107.70	140.40
MEAN	5.92	3.19	1.29	0	0	0	359	133	170	20.6	3.47	4.68
MAX	28	4.9	3.1	0	0	0	960	504	482	32	9.7	26
MIN	.10	1.2	0	0	0	0	0	36	36	6.4	.10	.10
AC-FT	364	190	79	0	0	0	21,380	8,180	10,100	1,260	214	278

CAL YR 1961: TOTAL 2,900.20 MEAN 7.95 MAX 95 MIN 0 AC-FT 5,750

WAT YR 1962: TOTAL 21,202.50 MEAN 58.1 MAX 960 MIN 0 AC-FT 42,050

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	1.2	9.0	12	1.0	0	0	50	16	17	0	22	.20
2	1.4	10	12	1.0	0	0	40	16	15	.20	18	.20
3	1.4	10	12	1.0	0	0	40	16	13	.60	12	.20
4	1.2	10	13	1.0	0	0	35	13	11	.80	7.7	.20
5	1.0	10	6.0	1.0	0	0	70	13	9.7	1.0	6.7	.20
6	.90	10	6.0	1.0	0	0	140	19	8.9	2.5	7.4	.20
7	1.0	10	5.5	1.0	0	0	130	18	11	1.0	5.7	.10
8	1.2	10	5.5	1.0	0	0	115	7.7	13	1.0	4.4	.10
9	1.7	8.0	4.5	1.0	0	0	95	4.4	22	1.0	2.9	.10
10	2.0	9.0	3.0	1.0	0	0	80	3.5	70	1.0	2.3	.20
11	2.1	9.5	2.5	.90	0	0	70	3.7	29	1.0	1.9	.20
12	2.4	10	2.0	.80	0	0	59	3.7	9.7	1.0	1.5	.20
13	2.4	10	1.5	.70	0	0	50	5.2	7.4	.90	1.0	.40
14	3.1	10	1.2	.60	0	0	43	7.0	14	.80	1.0	1.0
15	4.2	12	1.0	.50	0	0	36	6.4	14	.80	1.0	1.4
16	5.2	12	1.0	.40	0	0	35	8.1	13	1.5	.80	1.0
17	6.4	12	1.2	.30	0	0	36	10	8.5	45	.70	.70
18	6.4	14	1.5	.20	0	0	29	9.7	10	45	.50	.60
19	5.5	12	2.0	.10	0	.10	28	7.4	10	35	.40	.80
20	5.2	12	2.0	.10	0	.10	28	7.4	12	28	.30	.90
21	5.2	12	2.0	.10	0	.10	24	8.1	9.3	22	.30	1.0
22	7.7	9.7	2.0	.10	0	.50	20	13	5.5	16	.20	1.0
23	8.1	7.7	1.5	.10	0	5.0	18	29	4.2	8.5	.20	1.0
24	8.1	6.7	1.0	.10	0	30	17	34	5.2	6.0	.20	1.4
25	7.7	8.5	1.0	0	0	115	18	32	6.4	4.7	.20	1.4
26	8.0	9.7	1.0	0	0	120	16	27	8.5	4.7	.20	1.2
27	7.0	12	1.0	0	0	115	14	21	7.7	5.5	.20	.90
28	7.5	15	1.0	0	0	95	14	20	7.4	8.1	.20	.90
29	7.5	15	1.0	0	0	70	16	18	1.7	15	.20	.90
30	8.0	13	1.0	0	0	60	15	16	0	27	.20	1.0
31	8.0	-----	1.0	0	0	55	-----	17	-----	26	.20	-----
TOTAL	138.70	318.8	108.9	15.00	0	665.80	1,381	430.3	374.1	311.60	100.50	19.60
MEAN	4.47	10.6	3.51	.48	0	21.5	46.0	13.9	12.5	10.1	3.24	.65
MAX	8.1	15	13	1.0	0	120	140	34	70	45	22	1.4
MIN	.90	6.7	1.0	0	0	0	14	3.5	0	0	.20	.10
AC-FT	275	632	216	30	0	1,320	2,740	853	742	618	199	39

CAL YR 1962: TOTAL 21,449.70 MEAN 58.8 MAX 960 MIN 0 AC-FT 42,540

WAT YR 1963: TOTAL 3,864.30 MEAN 10.6 MAX 140 MIN 0 AC-FT 7,660

## 5-0830. Turtle River at Marvel, N. Dak.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	.80	.80	.30	0	0	0	.40	37	4.4	75	14	11
2	.70	.80	.30	0	0	0	.50	35	3.8	55	15	13
3	.70	.70	.30	0	0	0	.60	33	3.8	44	15	12
4	.40	.60	.30	0	0	0	.80	33	3.6	37	13	12
5	.20	.40	.30	0	0	0	1.0	33	3.6	32	12	11
6	.30	.60	.30	0	0	0	5.0	36	4.0	30	11	10
7	.30	.60	.30	0	0	0	15	39	4.4	26	9.8	8.0
8	.30	.40	.20	0	0	0	60	35	5.9	24	8.0	6.8
9	.60	.40	.20	0	0	0	120	31	12	21	6.5	5.4
10	.80	.40	.10	0	0	0	150	30	30	18	5.4	4.9
11	.80	.60	.10	0	0	0	200	27	107	17	4.7	4.2
12	.80	.70	.10	0	0	0	250	24	246	15	3.8	3.6
13	.80	.80	.10	0	0	0	300	22	507	14	3.1	3.0
14	1.1	.80	.10	0	0	0	380	22	555	13	2.8	2.4
15	1.2	.70	0	0	0	0	480	19	550	12	2.6	2.4
16	1.2	.70	0	0	0	0	480	18	500	11	2.8	2.4
17	1.1	.70	0	0	0	0	405	17	454	11	2.8	2.2
18	1.0	.70	0	0	0	0	359	15	354	10	2.6	2.2
19	1.0	.80	0	0	0	0	289	15	278	10	2.2	2.2
20	1.2	.80	0	0	0	.10	195	14	345	12	2.2	2.2
21	1.7	.80	0	0	0	.10	131	13	504	12	2.4	2.2
22	2.6	1.0	0	0	0	.10	108	12	608	15	3.1	2.2
23	3.0	.70	0	0	0	.10	94	10	655	15	3.6	5.0
24	2.6	.60	0	0	0	.10	82	9.8	609	15	4.4	10
25	2.2	.60	0	0	0	.20	71	9.1	520	14	11	10
26	1.6	.60	0	0	0	.20	73	7.7	436	14	13	32
27	1.2	.60	0	0	0	.20	67	6.2	314	15	13	50
28	1.2	.60	0	0	0	.20	49	5.9	204	12	14	65
29	1.2	.40	0	0	0	.30	43	5.4	141	15	11	65
30	1.0	.40	0	0	0	.30	39	4.9	102	15	11	60
31	.80	-----	0	0	0	.40	-----	4.7	-----	14	12	-----
TOTAL	34.40	19.30	3.00	0	0	2.30	4,449.30	623.7	8,074.5	646	235.8	422.3
MEAN	1.11	.64	.097	0	0	.074	148	20.1	269	20.8	7.61	14.1
MAX	3.0	1.0	.30	0	0	.40	480	39	655	75	15	65
MIN	.20	.40	0	0	0	0	.40	4.7	3.6	10	2.2	2.2
AC-FT	68	38	6.0	0	0	4.6	8,830	1,240	16,020	1,280	468	838

CAL YR 1963: TOTAL 3,354.60 MEAN 9.19 MAX 140 MIN 0 AC-FT 6,650  
 WAT YR 1964: TOTAL 14,510.60 MEAN 39.6 MAX 655 MIN 0 AC-FT 28,780

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	32	9.1	5.6	2.0	.60	2.0	2.6	42	72	50	10	7.5
2	26	9.4	5.6	1.8	.60	2.0	2.6	62	130	40	12	10
3	22	9.8	4.8	1.8	.60	2.0	3.0	80	233	30	14	12
4	19	10	4.5	1.8	.60	1.8	4.0	100	298	23	14	14
5	15	9.8	3.9	1.8	.80	1.8	6.0	106	249	19	14	20
6	13	9.8	3.7	1.8	.80	2.0	20	192	163	16	14	20
7	12	9.1	3.7	1.8	1.0	2.4	60	236	139	14	13	30
8	11	8.3	3.8	1.8	1.0	2.4	300	202	119	13	10	31
9	10	7.1	3.8	1.6	1.4	2.2	450	154	102	13	9.1	27
10	12	6.8	3.8	1.6	1.4	2.2	620	137	82	13	8.6	24
11	12	7.1	3.7	1.4	1.4	2.2	910	128	67	12	7.7	21
12	12	7.4	3.9	1.4	1.6	2.2	1,560	110	52	23	7.7	18
13	11	7.1	3.9	1.4	1.8	2.2	2,800	94	41	36	7.1	16
14	11	6.5	3.8	1.2	1.8	2.2	3,100	81	35	27	6.2	15
15	11	6.8	3.4	1.2	1.8	2.2	1,960	68	30	26	5.6	21
16	11	7.1	3.4	1.0	1.8	2.2	1,340	63	26	29	4.3	25
17	10	7.1	3.4	.80	1.8	2.0	970	60	24	25	3.4	36
18	10	6.8	3.4	.80	1.8	2.0	700	57	21	19	3.3	44
19	10	6.7	3.2	.80	1.8	2.0	470	52	19	16	2.6	51
20	9.8	6.6	3.2	.80	2.0	2.0	320	46	18	15	2.5	55
21	9.1	6.6	3.2	.80	2.0	2.0	250	46	17	15	2.3	46
22	9.1	6.5	3.2	.80	1.8	2.0	205	44	16	15	2.0	38
23	9.1	6.4	2.8	.80	1.8	2.0	168	39	14	15	1.9	38
24	9.1	6.4	2.6	.80	1.8	2.0	130	39	13	16	1.8	39
25	9.4	6.2	2.6	.80	1.8	2.0	100	45	13	16	1.9	43
26	9.4	6.2	2.0	.80	1.8	2.0	70	55	14	14	2.2	54
27	9.4	6.0	2.0	.80	2.0	2.1	60	60	24	12	2.5	59
28	10	5.8	2.0	.80	2.0	2.1	55	65	39	10	2.6	58
29	9.8	6.0	2.0	.60	-----	2.1	50	69	55	9.7	3.4	51
30	9.8	6.0	2.0	.60	-----	2.1	45	64	60	9.7	5.0	57
31	9.1	-----	2.0	.60	-----	2.4	-----	66	-----	10	6.4	-----
TOTAL	383.1	220.5	104.9	36.80	41.40	64.8	16,731.2	2,662	2,185	601.4	201.1	980.5
MEAN	12.4	7.35	3.38	1.19	1.48	2.09	558	85.9	72.8	19.4	6.49	32.7
MAX	32	10	5.6	2.0	2.0	2.4	3,100	236	298	50	14	59
MIN	9.1	5.8	2.0	.60	.60	1.8	2.6	39	13	9.7	1.8	7.5
AC-FT	760	437	208	73	82	129	33,190	5,280	4,330	1,190	399	1,940

CAL YR 1964: TOTAL 15,162.40 MEAN 41.4 MAX 655 MIN 0 AC-FT 30,070  
 WAT YR 1965: TOTAL 24,212.70 MEAN 66.3 MAX 3,100 MIN .60 AC-FT 48,030

5-0836. Middle Branch Forest River near Whitman, N. Dak.

Location.--Lat 48°14'50", long 98°07'00", in SW 1/4 sec. 16, T.15S N., R.58 W., 150 ft downstream from bridge on State Highway 35 and 6 miles north of Whitman.

Drainage area.--73 sq mi, approximately.

Records available.--October 1960 to September 1965.

Gage.--Water-stage recorder.

Average discharge.--5 years, 1.32 cfs (956 acre-ft per year).

Extremes.--Maximums and minimums (discharge in cubic feet per second, gage height in feet).

Annual maximum discharge (\*) and peak discharges above base (70 cfs), water years 1961-65

Date	Time	Discharge	Gage height	Date	Time	Discharge	Gage height	Date	Time	Discharge	Gage height
Mar. 20, 1961	1500	-	a 3.59	Apr. 21, 1962	0900	* 100	a 4.62	June 11, 1964	2040	134	4.91
Mar. 23, 1961	1800	* 1.6	a 3.11	June 25, 1963	0500	* 7.0	3.44	June 19, 1964	0700	* 192	5.23
Apr. 15, 1962	1400	-	a 4.83	Apr. 13, 1964	-	72	4.91	Apr. 11, 1965	-	* 240	a 5.76

a Backwater from ice.

No flow for most of each year.

1960-65: Maximum discharge, 240 cfs Apr. 11, 1965 (gage height, 5.76 ft, backwater from ice); no flow for most of each year.

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

Discharge, in cubic feet per second, water years October 1960 to September 1963

Mar. 20, 1961....	0.10	Apr. 21, 1962....	95	May 29, 1962....	0.20	June 19, 1962....	0.40
21.....	.20	22.....	87	30.....	.90	20.....	.30
22.....	.40	23.....	57	31.....	1.0	21.....	.20
23.....	1.4	24.....	32	June 1.....	1.2	22.....	.10
24.....	1.0	25.....	15	2.....	1.2	23.....	.10
25.....	1.2	26.....	7.0	3.....	1.0	24.....	.10
26.....	.80	27.....	3.4	4.....	.90	Mar. 23, 1963....	.10
27.....	.20	28.....	1.3	5.....	1.0	24.....	.10
Apr. 8, 1962....	.10	29.....	1.2	6.....	.80	25.....	.20
9.....	.40	30.....	1.0	7.....	2.7	26.....	.20
10.....	2.0	May 1.....	.20	8.....	1.8	27.....	.20
11.....	1.5	2.....	.10	9.....	1.1	28.....	.20
12.....	2.0	15.....	.10	10.....	1.1	29.....	.10
13.....	2.5	19.....	.10	11.....	.80	30.....	.10
14.....	3.0	20.....	.10	12.....	.60	31.....	.10
15.....	20	23.....	.70	13.....	.30	Apr. 9.....	.20
16.....	40	24.....	.80	14.....	.30	10.....	.10
17.....	65	25.....	.40	15.....	2.6	June 2.....	.30
18.....	45	26.....	.30	16.....	2.2	3.....	.10
19.....	45	27.....	.20	17.....	1.2	25.....	1.1
20.....	60	28.....	.10	18.....	.70	26.....	.10

Month	Cfs-days	Maximum	Minimum	Mean	Runoff in acre-feet
March 1961.....	5.30	1.4	0	0.17	11
Water year 1960-61.....	5.30	1.4	0	.015	11
Calendar year 1961.....	5.30	1.4	0	.015	11
April 1962.....	586.40	95	0	19.5	1,160
May.....	5.20	1.0	0	.17	10
June.....	22.70	2.7	0	.76	45
Water year 1961-62.....	614.30	95	0	1.68	1,220
Calendar year 1962.....	614.30	95	0	1.68	1,220
March 1963.....	1.30	.20	0	.042	2.6
April.....	0.30	.20	0	.010	.6
June.....	1.60	1.1	0	.053	3.2
Water year 1962-63.....	3.20	1.1	0	.009	6.4

Note.--Flow occurred only on days listed above.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965												
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	0	0	0	0	0	0	0	1.3	.80	0	0	0
2	0	0	0	0	0	0	0	1.3	5.1	0	0	0
3	0	0	0	0	0	0	0	.90	7.5	0	0	0
4	0	0	0	0	0	0	0	.40	15	0	0	.20
5	0	0	0	0	0	0	1.0	.80	5.2	0	0	1.0
6	0	0	0	0	0	0	2.0	2.9	4.4	0	0	.40
7	0	0	0	0	0	0	5.0	3.0	2.9	0	0	.20
8	0	0	0	0	0	0	10	2.0	2.1	0	0	.10
9	0	0	0	0	0	0	15	1.5	1.2	0	0	0
10	0	0	0	0	0	0	32	1.5	.80	0	0	0
11	0	0	0	0	0	0	145	.70	.70	0	0	.10
12	0	0	0	0	0	0	132	.50	.60	0	0	.10
13	0	0	0	0	0	0	89	.20	.40	0	0	.10
14	0	0	0	0	0	0	101	.10	.30	9.5	0	.20
15	0	0	0	0	0	0	109	0	.10	9.2	0	.40
16	0	0	0	0	0	0	81	0	.10	4.9	0	.60
17	0	0	0	0	0	0	62	0	0	.50	0	.50
18	0	0	0	0	0	0	44	0	0	1.8	0	.40
19	0	0	0	0	0	0	32	0	0	1.2	0	.20
20	0	0	0	0	0	0	22	0	0	1.2	0	.10
21	0	0	0	0	0	0	18	0	0	.90	0	.10
22	0	0	0	0	0	0	13	0	0	.70	0	.20
23	0	0	0	0	0	0	8.6	0	0	.60	0	.40
24	0	0	0	0	0	0	6.4	0	0	.60	0	.30
25	0	0	0	0	0	0	5.4	.30	0	.40	0	.30
26	0	0	0	0	0	0	5.0	.70	0	.30	0	.20
27	0	0	0	0	0	0	2.6	.20	0	.20	0	.20
28	0	0	0	0	0	0	2.7	.40	0	.10	0	.10
29	0	0	0	0	---	0	2.1	.20	0	.10	0	.10
30	0	0	0	0	---	0	1.4	.30	0	0	0	.30
31	0	---	---	---	---	---	---	1.0	---	---	0	---
TOTAL	0	0	0	0	0	0	367.2	20.20	47.20	34.60	0	6.80
MEAN	0	0	0	0	0	0	91.6	.65	1.57	1.12	0	.23
MAX	0	0	0	0	0	0	145	3.0	15	9.5	0	1.0
MIN	0	0	0	0	0	0	0	0	0	0	0	0
AC-FT	0	0	0	0	0	0	1,880	40	94	69	0	13
CAL YR 1964: TOTAL	744.00			MEAN 2.03								
WAT YR 1965: TOTAL	1,056.00			MEAN 2.89								
					MAX 158		MIN 0		AC-FT 1,480			
					MAX 145		MIN 0		AC-FT 2,090			

## 5-0840. Forest River near Fordville, N. Dak.

Location.--Lat 48°12', long 97°44', on line between secs.32 and 33, T.155 N., R.55 W., on right bank 50 ft upstream from highway bridge, half a mile downstream from South Branch, and 3 miles south-east of Fordville.

Drainage area.--456 sq mi, of which about 120 sq mi is probably noncontributing.

Records available.--April 1940 to September 1965.

Gage.--Water-stage recorder. Altitude of gage is 1,040 ft (by barometer). Prior to July 21, 1951, chain gage at site 50 ft downstream at same datum.

Average discharge.--25 years, 34.5 cfs (24,980 acre-ft per year); median of yearly mean discharges, 20 cfs (14,500 acre-ft per year).

Extremes.--Maximums and minimums (discharge in cubic feet per second, gage height in feet).

Annual maximum discharge (\*) and peak discharges above base (200 cfs), water years 1961-65

Date	Time	Discharge	Gage height	Date	Time	Discharge	Gage height	Date	Time	Discharge	Gage height
Mar. 19, 1961	1420	* 65	a 2.69	June 15, 1962	1840	651	4.08	Apr. 12, 1964	0330	457	3.72
Apr. 6, 1962	0100	* 2,600	a 7.69	June 25, 1963	2330	284	2.86	Apr. 16, 1964	1330	219	2.92
Apr. 18, 1962	0400	898	4.57	July 8, 1963	1050	* 590	3.67	June 12, 1964	1630	* 1,780	6.46
June 7, 1962	1300	1,310	5.32					June 19, 1964	1000	* 3,960	9.03
June 10, 1962	1000	334	3.22	Apr. 4, 1964	-	250	-	Apr. 13, 1965	1400	* 4,730	a 10.22
								June 5, 1965	0100	214	2.90

a Backwater from ice or beaver dams.

Annual minimum discharge, water years 1961-65

Water year	Date	Discharge	Gage height	Water year	Date	Discharge	Gage height
1961	Aug. 29, 1961	a 2.2	-	1964	Oct. 1, 2, 4, 5, 1963	a 3.2	-
1962	(b)	a 5.2	-	1965	Nov. 17, 1964	2.2	1.36
1963	Feb. 4, 11, 1963	a 1.0	-				

a Minimum daily.

b Nov. 17, 30, Dec. 8, 9, 12, 13, 1961, Jan. 21, 22, Mar. 7, 1962.

1940-65: Maximum discharge, 16,400 cfs Apr. 18, 1950 (gage height, 14.48 ft, from floodmark), from rating curve extended above 5,600 cfs on basis of contracted-opening and slope-area measurements of peak flow; no flow Apr. 1-13, Sept. 3, 1940.

Remarks.--Records good except those for winter periods, which are fair. Some regulation of high flows by temporary retention in several retarding basins above station. Retarding basins have a combined capacity of about 14,000 acre-ft.

Revisions (water years).--WSP 1175: 1948. WSP 1728: Drainage area.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	2.7	6.5	6.0	5.0	2.8	6.4	15	11	5.4	4.6	3.2	2.5
2	2.8	6.5	6.2	4.8	2.8	7.0	14	7.8	5.0	4.6	3.2	2.6
3	2.6	6.5	6.4	4.8	2.8	7.2	13	6.8	4.5	4.4	3.2	2.7
4	2.8	6.5	6.6	4.7	2.8	7.0	14	7.8	4.5	4.2	3.0	2.6
5	3.0	6.5	6.6	4.7	2.8	7.2	12	8.8	3.8	4.0	2.8	2.6
6	3.2	6.5	6.6	4.7	2.8	8.0	11	9.4	3.8	3.8	2.6	2.6
7	3.2	6.5	6.8	4.7	3.0	8.5	11	8.8	4.5	3.6	2.8	2.6
8	3.0	6.5	6.6	4.7	3.0	8.8	13	8.3	5.4	3.0	2.6	2.8
9	2.8	6.5	6.6	4.7	3.0	10	13	8.3	5.4	3.6	2.6	2.6
10	3.0	6.5	6.6	4.7	3.0	11	13	8.3	4.1	3.2	2.6	3.4
11	3.0	6.5	6.6	4.6	3.2	14	13	8.8	3.8	3.0	2.6	3.8
12	3.6	6.5	6.6	4.6	3.2	15	12	7.8	3.4	3.2	2.5	3.8
13	3.6	6.5	6.4	4.6	3.4	20	14	8.3	3.2	5.0	2.5	4.0
14	3.6	6.5	6.6	4.4	3.4	28	14	8.3	3.2	4.6	2.4	3.8
15	3.6	6.5	6.6	4.4	3.6	30	12	7.8	3.2	4.0	2.4	3.6
16	3.6	6.6	6.6	4.4	3.6	32	12	6.8	3.4	3.8	2.3	3.4
17	3.8	6.6	6.4	4.2	3.6	35	10	6.2	3.8	4.0	2.3	3.2
18	3.6	6.6	6.4	4.2	3.6	45	10	6.8	3.8	4.0	3.0	3.0
19	3.8	6.6	6.2	4.0	3.6	60	12	6.2	4.0	3.8	3.6	3.2
20	3.8	6.6	6.0	4.0	3.6	50	14	6.2	4.0	4.0	3.2	4.0
21	4.4	6.8	6.0	3.8	3.8	42	16	6.8	4.6	4.2	3.0	4.0
22	4.4	7.0	5.8	3.6	4.0	48	15	5.8	4.6	4.0	3.0	5.0
23	4.4	7.0	5.8	3.4	4.4	45	13	6.2	4.6	3.8	2.6	4.8
24	4.5	7.2	5.8	3.2	4.6	36	12	5.8	4.6	3.6	2.3	4.6
25	4.6	7.2	5.6	3.0	4.8	38	12	5.4	4.6	3.6	2.3	4.4
26	4.7	7.0	5.6	3.0	5.2	30	9.4	5.4	4.6	3.8	2.3	4.2
27	4.6	6.0	5.6	2.8	5.6	25	9.9	5.4	4.6	3.6	2.3	4.2
28	4.8	6.2	5.4	2.6	6.0	20	9.9	5.4	4.4	3.4	2.4	4.0
29	5.5	6.5	5.4	2.6	-----	18	11	4.5	4.4	3.4	2.2	3.8
30	8.0	6.2	5.2	2.6	-----	20	10	5.0	4.6	3.2	2.3	3.6
31	6.5	-----	5.0	2.8	-----	16	-----	5.0	-----	3.2	2.3	-----
TOTAL	121.5	197.6	190.6	124.3	102.0	748.1	370.2	219.2	127.8	118.2	83.4	105.4
MEAN	3.92	6.39	6.15	4.01	3.66	24.1	12.3	7.07	4.26	3.81	2.69	3.51
MAX	9.0	7.2	6.8	5.0	6.0	60	16	11	5.4	5.0	4.0	5.0
MIN	2.6	6.0	5.0	2.6	2.8	6.4	9.4	4.5	3.2	3.0	2.0	2.5
AC-FT	241	392	378	247	202	1,480	734	435	253	234	165	209
CAL YR 1960: TOTAL	16,568.1			MEAN 45.3		MAX 1,970	MIN 2.1	AC-FT 32,860				
WAT YR 1961: TOTAL	2,508.3			MEAN 6.87		MAX 60	MIN 2.2	AC-FT 4,980				

## 5-0840. Forest River near Fordville, N. Dak.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	3.6	3.6	3.6	4.4	6.3	4.0	26	29	67	14	7.8	6.8
2	3.6	3.6	4.0	4.4	6.3	4.0	22	26	48	14	7.8	6.8
3	3.6	4.0	4.0	4.4	6.3	3.6	19	23	38	13	7.8	6.8
4	3.6	7.3	4.0	4.4	6.3	3.6	22	21	33	18	12	7.8
5	3.6	7.8	4.0	4.9	6.8	3.6	500	18	29	15	11	8.3
6	3.6	8.3	4.0	4.9	7.3	3.6	1,600	16	26	13	13	7.3
7	4.0	8.8	3.6	4.9	7.3	3.2	450	17	634	17	11	8.3
8	4.9	5.4	3.2	4.9	7.3	3.6	230	18	363	15	9.9	18
9	5.4	5.4	3.2	4.4	6.8	3.6	215	17	158	14	9.9	18
10	6.3	6.3	3.6	4.4	6.8	4.0	230	16	241	12	9.9	14
11	15	6.3	3.6	4.4	6.3	4.4	170	15	161	10	17	12
12	9.3	6.8	3.2	4.4	6.3	4.4	175	15	95	9.0	15	11
13	7.3	4.0	3.2	4.4	6.3	4.4	200	15	63	8.0	13	8.8
14	5.8	5.8	3.6	4.4	6.3	4.4	230	18	72	7.3	10	7.8
15	5.8	5.8	3.6	4.4	5.8	4.4	202	22	275	7.0	12	7.8
16	5.4	5.8	3.6	4.4	6.3	4.4	260	22	427	7.0	11	8.3
17	6.3	3.2	3.6	4.0	6.3	4.4	551	26	223	6.8	9.9	8.3
18	6.8	4.0	3.6	4.0	6.3	4.9	778	26	128	6.8	9.9	8.3
19	6.3	4.4	3.6	3.6	6.3	4.9	480	33	89	7.0	10	8.3
20	6.8	4.0	4.0	3.6	5.8	4.9	291	48	66	7.5	8.8	9.3
21	9.3	4.4	4.0	3.2	5.8	5.4	241	38	52	8.0	8.8	9.3
22	5.4	4.9	4.0	3.2	5.4	5.8	220	39	43	12	9.3	9.9
23	4.4	4.0	4.0	3.6	5.4	6.3	170	48	36	17	8.3	9.9
24	4.4	3.6	4.0	4.0	4.9	6.8	128	59	30	16	8.3	9.3
25	4.4	4.4	4.0	4.9	4.9	7.3	93	52	26	15	6.8	9.3
26	4.0	3.6	4.4	5.4	4.4	8.3	72	40	22	15	6.8	11
27	4.4	3.6	4.4	5.8	4.0	9.9	58	36	20	14	7.3	8.8
28	4.4	4.0	4.4	6.3	4.0		46	32	18	11	6.8	8.3
29	4.4	4.0	4.4	6.3	-----	35	39	35	16	8.3	5.8	8.3
30	4.4	3.2	4.4	6.3	-----	30	34	48	13	11	6.3	8.3
31	4.9	-----	4.4	6.3	-----	28	-----	64	-----	9.3	6.8	-----
TOTAL	171.4	152.6	119.2	142.9	168.3	285.1	7,752	932	3,512	358.0	298.0	286.4
MEAN	5.53	5.09	3.85	4.61	6.01	9.20	258	30.1	117	11.5	9.61	9.55
MAX	15	8.8	4.4	6.3	7.3	60	1,600	64	634	18	17	18
MIN	3.6	3.2	3.2	3.2	4.0	13	19	15	13	6.8	5.8	6.8
AC-FT	340	303	236	283	334	565	15,380	1,850	6,970	710	591	568

CAL YR 1961: TOTAL 2,441.8 MEAN 6.69 MAX 60 MIN 2.2

WAT YR 1962: TOTAL 14,177.9 MEAN 38.8 MAX 1,600 MIN 3.2

AC-FT 4,840

AC-FT 29,120

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	8.3	11	12	7.0	1.2	2.0	28	12	20	20	6.8	4.1
2	8.3	10	12	7.0	1.1	3.0	18	12	20	14	6.8	4.1
3	8.3	11	12	7.5	1.1	4.0	12	12	33	9.9	6.2	3.8
4	8.3	11	10	7.5	1.0	4.0	18	11	41	7.3	6.2	3.4
5	9.3	9.9	9.3	7.5	1.1	5.0	20	11	23	7.3	5.8	3.4
6	10	12	10	7.5	1.1	6.0	20	11	19	6.8	5.4	3.4
7	10	14	9.9	7.8	1.1	6.8	20	10	14	5.8	5.4	3.8
8	10	10	9.3	8.0	1.1	7.0	19	11	9.4	288	4.5	3.8
9	11	12	8.3	8.0	1.1	7.0	22	12	12	164	4.5	3.8
10	12	12	6.3	7.5	1.1	8.0	18	15	11	69	4.5	3.8
11	11	12	4.4	7.0	1.0	9.0	16	17	9.4	50	4.5	3.8
12	11	12	3.2	5.5	1.1	9.0	15	15	9.9	38	4.5	4.1
13	11	12	4.4	4.5	1.1	9.0	14	16	10	32	5.0	4.1
14	11	12	5.4	3.5	1.1	9.0	15	15	9.4	25	4.1	3.8
15	11	11	6.0	3.0	1.1	10	16	16	8.3	19	4.5	3.4
16	12	10	7.5	2.5	1.1	12	17	13	8.3	14	4.5	2.7
17	12	10	8.0	2.0	1.2	10	14	12	7.8	12	4.5	3.0
18	12	10	9.5	2.0	1.2	10	13	12	8.8	10	3.8	3.8
19	12	10	9.5	2.0	1.2	20	12	12	8.3	11	3.8	3.4
20	11	12	8.0	1.8	1.2	20	11	14	7.8	9.9	4.5	2.7
21	12	9.9	8.0	1.8	1.2	25	10	13	7.3	8.3	3.8	2.4
22	13	10	8.5	1.8	1.2	35	10	12	6.8	7.3	3.4	2.4
23	12	12	8.5	1.6	1.3	60	9.9	11	9.4	7.3	3.4	3.0
24	12	12	8.0	1.4	1.4	90	9.9	10	8.3	6.8	3.4	3.4
25	12	12	7.5	1.4	1.5	80	11	12	83	6.2	3.4	3.0
26	12	12	7.0	1.2	1.6	60	11	13	187	8.8	4.1	3.0
27	12	11	7.0	1.2	1.7	40	10	13	111	12	4.5	3.0
28	12	12	7.5	1.2	1.8	35	12	12	62	12	5.4	3.0
29	11	12	7.5	1.1	-----	34	12	12	41	9.4	5.4	3.0
30	11	12	7.5	1.2	-----	25	12	11	28	8.3	5.4	3.0
31	11	-----	7.0	1.2	-----	22	-----	12	-----	7.3	5.0	-----
TOTAL	339.5	338.8	249.0	124.2	34.0	676.8	445.8	390	834.2	906.7	147.0	101.4
MEAN	11.0	11.3	8.03	4.01	1.21	21.8	14.9	12.6	27.8	29.2	4.74	3.38
MAX	13	14	12	8.0	1.8	90	28	17	187	288	6.8	4.1
MIN	8.3	9.9	3.2	1.1	1.0	2.0	9.9	10	6.8	5.8	3.4	2.4
AC-FT	673	672	494	246	67	1,340	884	774	1,650	1,800	292	201

CAL YR 1962: TOTAL 14,662.0 MEAN 40.2 MAX 1,600 MIN 3.2

WAT YR 1963: TOTAL 4,587.4 MEAN 12.6 MAX 288 MIN 1.0

AC-FT 29,080

AC-FT 9,100

## 5-0840. Forest River near Fordville, N. Dak.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	3.2	5.4	6.8	4.6	7.0	6.8	9.0	25	7.3	52	11	10
2	3.2	4.8	6.7	4.6	7.0	6.8	10	24	7.3	59	10	8.8
3	3.6	4.8	6.6	4.8	7.0	6.6	100	25	7.3	58	9.3	8.8
4	3.2	4.8	6.7	4.8	7.2	6.6	200	28	7.3	47	8.8	8.3
5	3.2	5.8	6.6	5.0	7.2	6.6	130	26	6.3	42	8.3	7.8
6	4.0	6.8	6.5	5.0	7.2	6.6	50	26	8.8	40	7.3	7.8
7	4.4	6.8	5.5	5.0	7.2	6.6	45	25	9.3	36	7.3	8.3
8	4.4	7.8	3.5	5.0	7.3	6.6	50	21	16	35	7.8	8.3
9	4.9	7.8	6.0	5.1	7.3	6.6	50	18	35	38	8.8	7.8
10	4.9	7.8	6.5	5.1	7.3	6.6	50	17	46	31	8.8	7.8
11	4.4	7.3	6.2	5.0	7.3	6.6	338	15	36	26	8.8	7.8
12	4.6	7.3	6.0	5.0	7.3	6.8	344	15	94.0	24	8.8	7.8
13	4.0	7.3	5.6	5.0	7.3	7.0	156	14	436	21	8.8	7.8
14	4.9	7.3	5.2	5.0	7.3	6.8	105	13	299	18	8.8	7.8
15	4.9	7.8	4.8	5.2	7.3	6.8	150	13	210	17	8.3	8.3
16	4.0	8.3	4.6	5.4	7.3	7.0	194	13	136	15	7.8	8.8
17	4.4	8.3	4.6	5.6	7.3	136	12	109	12	12	7.8	8.8
18	4.4	8.3	4.4	5.6	7.3	6.8	90	12	268	12	7.3	8.8
19	4.4	7.8	4.4	5.8	7.3	6.6	93	11	2,700	12	6.8	9.3
20	4.9	6.2	4.2	5.8	7.3	6.6	67	10	756	15	7.3	8.8
21	8.3	6.2	4.2	6.0	7.3	6.6	58	9.9	362	19	16	9.9
22	7.8	6.4	4.2	6.0	7.2	6.6	47	9.3	302	17	16	9.9
23	6.3	6.0	4.2	6.2	7.2	6.6	48	9.9	214	15	14	10
24	5.8	5.8	4.4	6.2	7.0	7.2	42	9.3	180	12	12	10
25	5.8	6.2	4.6	6.2	6.8	7.2	39	8.8	144	11	11	11
26	4.9	6.4	4.6	6.4	6.8	7.4	37	7.8	112	10	10	23
27	5.4	7.5	4.6	6.4	6.8	7.6	34	7.3	91	11	9.9	21
28	5.4	7.5	4.6	6.6	6.8	8.0	31	7.3	77	11	9.9	13
29	4.9	7.5	4.6	6.6	6.8	8.0	27	7.3	67	10	12	12
30	5.4	6.8	4.6	6.8	-----	8.4	26	7.3	58	9.9	12	11
31	5.4	-----	4.6	6.8	-----	8.8	-----	7.3	-----	9.3	12	-----
TOTAL	149.1	204.8	160.6	172.6	207.4	216.6	2,756.0	454.5	7,647.6	745.2	305.7	298.5
MEAN	4.81	6.83	5.18	5.57	7.15	6.99	91.9	14.7	255	24.0	9.86	9.95
MAX	8.3	8.3	6.8	6.8	7.3	8.8	344	28	2,700	59	16	23
MIN	3.2	4.8	3.5	4.6	6.8	6.6	9.0	7.3	6.3	9.3	6.8	7.8
AC-FT	296	406	319	342	411	430	5,470	901	15,170	1,480	606	592
CAL YR 1963: TOTAL	4,174.6								8,280			
WAT YR 1964: TOTAL	13,318.6								AC-FT 26,420			

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	11	9.9	6.8	5.9	7.2	8.4	8.8	50	6.9	14	14	6.3
2	11	9.9	6.8	5.9	7.0	8.4	9.0	56	6.3	14	12	6.3
3	11	10	6.2	5.9	6.8	8.4	9.3	46	8.4	12	10	6.8
4	11	10	6.2	5.9	6.8	8.6	12	40	138	10	11	18
5	11	10	5.4	5.9	6.8	8.6	15	42	174	8.8	13	17
6	11	9.3	4.4	5.9	6.3	9.3	24	66	118	8.3	20	10
7	9.9	9.3	5.4	5.9	6.3	10	85	67	86	7.8	16	8.3
8	9.9	9.3	5.5	5.9	6.3	10	180	53	63	8.3	11	6.8
9	10	8.8	5.8	5.9	6.8	9.6	240	45	51	9.9	8.8	7.3
10	9.9	9.3	5.8	5.9	6.8	10	760	44	43	10	6.8	7.7
11	9.9	9.9	5.9	5.4	6.8	10	3,690	40	38	8.8	5.4	7.8
12	9.9	9.9	6.0	5.4	7.3	9.6	2,180	39	33	18	4.9	9.3
13	9.9	9.9	6.0	5.4	8.0	9.3	1,020	36	29	56	4.9	10
14	8.8	9.3	6.2	5.4	7.8	9.3	670	33	26	56	4.4	32
15	8.8	9.9	6.0	5.4	7.8	8.8	359	32	26	37	4.4	32
16	9.3	7.8	5.8	5.4	8.0	8.6	228	32	22	25	5.4	30
17	9.3	8.3	5.8	5.4	8.0	8.4	196	33	18	21	5.8	36
18	8.8	7.3	5.8	5.4	7.8	8.4	180	32	14	18	6.3	35
19	8.8	7.7	5.8	5.4	7.8	8.4	170	30	14	14	7.3	31
20	8.8	7.3	5.8	5.4	7.8	8.4	152	30	12	15	7.3	28
21	9.3	5.8	5.8	5.8	8.8	8.4	136	30	11	13	7.3	24
22	10	6.8	5.8	6.3	8.6	8.4	122	29	11	12	8.3	27
23	9.9	7.6	5.8	6.8	8.6	8.4	115	28	11	12	7.8	36
24	9.9	7.3	6.0	6.8	8.4	8.4	104	30	10	9.9	7.8	35
25	9.9	7.8	6.0	6.8	8.2	8.4	95	36	10	7.8	8.3	31
26	9.9	6.8	6.0	6.8	8.4	8.6	84	34	11	7.3	8.3	27
27	9.9	6.8	6.0	6.8	8.4	8.6	72	36	18	6.8	8.3	25
28	9.3	6.8	5.9	7.0	8.4	8.8	63	36	18	6.8	7.3	25
29	9.3	7.3	5.9	7.2	-----	8.8	58	34	14	6.8	7.3	30
30	9.3	6.8	5.9	7.2	-----	8.8	51	34	11	15	7.3	45
31	9.9	-----	5.9	7.2	-----	8.8	-----	44	-----	17	7.3	-----
TOTAL	304.6	252.6	182.4	187.7	212.0	274.9	11,088.1	1,217	1,246	486.3	264.0	640.6
MEAN	9.83	8.42	5.88	6.05	7.57	8.87	370	39.3	41.5	15.7	8.52	21.4
MAX	11	10	6.8	7.2	8.8	10	3,690	67	174	56	20	45
MIN	8.8	5.8	4.4	5.4	6.3	8.4	8.8	28	10	6.8	4.4	6.3
AC-FT	604	501	362	372	421	545	21,990	2,410	2,470	965	524	1,270
CAL YR 1964: TOTAL	13,543.7								AC-FT 26,860			
WAT YR 1965: TOTAL	16,356.2								AC-FT 32,440			

Location.--Lat 48°16'10", long 97°22'10", in SE $\frac{1}{4}$  sec.31, T.156 N., R.52 W., on right bank 30 ft upstream from dam in Minto, 150 ft upstream from Great Northern Railway bridge, and 2 blocks east of U.S. Highway 81.

Records available.--April 1944 to September 1965.

Average discharge.--21 years, 45.2 cfs (32,720 acre-ft per year); median of yearly mean discharges, 26 cfs (18,800 acre-ft per year).

Extremes.--Maximums and minimums (discharge in cubic feet per second, gage height in feet).

Annual maximum discharge (*) and peak discharges above base (200 cfs), water years 1961-65											
Date	Time	Discharge	Gage height	Date	Time	Discharge	Gage height	Date	Time	Discharge	Gage height
Mar. 22, 1961	1330	* 147	1.90	June 17, 1962	2000	847	3.37	June 13, 1964	2200	685	3.10
								June 21, 1964	0950	* 1,460	4.31
Apr. 19, 1962	0145	* 2,400	a 6.68	Mar. 22, 1963	1750	-	a 2.75				
Apr. 8, 1962	2250	825	3.53	Mar. 24, 1963	1050	* 250	a 2.54	Apr. 12, 1965	1500	* 3,710	7.48
June 11, 1962	0841	3,002	3.02					June 2, 1965	1700	274	2.22
June 14, 1962	1300	418	2.55	Apr. 15, 1964	1900	450	2.62	June 6, 1965	1000	238	2.13

Annual minimum discharge, water years 1961-65

Annual maximum discharge, water years 1961-65					
Water year	Date	Discharge	Water year	Date	Discharge
1961	Many days	0	1964	Many days	0
1962	do.	0	1965	Feb. 11 to Mar. 6,	a 2.6
1963	do.	0		Mar. 10-14, 1965	

1944-65: Maximum discharge, 16,600 cfs Apr. 18, 1950 (gage height, 11.80 ft, from floodmarks), from rating curve extending above 7,200 cfs on basis of contracted-opening measurement of peak flow; no flow at times in each year 1945-47, 1953-55, 1959-64.

Remarks.--Records good except those for winter periods, which are fair. Occasionally during high stages, particularly when the channel is filled with snow, overflow occurs half a mile below the municipality of Forest River and bypasses the gage 3 miles south of Minto and flows into Lake Ardoch. Bypass flow is not included in discharge record for this station.

Revisions (water years).--WSP 1728: Drainage area. WSP 1438: 1948-50.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961												
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	.20	5.5	1.2	.80	0	0	27	18	40	1.3	2.2	0
2	.10	6.4	1.2	.80	0	0	28	18	8.9	1.3	2.2	0
3	.10	5.5	1.2	.80	0	0	33	15	6.4	1.3	2.2	0
4	.10	5.5	1.2	.80	0	0	31	13	6.4	1.3	1.7	0
5	.10	5.5	1.0	.80	0	0	27	13	5.5	.90	1.7	0
6	0	4.7	.80	.90	0	0	22	14	5.5	.90	1.3	0
7	0	3.9	.80	.80	0	.60	24	14	5.5	.90	1.3	0
8	0	3.9	.80	.80	0	.30	30	13	5.5	.90	.90	0
9	0	3.3	.60	.80	0	.10	31	13	5.5	.90	.60	0
10	0	3.3	.60	.80	0	.10	30	13	6.4	.90	.60	0
11	0	3.3	.60	.70	0	.10	26	13	6.4	2.2	.40	0
12	.20	3.3	.60	.70	0	.30	23	13	6.4	1.7	.40	0
13	.90	3.9	.60	.70	0	1.0	27	13	5.5	7.6	.20	0
14	.90	3.9	.60	.70	0	1.1	27	11	3.9	7.6	.10	0
15	.90	4.7	.60	.60	0	1.7	15	11	3.9	31	.10	0
16	.90	4.7	.60	.60	0	1.3	10	10	3.9	27	0	0
17	.90	4.7	.60	.80	0	2.2	21	10	3.3	19	0	0
18	1.3	4.7	.60	.80	0	2.2	27	10	3.3	14	0	0
19	1.7	4.7	.60	.80	0	3.3	31	10	2.7	10	0	0
20	2.7	4.7	.60	.80	0	3.3	30	10	2.2	5.5	0	0
21	2.7	4.7	.60	.80	0	52	26	10	2.2	6.4	0	0
22	2.7	4.7	.60	.60	0	116	24	10	2.2	5.5	0	0
23	3.3	3.9	.60	.60	0	77	21	10	2.2	3.9	0	0
24	3.3	3.9	.60	.60	0	72	21	8.9	1.7	3.3	0	0
25	3.3	3.9	.80	.40	0	90	21	7.6	1.7	2.7	0	0
26	3.9	3.5	.80	.40	0	85	21	7.6	2.2	2.7	0	0
27	3.9	3.0	.80	.40	0	64	21	8.9	1.7	2.7	0	0
28	2.7	2.5	.60	.20	0	26	20	8.9	1.7	2.7	0	0
29	1.8	.60	.20	.20	0	19	7.6	8.9	1.3	2.7	0	0
30	4.7	1.2	.80	.10	0	57	19	7.6	1.3	2.7	0	0
31	4.7	-----	.80	.10	0	40	-----	20	-----	2.7	0	-----
TOTAL	50.10	123.2	23.00	19.70	0	724.60	731	360.1	155.3	174.80	15.90	0
MEAN	1.62	4.11	.74	.64	0	23.4	24.4	11.6	5.18	5.64	.51	0
MAX	4.7	6.4	1.2	.80	0	116	33	20	40	31	2.2	0
MIN	0	1.2	.60	.10	0	0	10	7.6	1.3	.90	0	0
AC-FT	99	244	46	39	0	1,440	1,450	714	308	347	32	0
CAL YR 1960:	TOTAL	20,738.20		MEAN 56.7		MAX 1,950	MIN 0		AC-FT 41,130			
YR 1961:	TOTAL	2,377.70		MEAN 6.51		MAX 116	MIN 0		AC-FT 4,720			

## 5-0850. Forest River at Minto, N. Dak.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	0	3.3	2.7	.40	0	0	0	85	160	30	18	8.9
2	0	3.3	2.7	.40	0	0	0	77	131	27	19	8.9
3	0	1.7	2.7	.40	0	0	0	69	110	26	18	8.9
4	0	2.7	2.7	.40	0	0	0	62	90	27	20	10
5	0	2.7	2.2	.40	0	0	0	55	74	26	18	10
6	0	2.7	2.2	.40	0	0	.10	48	67	26	15	6.4
7	0	2.7	2.2	.40	0	0	.20	46	62	26	13	7.6
8	0	2.7	1.7	.40	0	0	.40	430	24	11	7.6	
9	0	2.7	1.7	.40	0	0	150	42	715	21	10	10
10	0	3.3	1.3	.40	0	0	350	40	455	21	10	15
11	0	3.3	.90	.40	0	0	320	36	551	20	10	16
12	0	3.9	.90	.40	0	0	310	36	486	18	10	15
13	0	3.9	.90	.30	0	0	300	36	312	16	11	13
14	2.7	3.9	.90	.30	0	0	320	36	312	16	14	5.5
15	6.4	3.9	.60	.20	0	0	360	38	523	15	14	4.7
16	6.4	4.7	.60	.10	0	0	460	40	733	14	13	10
17	5.5	3.9	.60	.10	0	0	1,200	42	799	15	11	7.6
18	4.7	3.9	.40	.10	0	0	2,050	40	551	15	11	7.6
19	3.3	3.3	.60	0	0	0	1,950	42	352	18	11	6.4
20	4.7	3.3	.40	0	0	0	1,180	46	244	18	11	5.5
21	4.7	3.9	.40	0	0	0	793	55	184	19	8.9	4.7
22	3.3	3.9	.40	0	0	0	527	59	141	19	8.9	4.7
23	3.3	3.9	.40	0	0	0	423	77	113	19	8.9	4.7
24	2.7	3.9	.40	0	0	0	321	96	90	19	8.9	5.5
25	3.9	3.3	.40	0	0	0	252	102	72	19	8.9	6.4
26	5.5	3.3	.40	0	0	0	196	102	64	19	10	6.4
27	4.7	3.3	.40	0	0	0	153	85	55	19	8.9	6.4
28	4.7	3.3	.40	0	0	0	128	69	46	19	8.9	6.4
29	3.9	3.3	.40	0	-----	0	110	69	40	19	8.9	7.6
30	3.3	2.7	.40	0	-----	0	99	107	33	18	8.9	8.9
31	3.3	.40	0	0	-----	0	177	-----	-----	18	8.9	-----
TOTAL	77.0	100.6	32.80	5.90	0	0	11,952.70	1,958	7,995	626	367.0	246.3
MEAN	2.48	3.35	1.06	.19	0	0	398	63.2	267	20.2	11.8	8.21
MAX	6.4	4.7	2.7	.40	0	0	2,050	177	799	30	20	16
MIN	0	1.7	.40	0	0	0	0	36	33	14	8.9	4.7
AC-FT	153	200	65	12	0	0	23,710	3,880	15,860	1,240	728	489

CAL YR 1961: TOTAL 2,391.80 MEAN 6.55 MAX 116 MIN 0 AC-FT 4,740

WAT YR 1962: TOTAL 23,361.30 MEAN 64.0 MAX 2,050 MIN 0 AC-FT 46,340

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	8.9	16	18	1.7	0	0	42	20	13	36	10	2.7
2	8.9	16	13	1.7	0	0	33	19	14	30	8.9	1.7
3	5.5	15	13	1.7	0	0	21	19	14	26	7.6	.90
4	5.5	13	10	1.7	0	0	16	18	19	21	6.4	.60
5	8.3	14	5.5	1.7	0	0	52	18	21	19	6.4	.60
6	6.4	15	10	1.7	0	0	77	18	30	16	6.4	.40
7	8.9	16	10	1.7	0	0	67	19	26	14	5.5	.40
8	13	14	8.9	2.2	0	0	67	18	21	13	4.7	.40
9	16	18	8.9	2.2	0	0	50	18	23	22	3.3	.40
10	13	20	6.4	2.0	0	0	46	18	20	144	3.3	.20
11	13	19	3.3	1.8	0	0	42	19	18	82	3.9	.20
12	13	19	2.2	1.6	0	0	38	19	16	55	3.3	.40
13	13	20	2.2	1.4	0	0	36	21	16	42	3.3	.10
14	14	16	1.7	1.2	0	0	35	23	16	31	2.7	.10
15	15	19	2.2	1.0	0	0	36	23	15	28	2.7	.10
16	14	8.9	2.2	.90	0	0	38	21	15	26	2.7	0
17	14	16	2.2	.80	0	0	33	21	13	23	2.7	.10
18	15	16	2.7	.60	0	0	30	21	13	19	2.7	.40
19	14	16	2.2	.50	0	0	28	19	13	16	2.7	1.7
20	15	16	2.2	.40	0	2.0	28	20	11	16	2.2	1.3
21	15	18	2.2	.30	0	1.0	28	20	10	15	2.2	1.3
22	16	10	3.3	.20	0	40	24	21	10	13	2.7	.90
23	16	10	2.2	.10	0	200	21	21	8.9	11	2.2	.90
24	16	13	2.2	.10	0	220	21	20	10	10	1.7	1.3
25	16	14	2.2	.10	0	200	21	19	15	8.9	1.7	1.3
26	16	15	2.2	0	0	160	21	19	15	13	2.2	2.2
27	16	16	2.2	0	0	113	21	18	14	14	2.7	.90
28	16	18	2.2	0	0	99	21	16	96	16	2.7	.60
29	16	19	2.2	0	-----	122	21	15	69	14	2.2	.90
30	16	18	1.7	0	-----	85	20	13	48	15	2.2	.90
31	16	-----	1.7	0	-----	67	-----	13	-----	13	1.7	-----
TOTAL	409.4	473.9	151.1	29.30	0	1,309.0	1,034	587	681.9	821.9	115.6	23.90
MEAN	13.2	15.8	4.87	.95	0	42.2	34.5	18.9	22.7	26.5	3.73	.80
MAX	16	20	18	2.2	0	220	77	23	96	144	10	2.7
MIN	5.5	8.9	1.7	0	0	0	16	13	8.9	8.9	1.7	0
AC-FT	812	940	300	58	0	2,600	2,050	1,160	1,350	1,630	229	47

CAL YR 1962: TOTAL 24,185.30 MEAN 66.3 MAX 220 MIN 0 AC-FT 47,970

WAT YR 1963: TOTAL 5,637.00 MEAN 15.4 MAX 220 MIN 0 AC-FT 11,180

5-0850. Forest River at Minto, N. Dak.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	.60	5.5	4.5	.20	.10	.10	.80	4.8	14	125	21	14
2	.40	5.5	4.0	.20	.10	.10	1.5	4.6	13	113	21	14
3	.40	4.7	4.0	.20	.10	.10	4.0	4.4	13	107	20	11
4	.20	5.5	4.0	.20	.10	.10	4.7	4.4	11	99	18	10
5	.10	5.5	4.0	.20	.10	.10	3.9	4.4	10	93	15	8.9
6	.10	5.5	3.8	.20	.10	.10	3.3	4.4	13	82	13	8.9
7	0	5.5	3.5	.20	.10	.10	15	4.4	14	77	13	8.9
8	0	5.5	1.5	.20	.10	.10	100	4.2	19	69	10	8.9
9	0	7.6	1.0	.20	.10	.10	119	40	26	69	10	7.6
10	0	7.6	.50	.20	.10	.10	128	38	30	69	8.9	7.6
11	0	7.6	.20	.20	.10	.10	170	33	40	59	8.9	7.6
12	0	6.4	.20	.20	.10	.10	299	28	64	52	8.9	7.6
13	0	5.5	.20	.20	.10	.20	418	27	371	44	8.9	7.6
14	.10	5.5	.20	.20	.10	.20	352	26	556	42	10	7.6
15	1.7	5.5	.20	.20	.10	.20	410	26	396	38	10	7.6
16	3.3	7.6	.20	.20	.10	.20	418	24	317	35	10	8.9
17	3.9	3.9	.20	.10	.10	.20	365	23	219	31	10	8.9
18	3.3	4.7	.20	.10	.10	.30	252	23	177	30	8.9	8.9
19	3.9	6.4	.20	.10	.10	.30	170	21	289	27	8.9	8.9
20	4.7	7.6	.20	.10	.10	.30	157	21	995	26	7.6	8.9
21	5.5	3.3	.20	.10	.10	.30	122	20	1,310	30	8.9	8.9
22	8.9	3.9	.20	.10	.10	.30	102	19	817	31	10	8.9
23	8.9	3.3	.20	.10	.10	.40	93	19	590	33	15	8.9
24	10	3.3	.20	.10	.10	.40	82	18	436	28	16	10
25	7.6	3.3	.20	.10	.10	.40	77	16	334	26	14	11
26	6.4	3.9	.20	.10	0	.40	67	16	261	24	13	13
27	6.4	4.7	.20	.10	.40	.40	62	15	204	23	12	15
28	5.5	4.7	.20	.10	.10	.60	59	15	167	23	10	19
29	5.5	5.5	.20	.10	.10	.60	55	15	150	21	11	20
30	4.7	5.5	.20	.10	-----	.60	50	14	141	20	11	16
31	5.5	-----	.20	.10	-----	.60	-----	14	-----	20	13	-----
TOTAL	97.60	160.5	35.00	4.70	2.70	8.10	4,160.20	867	7,997	1,566	374.9	313.0
MEAN	3.15	5.35	1.13	.15	.093	.26	139	28.0	267	50.5	12.1	10.4
MAX	10	7.6	4.5	.20	.10	.60	418	48	1,310	125	21	20
MIN	0	3.3	.20	.10	0	.10	.80	14	10	20	7.6	7.6
AC-FT	194	318	69	9.3	5.4	16	8,250	1,720	15,860	3,110	744	621

CAL YR 1963: TOTAL 4,895.70 MEAN 13.4 MAX 220 MIN 0 AC-FT 9,710  
WAT YR 1964: TOTAL 15,586.70 MEAN 42.6 MAX 1,310 MIN 0 AC-FT 30,920

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	15	13	6.0	4.4	3.2	2.6	3.0	90	55	26	16	8.9
2	15	13	5.8	4.2	3.2	2.6	3.0	87	178	23	18	7.6
3	15	13	5.8	4.2	3.2	2.6	3.2	87	200	23	19	7.6
4	15	13	5.8	4.2	3.2	2.6	4.6	85	144	21	18	11
5	15	13	5.6	4.2	3.2	2.6	8.5	82	144	21	15	11
6	15	14	5.4	4.2	3.0	2.6	8.0	82	215	21	15	18
7	13	13	5.4	4.2	3.0	2.8	25	87	177	20	15	20
8	13	11	5.4	4.0	3.0	2.8	150	90	138	19	18	16
9	11	11	5.4	4.0	3.0	2.8	350	90	107	18	18	15
10	11	11	5.2	4.0	2.8	2.6	480	85	80	16	15	13
11	11	13	5.2	4.0	2.6	2.6	1,050	77	72	16	15	11
12	13	14	5.0	4.0	2.6	2.6	3,250	72	64	23	14	10
13	14	14	5.0	4.0	2.6	2.6	2,940	64	55	21	13	10
14	14	13	4.9	4.0	2.6	2.6	1,790	59	50	23	13	13
15	14	13	4.9	3.8	2.6	2.8	1,060	52	46	42	11	14
16	14	13	4.9	3.8	2.6	2.8	630	50	42	50	10	16
17	13	13	4.9	3.8	2.6	2.8	418	50	36	42	7.6	19
18	13	5.5	4.8	3.8	2.6	2.8	326	50	35	33	7.6	20
19	13	7.5	4.8	3.6	2.6	2.8	278	48	33	30	8.9	20
20	13	7.0	4.8	3.6	2.6	2.8	248	46	30	28	8.9	21
21	11	6.6	4.6	3.6	2.6	3.0	215	46	27	27	8.9	20
22	11	6.6	4.6	3.6	2.6	3.0	188	44	27	23	8.9	20
23	11	6.6	4.6	3.6	2.6	3.0	167	42	26	21	7.6	19
24	11	6.4	4.6	3.4	2.6	3.2	150	44	23	21	6.4	20
25	11	6.6	4.6	3.4	2.6	3.2	141	44	23	19	7.6	20
26	11	6.4	4.6	3.4	2.6	3.2	128	46	24	18	7.6	20
27	11	6.4	4.6	3.4	2.6	3.2	119	48	27	18	6.4	19
28	11	6.2	4.4	3.4	2.6	3.2	113	48	27	16	6.4	19
29	11	6.2	4.4	3.2	-----	3.2	104	50	27	16	6.4	21
30	11	6.0	4.4	3.2	-----	3.0	93	50	26	15	7.6	21
31	13	-----	4.4	3.2	-----	3.0	-----	52	-----	15	7.6	-----
TOTAL	391	304.0	154.8	117.4	77.6	88.0	14,443.5	1,953	2,158	725	357.4	481.1
MEAN	12.6	10.1	4.99	3.79	2.77	2.84	481	63.0	71.9	23.4	11.5	16.0
MAX	15	14	6.0	4.4	3.2	3.2	3,250	96	215	50	19	21
MIN	11	5.5	4.4	3.2	2.6	2.6	3.0	42	23	15	6.4	7.6
AC-FT	776	603	307	233	154	175	28,650	3,870	4,280	1,440	709	954

CAL YR 1964: TOTAL 16,143.40 MEAN 44.1 MAX 1,310 MIN 0 AC-FT 32,020  
WAT YR 1965: TOTAL 21,250.8 MEAN 58.2 MAX 3,250 MIN 2.6 AC-FT 42,150

5-0875. Middle River at Argyle, Minn.

Location.--Lat 48°20'27", long 96°49'02", in SE¼SW¼ sec.10, T.156 N., R.48 W., on left bank 20 ft upstream from bridge on U.S. Highway 75 in Argyle and 14 miles upstream from mouth.

Drainage area.--265 sq mi.

Records available.--March to September 1945, November 1950 to September 1965. Monthly discharge only for some periods, published in WSP 1728.

Gage.--Water-stage recorder. Datum of gage is 828.53 ft above mean sea level, datum of 1929. Prior to Nov. 8, 1951, chain or wire-weight gage at bridge 20 ft upstream at datum 1.0 ft higher. Nov. 8, 1951, to Sept. 18, 1952, water-stage recorder at present site at datum 1.0 ft higher.

Average discharge.--15 years (1950-65), 34.9 cfs (25,270 acre-ft per year).

Extremes.--Maximum and minimum discharges for the water years 1961-65 are contained in the following table:

Water year	Maximum			Minimum		
	Date	Discharge (cfs)	Gage height (feet)	Date	Discharge (cfs)	Gage height (feet)
1961	Mar. 27, 1961	135	a 6.77	Many days	0	-
1962	June 12, 1962	1,620	b 14.12	do.	0	-
1963	Apr. 11, 1963	925	11.29	do.	0	-
1964	June 22, 1964	900	12.40	do.	0	-
1965	Apr. 12, 1965	2,590	15.29	Feb. 22 to Mar. 3	1.0	c 1.21

a Backwater from ice.

b Backwater from vegetation.

c Occurred Aug. 24, 1965.

1945, 1950-65: Maximum discharge, 2,590 cfs Apr. 12, 1965 (gage height, 15.29 ft); no flow at times in most years.

Flood in April 1950 reached a stage of 15.25 ft, present datum, from floodmarks (discharge, 2,790 cfs).

Remarks.--Records good except those for periods of no gage-height record and those for winter periods, which are fair.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	.10	1.1	.50	.50	.10	.30	80	18	3.6	0	0	0
2	.10	.80	.50	.50	.10	.30	70	17	3.3	0	0	0
3	.10	.60	.50	.40	.10	.30	60	17	3.2	0	0	0
4	.10	.50	.50	.40	.10	.30	50	16	2.9	0	0	0
5	.10	.40	.60	.40	.10	.30	40	14	2.2	0	0	0
6	.10	.40	.60	.40	.10	.30	30	14	1.8	0	0	0
7	.10	.30	.60	.40	.10	.40	28	13	1.4	0	0	0
8	.10	.10	.60	.40	.10	.40	28	12	1.1	0	0	0
9	.10	.20	.60	.40	.10	.40	24	11	1.0	0	0	0
10	.10	.20	.60	.40	.20	.40	22	16	.80	0	0	0
11	.10	.20	.60	.40	.20	.40	20	17	.60	0	0	0
12	.10	.20	.60	.40	.20	.40	18	16	.40	0	0	0
13	.20	.20	.60	.40	.20	.50	20	15	.30	0	0	0
14	.20	.30	.60	.40	.20	.50	18	14	.20	0	0	0
15	.20	.40	.70	.40	.20	.50	18	13	.10	0	0	0
16	.20	.40	.70	.40	.20	.50	15	11	.10	0	0	0
17	.20	.30	.70	.40	.20	.60	15	11	.10	0	0	0
18	.20	.20	.60	.30	.20	.80	14	10	.10	0	0	0
19	.20	.20	.60	.30	.20	1.0	13	9.5	0	0	0	0
20	.30	.30	.60	.30	.20	1.2	13	8.7	0	0	0	0
21	.30	.40	.60	.30	.20	1.5	13	7.9	0	0	0	0
22	.50	.40	.60	.20	.30	6.0	19	7.1	0	0	0	0
23	.50	.30	.60	.20	.30	10	24	6.6	0	0	0	0
24	.50	.40	.60	.20	.30	12	28	6.1	0	0	0	0
25	.20	.60	.50	.20	.30	50	28	5.5	0	0	0	0
26	.20	1.2	.50	.20	.30	100	27	5.5	0	0	0	9.5
27	.30	.60	.50	.20	.30	130	24	5.0	0	0	0	11
28	.30	.50	.50	.20	.30	110	22	4.6	0	0	0	9.5
29	.50	.50	.50	.20	-----	100	20	4.3	0	0	0	7.4
30	2.2	.50	.50	.20	-----	95	18	4.1	0	0	0	6.6
31	1.4	-----	.50	.10	-----	90	-----	3.8	-----	0	0	-----
TOTAL	9.80	12.70	17.80	10.10	5.40	714.30	819	333.7	23.20	0	0	44.0
MEAN	.32	.42	.57	.33	.19	23.0	27.3	10.8	.77	0	0	1.47
MAX	2.2	1.2	.70	.50	.30	130	80	18	3.6	0	0	11
MIN	.10	.10	.50	.10	.10	.30	13	3.8	0	0	0	0
AC-FT	19	25	35	20	11	1,420	1,620	662	46	0	0	87

CAL YR 1960: TOTAL 12,780.90 MEAN 34.9 MAX 830 MIN 0 AC-FT 25,350

MAT YR 1961: TOTAL 1,990.00 MEAN 5.45 MAX 130 MIN 0 AC-FT 3,950

## 5-0875. Middle River at Argyle, Minn.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	5.5	4.9	1.6	.50	.30	0	0	150	418	67	19	1.6
2	4.7	4.5	1.6	.50	.30	0	0	135	685	58	16	1.6
3	4.0	4.6	1.6	.50	.30	0	0	119	647	52	14	1.4
4	3.6	4.2	1.4	.50	.30	0	0	103	471	49	14	1.6
5	3.3	4.2	1.4	.50	.30	0	0	88	340	45	11	1.6
6	3.3	4.0	1.4	.50	.20	0	2.0	73	268	41	11	1.5
7	3.7	3.8	1.4	.50	.20	0	4.0	63	224	39	10	1.4
8	4.0	3.6	1.2	.50	.20	0	6.0	54	195	34	9.9	4.6
9	2.4	3.2	2.2	.40	.10	0	10	46	220	31	9.9	5.7
10	1.2	3.2	1.0	.40	.20	0	20	42	742	28	9.9	5.5
11	4.2	3.2	1.0	.40	.10	0	100	41	1,240	39	10	6.4
12	5.8	3.2	1.0	.40	.10	0	150	41	1,420	58	9.3	24
13	4.6	3.0	.80	.40	.10	0	180	43	1,440	94	9.3	31
14	4.1	2.8	.80	.40	.10	0	190	43	1,100	82	7.7	29
15	5.7	2.8	.80	.40	.10	0	220	42	772	59	7.1	24
16	24	2.8	.80	.40	.10	0	240	90	548	48	6.3	22
17	22	2.4	.80	.30	.10	0	270	168	409	35	5.5	12
18	21	2.4	.80	.30	.10	0	300	260	359	31	5.1	9.3
19	19	2.2	.80	.30	.10	0	400	305	445	27	5.1	7.1
20	15	2.2	.70	.30	.10	0	640	288	484	22	4.7	5.8
21	13	2.2	.70	.30	.10	0	680	279	453	23	4.3	5.0
22	13	2.2	.70	.30	0	0	680	411	342	24	4.2	4.3
23	12	2.2	.70	.30	0	0	670	506	268	18	4.5	3.0
24	10	2.2	.60	.30	0	0	620	419	210	23	3.8	2.9
25	8.3	2.2	.60	.30	0	0	520	872	178	69	3.3	2.9
26	7.6	2.0	.60	.30	0	0	421	1,440	163	71	2.8	2.8
27	6.6	2.2	.60	.30	0	0	354	1,120	137	59	2.3	2.6
28	6.4	2.0	.50	.30	0	0	278	786	109	46	2.0	2.3
29	6.0	1.8	.50	.30	-----	-----	215	550	91	37	1.8	2.2
30	5.7	1.8	.50	.30	-----	-----	178	402	76	29	1.9	2.8
31	5.3	-----	.50	.30	-----	-----	0	318	-----	23	1.7	-----
TOTAL	255.0	88.0	28.60	11.70	3.60	0	7,348.0	9,267	14,458	1,361	227.4	227.9
MEAN	8.23	2.93	.92	.38	.13	0	245	299	482	43.9	7.34	7.60
MAX	24	4.9	1.6	.50	.30	0	680	1,410	1,440	94	19	31
MIN	1.2	1.8	.50	.30	0	0	0	41	76	18	1.7	1.4
AC-FT	506	175	57	23	7.1	0	14,570	18,380	28,680	2,700	451	452
CAL YR 1961: TOTAL	2,321.30											
MEAN	6.36											
MAX	130											
MIN	0											
AC-FT	4,600											
WAT YR 1962: TOTAL	33,276.20											
MEAN	91.2											
MAX	1,440											
MIN	0											
AC-FT	66,000											

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	2.7	2.4	5.2	1.8	0	0	110	48	27	20	15	.60
2	2.0	2.6	5.2	1.6	0	0	80	50	27	16	16	.40
3	2.4	2.6	5.2	1.4	0	0	40	52	25	13	16	.40
4	3.0	2.8	5.0	1.2	0	0	30	46	27	11	14	.40
5	2.9	2.7	4.8	1.2	0	0	55	45	28	9.3	12	.40
6	3.6	3.4	4.6	1.2	0	0	60	42	29	8.3	9.1	.30
7	2.7	4.6	4.4	1.0	0	0	150	40	29	7.2	7.2	.40
8	2.9	4.5	4.4	1.0	0	0	410	38	24	6.4	5.8	.40
9	3.6	4.3	4.2	.80	0	0	550	37	40	5.7	5.0	.10
10	2.6	4.3	4.0	.60	0	0	727	39	26	5.1	4.1	.10
11	3.2	4.3	3.9	.40	0	0	764	38	24	5.5	3.4	.20
12	4.0	4.3	3.8	.20	0	0	525	37	34	5.4	3.0	.40
13	4.0	4.2	3.7	.10	0	0	348	39	36	5.8	3.0	.10
14	4.1	4.2	3.6	.10	0	0	256	40	32	6.3	2.8	.10
15	2.3	4.2	3.5	0	0	0	193	39	28	5.5	2.4	0
16	2.2	4.2	3.4	0	0	0	155	39	24	6.3	2.2	0
17	2.0	4.2	3.3	0	0	0	131	39	21	5.7	2.0	0
18	1.9	4.2	3.2	0	0	0	128	36	21	4.9	1.8	0
19	1.9	4.2	3.1	0	0	0	140	38	20	4.7	3.0	0
20	1.9	4.2	3.0	0	0	0	128	38	19	4.7	2.9	0
21	2.0	5.2	2.9	0	0	0	112	42	45	4.3	2.6	0
22	2.3	5.2	2.8	0	0	1.0	92	41	61	4.0	2.2	0
23	2.4	5.0	2.7	0	0	2.0	72	47	54	3.8	1.8	0
24	2.4	4.8	2.6	0	0	6.0	65	52	43	3.7	1.5	0
25	2.3	4.8	2.5	0	0	10	60	53	36	3.3	1.2	0
26	2.3	4.6	2.4	0	0	40	61	49	32	5.0	.90	0
27	2.3	4.8	2.3	0	0	70	59	44	27	4.3	.80	0
28	2.4	5.0	2.2	0	0	110	56	42	27	4.6	.80	0
29	2.4	5.0	2.1	0	0	140	54	36	27	4.6	.80	0
30	2.4	5.0	2.0	0	0	110	47	32	24	6.9	.80	0
31	2.4	-----	1.9	0	0	90	-----	29	-----	12	.60	-----
TOTAL	81.5	125.8	107.9	12.60	0	579.0	5,658	1,293	917	213.3	144.70	4.30
MEAN	2.63	4.19	3.48	.41	0	18.7	189	41.7	30.6	6.88	4.67	.14
MAX	4.1	5.2	5.2	1.8	0	140	764	56	61	20	16	.60
MIN	1.9	2.4	1.9	0	0	0	30	29	19	3.3	.60	0
AC-FT	162	250	214	25	0	1,150	11,220	2,560	1,820	423	287	8.5
CAL YR 1962: TOTAL	33,219.80											
MEAN	91.0											
MAX	1,440											
MIN	0											
AC-FT	65,890											
WAT YR 1963: TOTAL	9,137.10											
MEAN	25.0											
MAX	764											
MIN	0											
AC-FT	18,120											

Note.--No gage-height record Jan. 25 to Mar. 24.

## 5-0875. Middle River at Argyle, Minn.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	0	.10	.10	0	0	0	0	47	10	98	16	5.3
2	0	.10	.10	0	0	0	0	49	9.2	79	18	4.7
3	0	.20	.10	0	0	0	0	51	8.2	64	25	5.0
4	0	.20	.10	0	0	0	1.0	58	7.2	53	48	4.6
5	0	.10	.10	0	0	0	2.0	65	6.5	46	120	4.3
6	0	.10	.10	0	0	0	2.0	87	7.2	40	138	3.6
7	0	.20	.10	0	0	0	2.0	102	6.7	35	110	3.6
8	0	.20	.10	0	0	0	5.0	96	8.6	31	77	4.4
9	0	.20	.10	0	0	0	15	83	13	30	54	4.0
10	0	.20	.10	0	0	0	35	67	24	38	41	3.1
11	0	.20	0	0	0	0	25	57	133	65	32	2.8
12	0	.20	0	0	0	0	30	48	236	75	26	2.2
13	0	.20	0	0	0	0	55	42	356	72	22	1.8
14	0	.20	0	0	0	0	68	36	478	60	18	1.7
15	0	.20	0	0	0	0	120	33	859	45	16	1.7
16	0	.20	0	0	0	0	150	29	738	35	14	2.0
17	0	.20	0	0	0	0	170	26	516	29	12	2.0
18	0	.20	0	0	0	0	230	25	374	24	10	2.0
19	0	.20	0	0	0	0	270	23	380	23	8.8	2.0
20	0	.20	0	0	0	0	199	23	509	19	7.8	2.0
21	0	.20	0	0	0	0	164	45	730	17	7.6	1.3
22	0	.20	0	0	0	0	117	53	878	18	7.1	1.4
23	0	.20	0	0	0	0	101	52	768	41	6.2	3.6
24	0	.20	0	0	0	0	89	46	576	46	5.8	2.6
25	0	.20	0	0	0	0	80	37	438	37	5.3	2.3
26	0	.20	0	0	0	0	72	28	343	31	4.7	6.0
27	0	.20	0	0	0	0	65	22	273	27	4.3	10
28	0	.10	0	0	0	0	55	17	209	23	5.5	19
29	.20	.10	0	0	0	0	47	14	161	19	4.1	53
30	.10	.10	0	0	0	0	46	12	127	16	4.7	91
31	.10	-----	0	0	0	0	-----	11	-----	15	5.5	-----
TOTAL	0.40	5.30	1.00	0	0	0	2,215.0	1,384	9,182.6	1,251	874.4	253.0
MEAN	.013	.18	.032	0	0	0	73.8	44.6	306	40.4	28.2	8.43
MAX	.20	.20	.10	0	0	0	270	102	878	98	138	91
MIN	0	.10	0	0	0	0	0	11	6.5	15	4.1	1.3
AC-FT	.8	11	2.0	0	0	0	4,390	2,750	18,210	2,480	1,730	502

CAL YR 1963: TOTAL 8,828.60 MEAN 24.2 MAX 764 MIN 0 AC-FT 17,510

WAT YR 1964: TOTAL 15,166.70 MEAN 41.4 MAX 878 MIN 0 AC-FT 30,080

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	88	7.6	5.6	2.9	1.7	1.0	1.4	120	64	221	14	1.9
2	70	7.6	5.2	2.9	1.6	1.0	1.6	112	63	199	13	1.4
3	57	7.4	5.0	2.9	1.5	1.0	2.1	106	67	176	12	1.3
4	52	7.2	4.8	2.8	1.4	1.1	4.0	121	89	206	11	3.1
5	52	11	4.7	2.8	1.4	1.1	9.0	159	161	225	9.4	2.6
6	52	22	4.6	2.8	1.3	1.1	16	176	229	183	8.8	2.4
7	50	21	4.5	2.8	1.3	1.1	25	229	224	138	7.8	3.0
8	46	19	4.5	2.8	1.2	1.2	40	376	239	105	7.1	2.8
9	42	18	4.5	2.8	1.2	1.3	92	423	301	92	6.4	2.8
10	36	14	4.4	2.7	1.1	1.4	190	362	317	62	5.5	2.6
11	31	15	4.4	2.6	1.1	1.5	466	306	266	50	5.5	2.6
12	27	14	4.3	2.6	1.1	1.6	1,500	310	196	49	4.7	2.4
13	24	14	4.2	2.5	1.1	1.6	2,410	297	141	42	5.5	2.3
14	20	15	4.1	2.5	1.1	1.7	2,160	233	104	57	4.4	3.3
15	18	20	4.0	2.5	1.1	1.7	1,940	180	78	118	3.7	3.4
16	17	23	4.0	2.5	1.1	1.7	1,670	144	61	127	3.2	3.7
17	15	23	3.9	2.5	1.1	1.6	1,350	126	50	108	3.7	4.0
18	14	17	3.7	2.5	1.1	1.6	1,070	112	41	106	3.2	3.6
19	12	14	3.5	2.5	1.1	1.6	855	100	35	89	2.6	4.7
20	12	12	3.4	2.5	1.1	1.5	694	96	32	72	2.3	7.8
21	11	11	3.4	2.5	1.1	1.5	557	93	27	61	1.9	11
22	11	10	3.3	2.5	1.0	1.5	446	87	24	64	1.8	11
23	10	10	3.3	2.6	1.0	1.4	363	83	20	67	1.7	11
24	9.6	9.8	3.3	2.6	1.0	1.4	305	81	18	56	1.4	11
25	9.2	9.3	3.2	2.6	1.0	1.3	262	76	16	46	1.6	14
26	9.0	8.6	3.2	2.5	1.0	1.3	229	72	16	38	2.0	18
27	8.8	8.0	3.1	2.4	1.0	1.3	196	69	20	31	2.7	21
28	9.4	7.3	3.1	2.3	1.0	1.3	176	68	17	25	1.9	25
29	10	6.6	3.0	2.2	-----	1.3	155	68	17	22	2.6	27
30	8.0	6.0	3.0	2.0	-----	1.3	135	70	130	18	2.0	28
31	7.4	-----	2.9	1.8	-----	1.4	-----	68	-----	16	2.2	-----
TOTAL	838.4	386.4	122.1	79.4	32.8	42.4	17,320.1	4,923	3,063	2,859	155.6	238.7
MEAN	27.0	12.9	3.94	2.56	1.17	1.37	577	159	102	92.2	5.02	7.96
MAX	88	23	5.6	2.9	1.7	1.7	2,410	423	317	225	14	28
MIN	7.4	6.0	2.9	1.8	1.0	1.0	1.4	68	16	16	1.4	1.3
AC-FT	1,660	766	242	157	65	84	34,350	9,760	6,080	5,670	309	473

CAL YR 1964: TOTAL 16,506.90 MEAN 45.1 MAX 878 MIN 0 AC-FT 32,740

WAT YR 1965: TOTAL 30,060.9 MEAN 82.4 MAX 2,410 MIN 1.0 AC-FT 59,620

## 5-0885. Homme Reservoir near Park River, N. Dak.

Location.--Lat 48°24'20", long 97°47'10", in SE $\frac{1}{4}$  NW $\frac{1}{4}$  sec.19, T.157 N., R.55 W., at Homme Dam on South Branch Park River, 2 miles west of town of Park River.

Drainage area.--226 sq mi.

Records available.--September 1949 to September 1965.

Gage.--Water-stage recorder. Datum of gage is at mean sea level, datum of 1929.

Extremes.--Maximums and minimums (contents in acre-feet, elevation in feet) for the water years 1961-65 are contained in the following table:

Water year	Maximum			Minimum		
	Date	Contents	Elevation	Date	Contents	Elevation
1961	Apr. 3-20, 1961	3,679	1,080.10	Jan. 31, 1961	2,619	1,074.52
1962	Apr. 19, 1962	4,162	1,082.30	Apr. 12, 1962	335	1,054.70
1963	Mar. 25, 1963	3,753	1,080.49	Feb. 22, 1963	2,276	1,072.64
1964	June 19, 1964	4,284	1,082.81	Mar. 12, 1964	2,539	1,074.10
1965	Apr. 11, 1965	4,498	1,083.70	Mar. 31, 1965	1,780	1,069.00

1949-65: Maximum contents, 4,498 acre-ft Apr. 11, 1965 (elevation, 1,083.70 ft); minimum since first reaching spillway level, 184 acre-ft Feb. 8, 1952 (elevation, 1,051.22 ft).

Remarks.--Reservoir is formed by an earthfill dam 865 ft long; storage began in September 1949; dam completed in October 1950. Usable capacity between invert of outlet, elevation, 1,048.0 ft, and crest of spillway, elevation, 1,080.0 ft, is 3,550 acre-ft. Dead storage is 100 acre-ft. Low flows are controlled by two sluice gates 3 x 5 ft. The spillway, which is 150 ft long, is uncontrolled. The records herein represent total contents. The reservoir is operated for flood control, water supply, and pollution abatement during low-flow periods.

Cooperation.--Records furnished by Corps of Engineers.

## MONTH-END ELEVATION AND CONTENTS, WATER YEARS OCTOBER 1960 TO SEPTEMBER 1965

Date	Elevation (feet)†	Contents (acre-feet)	Change in contents (acre-feet)	Date	Elevation (feet)†	Contents (acre-feet)	Change in contents (acre-feet)
Oct. 31, 1960.....	1,077.11	3,111	-17	Oct. 31, 1963.....	1,078.06	3,291	-236
Nov. 30.....	1,077.10	3,109	-2.0	Nov. 30.....	1,078.10	3,299	+8.0
Dec. 31.....	1,077.41	3,168	+59	Dec. 31.....	1,078.15	3,309	+10
Calendar year 1960	-	-	-211	Calendar year 1963	-	-	-66
Jan. 31, 1961.....	1,074.52	2,619	-549	Jan. 31, 1964.....	1,074.52	2,619	-690
Feb. 28.....	1,074.77	2,666	+47	Feb. 29.....	1,074.20	2,558	-61
Mar. 31.....	1,078.75	3,423	+757	Mar. 31.....	1,074.21	2,560	+2.0
Apr. 30.....	1,079.85	3,632	+209	Apr. 30.....	1,080.18	3,694	+1,134
May 31.....	1,079.91	3,643	+11	May 31.....	1,079.87	3,635	-59
June 30.....	1,079.46	3,557	-86	June 30.....	1,080.17	3,692	+57
July 31.....	1,078.56	3,386	-171	July 31.....	1,079.06	3,291	-401
Aug. 31.....	1,077.83	3,248	-138	Aug. 31.....	1,078.29	3,335	+44
Sept. 30.....	1,076.68	3,029	-219	Sept. 30.....	1,079.00	3,470	+135
Water year 1961...	-	-	-99	Water year 1964...	-	-	-57
Oct. 31.....	1,076.61	3,016	-13	Oct. 31.....	1,079.65	3,594	+124
Nov. 30.....	1,075.25	2,758	-258	Nov. 30.....	1,079.84	3,630	+36
Dec. 31.....	1,075.07	2,723	-35	Dec. 31.....	1,080.27	3,711	+81
Calendar year 1961	-	-	-445	Calendar year 1964	-	-	+401
Jan. 31, 1962.....	1,072.50	2,255	-468	Jan. 31, 1965.....	1,078.80	3,432	-279
Feb. 28.....	1,071.57	2,116	-139	Feb. 28.....	1,076.71	3,035	-397
Mar. 31.....	1,068.70	585	-1,531	Mar. 31.....	1,069.00	1,730	-1,305
Apr. 30.....	1,080.42	3,740	+3,155	Apr. 30.....	1,080.35	3,726	+1,996
May 31.....	1,080.44	3,744	+4.0	May 31.....	1,080.16	3,690	-36
June 30.....	1,080.15	3,688	-56	June 30.....	1,080.05	3,670	-20
July 31.....	1,080.04	3,668	-20	July 31.....	1,080.20	3,698	+28
Aug. 31.....	1,079.70	3,603	-65	Aug. 31.....	1,080.03	3,666	-32
Sept. 30.....	1,079.27	3,521	-82	Sept. 30.....	1,080.12	3,683	+17
Water year 1962...	-	-	+492	Water year 1965...	-	-	+213
Oct. 31.....	1,078.48	3,371	-150	† Elevation at 2400 hours.			
Nov. 30.....	1,078.43	3,362	-9.0				
Dec. 31.....	1,078.50	3,375	+13				
Calendar year 1962	-	-	+652				
Jan. 31, 1963.....	1,075.68	2,839	-536				
Feb. 28.....	1,072.66	2,279	-560				
Mar. 31.....	1,080.28	3,713	+1,434				
Apr. 30.....	1,080.14	3,687	-26				
May 31.....	1,080.14	3,687	0				
June 30.....	1,080.11	3,681	-6.0				
July 31.....	1,080.22	3,702	+21				
Aug. 31.....	1,079.96	3,652	-50				
Sept. 30.....	1,079.30	3,527	-125				
Water year 1963...	-	-	+6.0				

5-0890. South Branch Park River below Homme Dam, N. Dak.

Location.--Lat 48°24', long 97°47', in SE $\frac{1}{4}$  sec.19, T.157 N., R.55 W., on right bank half a mile downstream from Homme Dam and 2 miles west of town of Park River.

Drainage area.--226 sq mi.

Records available.--October 1949 to September 1965. Monthly discharge only for October and November 1949, published in WSP 1308.

Gage.--Water-stage recorder. Datum of gage is 1,000.00 ft above mean sea level, datum of 1929.

Average discharge.--16 years, 24.3 cfs (17,590 acre-ft per year); median of yearly mean discharges, 13 cfs (9,410 acre-ft per year).

Extremes.--Maximum and minimum discharges for the water years 1961-65 are contained in the following table:

Water year	Maximum			Minimum		
	Date	Discharge (cfs)	Gage height (feet)	Date	Discharge (cfs)	Gage height (feet)
1961	Apr. 26, 1961	86	a 23.81	Mar. 17 to Apr. 3	b 0.20	-
1962	Apr. 18, 1962	1,780	c 27.99	(d)	b .20	-
1963	June 25, 1963	316	24.90	May 4, 5, 1963	b .20	-
1964	June 19, 1964	2,300	28.71	Dec. 11-23, 1963	b .20	-
1965	Apr. 11, 1965	3,100	c 30.68	Nov. 19-27, 1964	b .20	-

a Maximum gage height for year, 24.05 ft Jan. 5, 1961, backwater from ice.

b Minimum daily.

c Backwater from ice.

d Nov. 11, 12, 1961, Aug. 2, 1962.

1949-65: Maximum discharge, about 13,000 cfs Apr. 24, 1950 (gage height, 37.52 ft), from rating curve extended above 5,500 cfs, result of failure of emergency embankment at site of Homme Dam; no flow for most of period Oct. 1 to Dec. 3, 1949.

Remarks.--Records good except those for winter period, which are fair. Flow regulated by Homme Reservoir (see station 5-0885).

Cooperation.--Gage-height record furnished by Corps of Engineers.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	1.7	1.0	.80	.30	.60	.30	.20	.40	1.7	17	.60	2.3
2	1.5	1.0	.80	.30	.60	.30	.20	.40	.80	16	.50	1.5
3	1.4	1.0	.80	4.0	.50	.30	.20	.40	.70	16	.50	1.3
4	1.2	.90	.80	17	.50	.30	.40	.40	.50	16	.60	.90
5	.90	1.0	.80	17	.50	.30	1.0	.30	.40	17	2.0	7.7
6	.80	1.0	.70	17	.50	.30	5.2	.40	.40	7.7	.90	17
7	.80	1.0	.60	17	.50	.30	5.2	2.2	.40	1.3	.80	18
8	.80	.90	.60	17	.50	.30	5.4	7.5	.50	1.4	.80	18
9	.80	.90	.50	17	.50	.30	5.8	1.5	1.2	1.1	.70	18
10	.80	.90	.50	17	.50	.30	6.8	1.2	1.9	.80	.60	18
11	.80	.90	.50	16	.50	.30	5.6	2.3	1.2	.80	.60	12
12	.90	1.0	.50	16	.50	.30	5.4	1.7	.90	.90	.60	8.2
13	.90	1.0	.40	16	.50	.30	5.6	1.4	.70	.90	.80	2.7
14	1.0	1.0	.40	16	.50	.30	6.0	2.1	.60	.90	.60	2.8
15	1.1	1.0	.40	16	.50	.30	5.4	8.5	.60	.70	1.9	2.8
16	.70	1.0	.30	16	.40	.30	4.4	1.5	.50	.60	.80	2.4
17	.70	.90	.30	16	.40	.20	3.5	1.0	.40	.50	.60	2.3
18	.60	.90	.30	16	.40	.20	3.5	1.0	.50	2.4	7.2	2.1
19	.70	.90	.30	16	.40	.20	3.8	1.0	.50	1.0	.9.6	2.0
20	.70	.90	.30	10	.40	.20	7.3	3.7	.50	.90	1.0	1.9
21	.80	.90	.30	.60	.40	.20	7.1	1.0	.60	1.1	.70	1.9
22	.80	.80	.30	.60	.40	.20	6.9	.50	.80	1.4	.60	2.0
23	.80	.80	.30	.60	.40	.20	3.5	.50	.90	1.1	.50	1.8
24	.80	.80	.30	.60	.40	.20	3.2	.50	.80	.80	.50	1.7
25	.80	.80	.30	.60	.40	.20	4.7	.50	.90	.70	1.1	1.6
26	.80	.80	.30	.60	.40	.20	27	.50	2.2	.70	.70	1.6
27	.80	.80	.30	.60	.40	.20	2.9	.50	2.0	.60	.70	1.5
28	.80	.80	.30	.60	.30	.20	.80	.50	1.8	.50	.60	1.5
29	.90	.80	.30	.60	-----	.20	5.2	.50	1.8	.70	.60	1.4
30	1.1	.80	.30	.60	-----	.20	.80	.50	9.0	.60	.60	1.4
31	1.0	-----	.30	.60	-----	.20	-----	.80	-----	.60	.70	-----
TOTAL	28.20	27.20	13.90	284.20	12.80	7.80	143.00	45.20	35.70	112.70	39.00	152.30
MEAN	.91	.91	.45	9.17	.46	.25	4.77	1.46	1.19	3.64	1.26	5.08
MAX	1.7	1.0	.80	17	.60	.30	27	8.5	9.0	17	9.6	18
MIN	.60	.80	.30	.30	.30	.20	.20	.30	.40	.50	.50	.90
AC-FT	56	54	28	564	25	15	284	90	71	224	77	302

CAL YR 1960: TOTAL 13,374.50

MEAN 36.5

MAX 2,340

MIN .30

AC-FT 26,530

WAT YR 1961: TOTAL

MEAN 2.47

MAX 27

MIN .20

AC-FT 1,790

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

CAL YR 1961: TOTAL	1,087.30	MEAN	2.98	MAX	27	MIN	.20	AC-FT	2,160
WAT YR 1962: TOTAL	10,905.10	MEAN	29.9	MAX	1,460	MIN	.20	AC-FT	21,630

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963

CAL YR 1962:	TOTAL 10,828.70	MEAN 29.7	MAX 1,460	MIN .20	AC-FT 21,480
WAT YR 1963:	TOTAL 3,039.20	MEAN 8.33	MAX 209	MIN .20	AC-FT 6,030

## 5-0890. South Branch Park River below Homme Dam, N. Dak.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	1.4	.70	.40	2.5	2.5	1.7	1.9	19	1.0	24	5.8	1.0
2	1.4	.60	.40	2.4	2.5	1.7	2.0	20	2.1	25	5.8	1.0
3	1.4	.60	.30	2.4	2.4	1.6	2.0	21	3.5	20	5.5	1.0
4	1.3	.60	.30	2.4	2.4	1.6	2.4	22	3.3	19	3.9	1.1
5	1.0	.70	.30	2.4	2.4	1.6	2.5	21	2.9	18	1.4	1.1
6	1.0	.60	.30	9.0	2.4	1.6	44	32	2.4	20	1.3	1.1
7	5.5	.60	.40	17	2.3	1.6	88	69	2.2	15	1.1	1.1
8	14	.60	.30	17	2.3	1.6	78	92	2.4	12	1.1	1.0
9	14	.60	.30	17	2.3	1.6	49	53	11	20	1.0	1.0
10	14	.60	.30	17	2.3	1.5	42	37	12	16	1.0	1.0
11	14	.60	.20	17	2.2	1.5	140	31	23	14	1.0	1.1
12	14	.60	.20	17	2.0	1.5	313	21	1,270	11	1.2	1.0
13	14	.60	.20	17	2.0	1.6	204	19	458	10	1.2	1.0
14	14	.50	.20	17	2.0	1.6	112	19	193	9.3	1.2	1.0
15	6.0	.50	.20	17	2.0	1.6	97	11	103	7.8	1.0	1.0
16	1.4	.60	.20	16	2.0	1.6	209	12	67	8.9	1.1	1.0
17	1.2	.60	.20	16	2.0	1.6	207	9.3	56	22	1.1	1.0
18	.80	.60	.20	16	2.0	1.6	127	19	364	32	1.0	1.0
19	.80	.60	.20	16	2.0	1.6	99	1.6	1,460	34	1.0	1.1
20	.80	.50	.20	16	2.0	1.6	48	2.5	551	43	1.1	1.0
21	.70	.50	.20	16	1.9	1.6	12	7.4	266	72	1.1	1.1
22	.70	.50	.20	16	1.9	1.6	35	4.4	155	97	1.1	1.2
23	.60	.50	.20	16	1.9	1.7	33	6.1	109	99	1.1	1.3
24	.60	.50	7.9	10	1.9	1.7	29	4.6	82	94	1.0	1.1
25	.60	.50	10	2.5	1.9	1.7	27	7.0	65	94	1.0	1.1
26	.60	.50	2.5	2.5	1.8	1.7	29	14	46	82	1.0	1.5
27	.60	.50	2.5	2.5	1.8	1.8	28	1.3	40	5.8	.90	1.1
28	.60	.40	2.5	2.5	1.8	1.8	26	1.1	35	4.1	.90	1.1
29	.60	.40	2.5	2.5	1.8	1.8	20	1.1	33	3.5	1.1	1.2
30	.60	.40	2.5	2.5	1.8	1.8	16	1.0	25	5.5	1.0	1.1
31	.70	-----	2.5	2.5	-----	1.8	-----	1.0	-----	5.5	1.0	-----
TOTAL	128.90	16.60	38.80	329.6	60.7	50.9	2,122.8	580.4	5,443.8	943.4	50.00	32.4
MEAN	4.16	.55	1.25	10.6	2.09	1.64	70.8	18.7	181	30.4	1.61	1.08
MAX	14	.70	10	17	2.5	1.8	313	92	1,460	99	5.8	1.5
MIN	.60	.40	.20	2.4	1.8	1.5	1.9	1.0	1.0	3.5	.90	1.0
AC-FT	256	33	77	654	120	101	4,210	1,150	10,800	1,870	99	64
CAL YR 1963: TOTAL	3,045.30	MEAN	8.34	MAX	209	MIN	.20	AC-FT	6,040			
WAT YR 1964: TOTAL	9,798.30	MEAN	26.8	MAX	1,460	MIN	.20	AC-FT	19,430			

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	1.2	.60	1.9	.70	19	37	1.4	29	26	14	39	2.5
2	1.2	.60	1.9	.70	19	37	1.4	12	36	6.3	29	6.9
3	1.5	.60	1.9	.70	19	36	1.4	18	66	5.1	24	2.5
4	1.1	.60	1.9	.70	19	36	1.2	19	73	5.4	18	32
5	1.0	.60	1.9	.70	4.0	36	1.2	33	65	3.0	13	19
6	1.0	.60	1.9	.70	3.5	36	1.1	240	54	3.9	19	18
7	.90	.50	1.9	.70	3.0	36	1.0	421	46	3.1	18	16
8	.80	.50	1.9	.70	2.8	36	1.0	192	40	3.1	13	9.3
9	.80	.50	1.9	.60	2.8	37	1.7	117	22	4.1	8.3	11
10	.80	.50	1.9	.60	2.8	37	225	90	19	2.8	4.1	5.1
11	.80	.50	1.8	.60	2.6	37	2,800	89	22	2.7	3.5	3.5
12	.80	.50	1.8	.60	2.6	46	1,700	74	18	22	4.1	3.9
13	.80	.40	1.8	.60	2.6	50	1,150	51	16	34	3.7	10
14	.80	.40	1.6	.60	2.6	50	700	41	14	13	11	18
15	.80	.30	1.4	2.5	2.5	50	437	35	13	9.3	1.5	23
16	.80	.30	1.2	4.0	2.5	28	300	31	12	6.7	1.1	36
17	.70	.30	1.0	4.0	2.4	6.0	218	30	9.3	5.1	2.3	51
18	.60	.30	.90	4.0	2.4	6.0	170	41	7.9	3.0	3.1	57
19	.60	.20	.90	4.0	2.4	6.0	136	9.3	12	3.0	2.7	44
20	.70	.20	.90	4.0	2.3	6.0	106	20	17	5.1	2.3	35
21	.40	.20	.90	4.0	2.3	5.0	96	31	2.8	9.8	2.2	27
22	.60	.20	.90	4.0	2.3	5.0	86	17	2.3	12	2.2	24
23	.90	.20	.90	4.0	1.5	50	74	19	4.8	22	2.1	27
24	.80	.20	.90	4.0	19	4.0	62	22	2.5	11	2.1	21
25	.80	.20	.80	10	19	4.0	51	27	3.3	7.1	2.2	22
26	.80	.20	.80	19	22	4.0	44	29	6.7	6.0	2.2	18
27	.80	.20	.80	19	38	3.0	37	24	16	5.7	2.2	18
28	.70	.60	.80	19	37	2.0	31	22	12	4.5	2.2	25
29	.70	2.0	.80	19	-----	1.6	29	26	1.1	5.1	2.2	38
30	.70	2.0	.80	19	-----	1.2	28	25	1.6	56	2.5	44
31	.60	-----	.70	19	-----	1.3	-----	27	-----	62	8.4	-----
TOTAL	25.50	15.00	41.40	171.70	274.4	685.1	8,491.4	1,861.3	641.3	359.9	251.2	667.7
MEAN	.82	.50	1.34	5.54	9.80	22.1	283	60.0	21.4	11.6	8.10	22.3
MAX	1.5	2.0	1.9	19	38	50	2,800	421	73	62	39	57
MIN	.40	.20	.70	.60	2.3	1.2	1.0	9.3	1.1	2.7	1.1	2.5
AC-FT	51	30	82	341	544	1,360	16,840	3,690	1,270	714	498	1,320
CAL YR 1964: TOTAL	9,695.90	MEAN	26.5	MAX	1,460	MIN	.20	AC-FT	19,230			
WAT YR 1965: TOTAL	13,485.90	MEAN	36.9	MAX	2,800	MIN	.20	AC-FT	26,750			

Location.--Lat 48°41', long 97°51', in SW $\frac{1}{4}$  sec.15, T.160 N., R.56 W., on right bank 50 ft downstream from bridge on State Highway 32 and 0.7 mile south of Mountain.

Records available.--June 1954 to September 1965.

Average discharge,--11 years, 2.64 cfs (1,910 acre-ft per year); median of yearly mean discharges, 2.6 cfs (1,880 acre-ft per year).

Annual maximum discharge (\*) and peak discharges above base (30 cfs), water years 1961-65

Date	Time	Discharge	Gage height	Date	Time	Discharge	Gage height	Date	Time	Discharge	Gage height
Mar. 14, 1961	1800	*	3 3.33	Aug. 10, 1962	1840	* 422	6.22	June 12, 1964	0140		770
Mar. 21, 1961	1900	30	3 3.28					June 18, 1964	2000	* 1,300	9.18
				May 31, 1963	1320	114	3.88	July 19, 1964	1955		128
Apr. 17, 1962	1530	*	7 7.33	June 1, 1963	0810	120	3.94				
Apr. 18, 1962	1930	374	6.82	May 10, 1963	0120	124	3.99	Apr. 10, 1965	1930	* 927	8.22
May 19, 1962	1230	82	3.51	July 26, 1963	1120	151	4.29	Apr. 16, 1965	1600		74
May 30, 1962	0320	189	4.61					May 6, 1965	0100	221	2.40
May 31, 1962	0440	200	4.48	Apr. 10, 1964	70	7	2.30	June 1, 1965	1730	252	8.8
June 10, 1962	1100	291	5.34	Apr. 15, 1964	2100	67	3.20	Sept. 30, 1965	0630	30	2.13
July 7, 1962	2020	57	3.15	May 6, 1964	0915	180	4.58				

No flow at times in each year.

1954-65: Maximum discharge, 1,300 cfs June 18, 1964 (gage height, 9.18 ft); no flow at times in each year.

Remarks.--Records fair.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	0	0	0	0	0	0	1.4	.40	.20	0	0	0
2	0	0	0	0	0	0	1.2	.40	.10	0	0	0
3	0	0	0	0	0	0	1.0	.40	.10	0	0	0
4	0	0	0	0	0	0	2.5	.40	0	0	0	0
5	0	0	0	0	0	0	3.0	.40	0	0	0	0
6	0	0	0	0	0	0	1.7	.60	0	0	0	0
7	0	0	0	0	0	0	.50	.70	0	0	0	0
8	0	0	0	0	0	0	.90	.50	0	0	0	0
9	0	0	0	0	0	0	1.6	.40	0	0	0	0
10	0	0	0	0	0	0	1.3	.40	0	0	0	0
11	0	0	0	0	0	0	1.0	.50	0	0	0	0
12	0	0	0	0	0	0	.50	.40	0	0	0	0
13	0	0	0	0	0	0	.60	.40	0	0	0	0
14	0	0	0	0	0	0	.50	.30	0	0	0	0
15	0	0	0	0	0	.20	.20	.30	0	0	0	0
16	0	0	0	0	0	.10	.30	.30	0	0	0	0
17	0	0	0	0	0	1.0	.30	.20	0	0	0	0
18	0	0	0	0	0	2.5	.40	.20	0	0	0	0
19	0	0	0	0	0	3.0	.50	.20	0	0	0	0
20	0	0	0	0	0	5.0	1.1	.20	0	0	0	0
21	0	0	0	0	0	14	2.0	.20	0	0	0	0
22	0	0	0	0	0	8.0	1.0	.20	0	0	0	0
23	0	0	0	0	0	9.5	.90	.20	0	0	0	0
24	0	0	0	0	0	9.0	.60	.10	0	0	0	0
25	0	0	0	0	0	9.5	.50	.10	0	0	0	0
26	0	0	0	0	0	5.0	.50	.10	0	0	0	0
27	0	0	0	0	0	3.0	.50	.10	0	0	0	0
28	0	0	0	0	0	2.0	.50	.10	0	0	0	0
29	0	0	0	0	---	1.5	.70	.10	0	0	0	0
30	0	0	0	0	---	1.0	.50	.10	0	0	0	0
31	0	---	0	0	---	1.5	---	.20	---	0	---	0
TOTAL	0	0	0	0	0	75.80	28.20	9.10	0.40	0	0	0
MEAN	0	0	0	0	0	2.45	.94	.29	.013	0	0	0
MAX	0	0	0	0	0	14	3.0	.70	.20	0	0	0
MIN	0	0	0	0	0	0	.20	.10	0	0	0	0
AC-FT	0	0	0	0	0	150	56	18	.8	0	0	0
CAL YR 1960: TOTAL	1,081.30			MEAN 2.95	MAX 212	MIN 0	AC-FT 2,140					
WAT 1961: TOTAL	113.50			MEAN .31	MAX 14	MIN 0	AC-FT 225					

## 5-0895. Cart Creek at Mountain, N. Dak.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	0	0	0	0	0	0	0	6.9	9.2	.70	.10	.30
2	0	0	0	0	0	0	0	6.0	7.4	1.0	.10	.20
3	0	0	0	0	0	0	0	5.5	6.3	1.0	.30	.20
4	0	0	0	0	0	0	0	5.0	5.6	1.3	4.2	.20
5	0	0	0	0	0	0	.10	4.2	5.2	.90	.80	.20
6	0	0	0	0	0	0	1.5	3.7	4.7	1.6	.50	.20
7	0	0	0	0	0	0	1.0	3.4	51	9.9	.30	.30
8	0	0	0	0	0	0	1.5	3.5	8.2	5.5	.30	.40
9	0	0	0	0	0	0	2.0	4.4	6.3	2.3	.30	.70
10	0	0	0	0	0	0	3.0	3.2	60	1.5	32	.60
11	0	0	0	0	0	0	4.0	2.7	11	1.0	10	.50
12	0	0	0	0	0	0	4.0	2.7	7.2	.50	3.0	.40
13	0	0	0	0	0	0	6.0	3.0	6.0	.50	1.9	.30
14	0	0	0	0	0	0	6.0	11	5.2	.40	1.6	.20
15	0	0	0	0	0	0	6.0	7.2	10	.40	1.5	.30
16	0	0	0	0	0	0	35	6.0	7.4	.40	1.2	.30
17	0	0	0	0	0	0	100	6.2	5.8	.40	.90	.30
18	0	0	0	0	0	0	210	5.0	5.2	.40	.90	.20
19	0	0	0	0	0	0	153	34	4.5	.40	.60	.20
20	0	0	0	0	0	0	127	12	4.2	.50	.60	.20
21	0	0	0	0	0	0	67	7.6	3.8	.40	.40	.20
22	0	0	0	0	0	0	24	7.2	3.4	.70	.50	.20
23	0	0	0	0	0	0	21	16	2.9	.50	.50	.20
24	0	0	0	0	0	0	21	9.5	2.4	.30	.40	.20
25	0	0	0	0	0	0	18	6.5	2.1	.20	.40	.20
26	0	0	0	0	0	0	14	5.5	1.8	.20	.30	.20
27	0	0	0	0	0	0	8.6	4.7	1.5	.20	.30	.20
28	0	0	0	0	0	.20	8.0	4.3	1.2	.20	.30	.20
29	0	0	0	0	0	0	7.4	9.2	.90	.20	.30	.20
30	0	0	0	0	0	0	6.9	7.6	.70	.20	.30	.20
31	0	0	0	0	0	0	0	15	-----	.10	.30	-----
TOTAL	0	0	0	0	0	0.20	856.00	296.1	251.10	33.80	65.10	8.20
MEAN	0	0	0	0	0	.0007	28.5	9.55	8.37	1.09	2.10	.27
MAX	0	0	0	0	0	.20	210	76	60	9.9	32	.70
MIN	0	0	0	0	0	0	0	2.7	.70	.10	.10	.20
AC-FT	0	0	0	0	0	.4	1,700	587	498	67	129	16

CAL YR 1961: TOTAL 113.50 MEAN .31 MAX 14 MIN 0 AC-FT 225  
WAT YR 1962: TOTAL 1,510.50 MEAN 4.14 MAX 210 MIN 0 AC-FT 3,000

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	.30	.60	.50	0	0	0	3.0	.80	11	.20	.30	0
2	.30	.60	.50	0	0	0	4.5	.80	13	.20	.20	0
3	.30	.50	.50	0	0	0	4.5	.70	77	.20	.20	0
4	.30	.50	.40	0	0	0	3.2	.50	31	.20	.10	0
5	.30	.50	.40	0	0	0	2.2	.70	11	.20	.10	0
6	.40	.60	.30	0	0	0	2.8	1.1	8.0	.20	.10	0
7	.40	.70	.30	0	0	0	3.0	1.3	5.3	.40	0	0
8	.40	.90	.30	0	0	0	1.5	1.1	4.8	.80	0	0
9	.40	.70	.20	0	0	0	1.0	1.0	23	.30	0	0
10	.40	.90	.10	0	0	0	2.1	1.0	32	.20	0	0
11	.30	.70	.10	0	0	0	1.4	.80	8.4	.20	0	0
12	.40	.70	0	0	0	0	1.8	1.1	5.6	.30	0	0
13	.40	.60	0	0	0	0	1.9	1.9	4.8	.20	0	0
14	.50	.60	0	0	0	0	1.8	1.6	3.6	.20	0	0
15	.50	.70	0	0	0	.10	1.6	1.1	3.0	.20	0	0
16	.50	.70	0	0	0	.20	1.8	1.8	2.3	.50	0	0
17	.50	.60	.20	0	0	.10	1.4	1.6	1.9	.20	0	0
18	.50	.40	.20	0	0	.40	1.2	1.2	1.8	.10	0	0
19	.50	.60	.20	0	0	.80	1.0	1.1	1.4	.20	0	0
20	.50	.60	.10	0	0	1.0	.80	1.0	1.2	.10	0	0
21	1.0	.70	.10	0	0	5.0	.80	1.0	1.0	.10	0	0
22	1.5	.60	.10	0	0	10	.70	.80	.80	0	0	0
23	1.2	.30	0	0	0	15	.70	.70	1.1	0	0	0
24	1.0	.50	0	0	0	10	1.1	.70	1.0	0	0	0
25	1.0	.50	0	0	0	9.0	1.1	.60	2.1	.10	0	0
26	.90	.60	0	0	0	9.5	1.0	.70	1.2	44	0	0
27	.90	.60	0	0	0	6.0	1.0	.80	.60	6.8	.10	0
28	.80	.60	0	0	0	4.0	1.2	.60	.50	2.6	0	0
29	.80	.60	0	0	0	4.5	1.2	.50	.40	1.3	0	0
30	.70	.60	0	0	0	2.0	.80	.70	.30	.80	0	0
31	.70	-----	0	0	0	2.0	-----	25	-----	.70	0	-----
TOTAL	18.60	18.30	4.50	0	0	79.60	52.10	54.30	259.10	61.50	1.10	0
MEAN	.60	.61	.15	0	0	2.57	1.74	1.75	8.64	1.98	.036	0
MAX	1.5	.90	.50	0	0	15	4.5	25	77	44	.30	0
MIN	.30	.30	0	0	0	0	.70	.50	.30	0	0	0
AC-FT	37	36	8.9	0	0	158	103	108	544	122	2.2	0

CAL YR 1962: TOTAL 1,551.90 MEAN 4.25 MAX 210 MIN 0 AC-FT 3,080  
WAT YR 1963: TOTAL 549.10 MEAN 1.50 MAX 77 MIN 0 AC-FT 1,090

5-0895. Cart Creek at Mountain, N. Dak.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	0	.30	.30	.10	.10	.10	.20	3.0	.40	1.3	.70	5.6
2	0	.30	.30	.10	.10	.10	1.0	3.6	.40	1.5	1.0	2.4
3	0	.30	.30	.10	.10	.10	4.0	4.1	.30	1.6	.90	1.6
4	0	.30	.30	.10	.10	.10	2.0	5.6	.30	1.6	.70	1.0
5	0	.30	.30	.10	.10	.10	4.0	3.8	.30	1.6	.40	.90
6	0	.30	.20	.10	.10	.10	2.5	38	.30	1.6	.40	1.0
7	0	.20	.20	.10	.10	.10	2.0	11	.30	1.3	.40	.90
8	0	.20	.20	.10	.10	.10	3.0	6.2	.70	1.3	.40	.70
9	.10	.30	.20	.10	.10	.10	5.0	4.5	6.2	1.6	.40	.70
10	.10	.30	.20	.10	.10	.10	25	3.6	1.9	1.6	.30	.70
11	.10	.30	.20	.10	.10	.10	40	3.2	45	1.3	.30	.70
12	.10	.30	.20	.10	.10	.10	26	2.8	169	1.0	.30	.60
13	.10	.30	.20	.10	.10	.10	10	2.5	17	.70	.20	.60
14	.10	.30	.20	.10	.10	.10	11	2.1	10	.70	.20	.50
15	.10	.30	.20	.10	.10	.10	38	1.9	6.0	.60	.20	.70
16	.10	.30	.10	.10	.10	.10	39	1.8	4.0	2.0	.20	.90
17	.10	.30	.10	.10	.10	.10	25	1.4	30	3.5	.10	.70
18	.10	.20	.10	.10	.10	.10	11	1.2	213	1.2	.10	.60
19	.10	.20	.10	.10	.10	.10	10	.80	145	20	.10	.60
20	.10	.20	.10	.10	.10	.10	11	.80	36	7.8	.10	.60
21	.30	.30	.10	.10	.10	.10	11	.80	23	3.5	.10	.60
22	.30	.30	.10	.10	.10	.10	6.5	.70	15	5.7	0	.70
23	.20	.20	.10	.10	.10	.10	5.8	.60	10	3.7	0	1.6
24	.20	.30	.10	.10	.10	.10	6.2	.50	9.0	2.3	0	1.2
25	.20	.30	.10	.10	.10	.10	11	.50	8.0	1.8	0	1.0
26	.20	.30	.10	.10	.10	.10	8.4	.40	5.0	1.6	0	7.1
27	.20	.30	.10	.10	.10	.10	5.6	.40	4.0	1.3	0	6.0
28	.20	.30	.10	.10	.10	.10	4.3	.40	3.0	1.3	0	3.7
29	.20	.30	.10	.10	.10	.10	3.2	.40	2.0	1.2	0	2.7
30	.20	.30	.10	.10	-----	.10	2.8	.40	1.4	.90	0	1.9
31	.20	-----	.10	.10	-----	.10	-----	.40	-----	.70	0	-----
TOTAL	3.60	8.40	5.10	3.10	2.90	3.10	334.50	107.40	766.50	77.80	7.50	48.50
MEAN	.12	.28	.16	.10	.10	.10	11.2	3.6	25.6	2.51	.24	1.62
MAX	.30	.30	.30	.10	.10	.10	.40	38	213	20	1.0	7.1
MIN	0	.20	.10	.10	.10	.10	.20	.40	.30	.60	0	.50
AC-FT	7.1	17	10	6.2	5.8	6.2	663	213	1,520	154	15	96
CAL YR 1963: TOTAL	524.80		MEAN 1.44		MAX 77		MIN 0		AC-FT 1,040			
WAT YR 1964: TOTAL	1,368.40		MEAN 3.74		MAX 213		MIN 0		AC-FT 2,710			

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	2.4	.90	.30	.80	.40	.30	.40	3.8	6.3	3.8	.70	.80
2	2.4	.90	.30	.80	.40	.30	.40	4.2	38	2.2	.70	.60
3	1.9	.90	.30	.90	.40	.30	.40	3.4	17	1.4	1.0	.60
4	1.9	.90	.20	.90	.40	.30	.50	3.4	36	1.1	1.1	1.8
5	1.9	.90	.20	.90	.40	.30	.50	39	9.9	1.0	.90	1.0
6	1.6	.70	.20	.90	.40	.40	.50	113	7.6	1.0	.90	.80
7	1.2	.70	.30	.90	.40	.40	8.0	12	6.7	1.0	.80	.80
8	1.2	.70	.30	.80	.40	.40	25	3.1	5.8	1.1	.80	.60
9	1.2	.70	.40	.70	.40	.40	18	2.3	4.2	1.1	.80	.70
10	1.2	.90	.40	.70	.40	.40	342	5.0	4.6	.90	.70	.70
11	1.3	.90	.60	.70	.30	.30	276	6.7	3.8	.90	.60	.70
12	1.3	.90	.60	.70	.30	.30	223	6.7	3.4	1.1	.60	.70
13	1.3	.70	.60	.70	.30	.30	143	7.2	3.4	1.0	.60	.70
14	1.6	.60	.50	.70	.30	.30	91	7.6	3.1	1.0	.40	4.4
15	1.3	1.2	.50	.70	.30	.30	43	6.3	2.5	.90	.40	3.1
16	.90	2.1	.50	.70	.30	.30	39	6.3	2.5	1.1	.40	3.1
17	.90	1.2	.50	.70	.30	.30	10	5.8	2.2	.80	.50	11
18	.90	1.0	.50	.70	.30	.30	9.9	5.4	2.0	.80	.50	2.8
19	.70	.70	.50	.70	.40	.30	8.1	5.0	1.8	1.3	.50	1.5
20	.70	1.0	.50	.70	.40	.30	7.2	4.6	1.7	2.8	.40	1.1
21	.90	.40	.50	.70	.30	.30	5.8	5.8	1.4	3.8	.40	1.0
22	.70	.20	.70	.60	.30	.30	6.0	3.7	1.7	1.7	.40	1.1
23	.60	.30	.60	.60	.30	.30	3.8	3.8	1.8	1.3	.30	1.5
24	.60	.90	.70	.60	.30	.30	3.1	5.0	1.4	.80	.50	1.3
25	.60	.40	.70	.60	.30	.30	3.4	5.4	1.4	.70	.70	1.3
26	.70	.70	.80	.50	.40	.30	3.8	8.1	1.7	.60	1.3	1.0
27	.70	.20	.80	.50	.40	.30	3.8	8.9	2.8	.60	1.5	1.0
28	.60	.30	.90	.50	.40	.30	3.8	7.6	1.7	.60	.70	1.0
29	.70	.30	.90	.40	-----	.30	4.2	6.3	2.5	.70	1.3	2.9
30	.90	.30	.80	.40	-----	.30	4.2	5.8	1.3	1.3	.90	13
31	.90	-----	.80	.40	-----	.30	-----	6.7	-----	1.0	.60	-----
TOTAL	35.80	22.50	16.30	21.20	9.90	9.80	1,285.80	318.0	178.9	39.40	21.90	62.60
MEAN	1.15	.75	.53	.68	.35	.32	42.9	10.3	5.96	1.27	.71	2.09
MAX	2.4	2.1	.90	.90	.40	.40	342	113	38	3.8	1.5	13
MIN	.60	.20	.20	.40	.30	.30	.40	2.3	1.3	.60	.30	.60
AC-FT	71	45	32	42	20	19	2,550	631	355	78	43	124
CAL YR 1964: TOTAL	1,425.90		MEAN 3.90		MAX 213		MIN 0		AC-FT 2,830			
WAT YR 1965: TOTAL	2,022.10		MEAN 5.54		MAX 342		MIN .20		AC-FT 4,010			

5-0900. Park River at Grafton, N. Dak.

Location.--Lat 48°25', long 97°24'. in NE $\frac{1}{4}$  sec.13, T.157 N., R.53 W., on right bank 30 ft upstream from Wakeman Avenue Bridge in Grafton and 3.5 miles downstream from South Branch.

Drainage area.--695 sq mi, approximately.

Records available.--April 1931 to September 1965. Monthly discharge only for some periods, published in WSP 1308.

Gage.--Water-stage recorder. Datum of gage is 807.39 ft above mean sea level, datum of 1929. Prior to Sept. 30, 1940, chain gage at site 30 ft downstream at same datum. Oct. 1, 1940, to Sept. 17, 1946, staff gage at site 2 miles downstream above masonry dam at present datum. Sept. 18, 1946, to July 25, 1952, wire-weight gage at site 30 ft downstream at present datum.

Average discharge.--34 years, 50.8 cfs (36,780 acre-ft per year), unadjusted; median of yearly mean discharges, 28 cfs (20,300 acre-ft per year), unadjusted.

Extremes.--Maximum and minimum discharges for the water years 1961-65 are contained in the following table:

Water year	Maximum			Minimum		
	Date	Discharge (cfs)	Gage height (feet)	Date	Discharge (cfs)	Gage height (feet)
1961	Apr. 27, 1961	40	a 7.51	At times	0	-
1962	Apr. 20, 1962	5,900	18.27	do.	0	-
1963	June 8, 1963	344	b 8.78	do.	0	-
1964	June 20, 1964	2,140	14.01	do.	0	-
1965	Apr. 13, 1965	5,710	18.21	do.	0	-

a Maximum gage height for year, 8.10 ft Mar. 17, 1961, backwater from ice.

b From floodmark.

1931-65: Maximum discharge, 12,600 cfs Apr. 19, 1950 (gage height, 20.13 ft), from rating curve extended above 9,000 cfs; no flow at times in most years.

Remarks.--Records good except those for winter periods, which are fair. Flow regulated by Homme Reservoir (see station 5-0885) and several small reservoirs. Diversion by city of Grafton started in October 1955.

Revisions (water years).--WSP 955: 1941. WSP 1728: Drainage area. WSP 1438: 1932, 1933(M), 1936-37(M), 1939(M), 1944.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	1i	0	0	0	0	0	3.4	4.1	0	0	0	.10
2	2.9	0	0	0	0	0	14	5.0	0	0	0	.10
3	.70	0	0	0	0	0	16	4.1	0	0	0	.10
4	.20	0	0	0	0	0	11	4.1	0	0	0	.10
5	.20	0	0	0	0	0	6.0	4.1	0	0	0	0
6	.20	0	0	0	0	0	7.2	9.6	0	0	.10	0
7	.20	0	0	0	0	0	8.4	6.0	0	0	.10	0
8	.20	0	0	0	0	0	11	2.9	0	0	.10	.10
9	.10	0	0	0	0	0	19	2.9	0	0	.10	.10
10	0	0	0	0	0	0	17	6.0	0	0	.10	.10
11	0	0	0	0	0	0	14	7.2	0	0	.10	.20
12	0	0	0	0	0	0	13	4.1	0	0	.10	.10
13	0	0	0	0	0	0	12	2.4	0	0	0	.10
14	0	0	0	0	0	0	13	2.4	0	.10	0	.10
15	0	0	0	0	0	0	12	.90	0	.70	0	0
16	0	0	0	0	0	0	12	.60	0	.90	0	0
17	0	0	0	0	0	3.0	7.2	.60	0	.10	0	0
18	0	0	0	0	0	6.0	11	.70	0	0	0	0
19	0	0	0	0	0	3.2	16	.90	0	0	0	0
20	0	0	0	0	0	5.0	17	1.1	0	0	0	0
21	0	0	0	0	0	5.5	17	1.1	0	0	0	0
22	0	0	0	0	0	7.0	19	.50	0	0	0	0
23	0	0	0	0	0	9.5	19	.10	0	0	.10	0
24	0	0	0	0	0	6.0	13	.10	0	0	.10	0
25	0	0	0	0	0	17	11	.10	0	0	.10	0
26	0	0	0	0	0	16	8.4	.10	0	0	.10	0
27	0	0	0	0	0	5.0	17	.10	0	0	.10	0
28	0	0	0	0	0	3.4	17	.10	0	0	.10	0
29	0	0	0	0	---	3.4	9.6	.10	0	0	.10	0
30	.40	0	0	0	---	4.1	7.2	.10	0	0	.10	0
31	.20	---	0	0	---	4.1	---	0	---	0	.10	---
TOTAL	16.30	0	0	0	0	98.2	378.4	72.10	0	1.80	1.60	1.20
MEAN	.53	0	0	0	0	3.17	12.6	2.33	0	.058	.052	.040
MAX	11	0	0	0	0	17	19	9.6	0	.90	.10	.20
MIN	0	0	0	0	0	0	3.4	0	0	0	0	0
AC-FT	32	0	0	0	0	195	751	143	0	3.6	3.2	2.4
(†)	40	63	57	44	42	46	41	49	57	44	55	49
MEAN‡	1.18	1.06	.92	.72	.76	3.91	13.3	3.12	.96	.78	.95	.86
AC-FT‡	72	63	57	44	42	241	792	192	57	48	58	51
CAL YR 1960: TOTAL	29,754.80	MEAN 81.3	MAX 2,720	MIN 0	AC-FT 59,020	MEAN ‡ 83.4	AC-FT ‡ 59,670					
WAT YR 1961: TOTAL	569.60	MEAN 1.56	MAX 19	MIN 0	AC-FT 1,130	MEAN ‡ 2.38	AC-FT ‡ 1,720					

† Diversion, in acre-feet, by city of Grafton.

‡ Adjusted for diversion.

5-0900. Park River at Grafton, N. Dak.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	0	0	.20	1.0	.10	1.2	28	188	300	27	1.8	.20
2	0	0	.20	.30	.20	1.2	30	157	331	24	1.3	.20
3	0	0	.20	.10	.20	.70	32	142	313	24	1.3	.20
4	0	0	.20	.10	2.0	1.5	32	130	222	24	2.9	.10
5	0	0	.20	.10	.60	.70	34	113	180	24	4.1	.10
6	0	0	.20	.10	.70	1.0	34	111	198	26	1.3	.10
7	0	0	.20	.10	2.0	.90	36	83	227	23	.90	.10
8	0	0	.20	0	2.7	.80	34	83	528	23	.70	.10
9	0	0	.20	0	3.1	.90	36	79	413	24	.70	.40
10	0	0	.20	0	5.6	.60	38	72	477	20	.70	.40
11	.10	0	.20	0	7.2	.60	36	68	442	16	2.4	.20
12	.10	0	.10	0	6.8	.20	38	62	357	16	1.3	.10
13	.10	0	.10	0	8.4	.50	42	66	375	16	.60	.10
14	.10	0	.10	0	8.6	.70	46	68	352	19	18	.10
15	.10	0	.10	0	7.2	.70	50	83	302	27	21	.10
16	.10	0	0	0	5.4	.70	60	88	310	26	30	.10
17	0	0	0	0	3.6	.60	96	96	289	23	47	0
18	0	0	0	0	3.4	.70	128	120	258	20	47	0
19	0	0	0	0	1.5	.80	892	120	229	19	36	0
20	0	.50	0	0	1.7	1.1	4,340	118	188	19	27	0
21	0	11	0	0	1.4	3.1	4,550	104	142	23	24	0
22	0	5.0	.10	0	1.7	5.4	3,530	72	113	24	19	.10
23	0	4.1	.10	0	1.4	5.2	2,690	20	92	19	16	.10
24	0	1.5	.10	0	1.4	12	1,820	16	77	19	12	.10
25	0	1.1	.10	.10	1.8	60	971	62	64	13	9.6	.10
26	0	1.3	.30	.10	.80	40	616	90	52	13	7.2	.10
27	0	.60	1.5	.10	1.2	40	430	94	47	8.4	2.9	.10
28	0	.20	1.5	.20	1.2	40	333	123	40	6.0	1.8	.10
29	0	.35	.20	1.5	.10	35	271	132	34	6.0	1.2	.10
30	0	.20	.80	.10	-----	30	224	164	33	2.4	.60	.10
31	0	-----	.30	.10	-----	28	-----	279	-----	2.4	.30	-----
TOTAL	0.60	25.70	8.90	2.60	81.90	314.80	21,497	3,203	6,985	576.2	340.60	3.50
MEAN	.019	.86	.29	.084	2.93	10.2	717	103	233	18.6	11.0	.12
MAX	.10	11	1.5	1.0	8.6	60	4,550	279	528	27	47	.40
MIN	0	0	0	0	.10	.20	28	16	33	2.4	.30	0
AC-FT	1.2	51	18	5.2	162	624	42,640	6,350	13,850	1,140	676	6.9
(+)	46	49	48	45	38	44	39	47	40	44	51	46
MEAN#	.76	1.68	1.07	.82	3.61	10.9	718	104	234	19.3	11.8	.89
AC-FT#	47	100	66	50	200	668	42,680	6,400	13,890	1,180	727	53

CAL YR 1961: TOTAL 588.50 MEAN 1.61 MAX 19 MIN 0 AC-FT 1,170 MEAN # 2.41 AC-FT # 1,740

WAT YR 1962: TOTAL 33,039.80 MEAN 90.5 MAX 4,550 MIN 0 AC-FT 65,530 MEAN # 92.2 AC-FT # 66,060

† Diversion, in acre-feet, by city of Grafton.

# Adjusted for diversion.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	.10	2.4	.30	0	0	.20	58	13	5.0	58	36	0
2	.10	1.5	.20	0	0	.20	30	8.4	6.0	45	40	0
3	0	.80	.20	0	0	.20	20	7.2	27	27	40	0
4	0	.60	.20	0	0	.20	21	13	96	16	33	0
5	0	.30	.20	0	0	.30	43	9.6	219	13	24	0
6	0	.80	.20	0	0	.30	41	5.0	292	11	31	0
7	0	1.0	.20	0	0	.30	40	8.4	271	9.6	24	0
8	0	.60	.10	0	0	.30	38	6.0	211	9.6	14	0
9	0	.80	.10	0	0	.30	30	7.2	160	9.6	7.2	0
10	0	.60	.10	0	0	.30	28	19	132	8.4	5.0	0
11	0	.60	.10	0	0	.30	27	13	125	13	4.1	0
12	.10	.40	.10	0	0	.30	27	13	118	14	2.9	0
13	.10	.30	.10	0	0	.30	30	14	167	13	2.4	0
14	.10	.30	.10	0	0	.30	27	13	170	7.2	4.1	0
15	.10	.30	.10	0	.20	.40	28	20	116	11	2.4	0
16	.10	.20	.10	0	1.0	.30	30	13	88	13	1.5	0
17	.10	.20	.10	0	1.8	.30	27	6.0	68	7.2	1.0	0
18	.10	.20	0	0	.80	.30	28	8.4	62	7.2	.30	0
19	.10	.20	0	0	.60	.50	26	13	52	12	.20	0
20	.10	.20	0	0	.30	.50	19	7.2	45	11	.10	0
21	.10	.20	0	0	.30	.80	17	6.0	36	9.6	.10	0
22	.10	.20	0	0	.30	1.5	21	6.0	30	7.2	.10	0
23	.10	.20	0	0	.30	1.0	14	9.6	31	7.2	.10	0
24	.10	.20	0	0	.30	5.0	14	6.0	28	4.1	.10	0
25	.10	.20	0	0	.20	190	14	5.0	45	3.4	0	0
26	.10	.20	0	0	.20	92	14	6.0	120	20	0	0
27	.10	.20	0	0	.20	66	14	3.4	154	20	0	0
28	.10	.20	0	0	.20	177	16	2.4	104	34	0	0
29	1.4	.30	0	0	-----	209	14	2.9	101	27	0	0
30	2.2	.30	0	0	-----	106	13	2.9	79	45	0	0
31	2.2	-----	0	0	-----	83	-----	3.4	-----	41	0	-----
TOTAL	7.70	14.50	2.50	0	6.70	939.40	771	271.0	3,158.0	534.3	273.60	0
MEAN	.25	.48	.081	0	.24	30.3	25.7	8.74	105	17.2	8.83	0
MAX	2.2	2.4	.30	0	1.8	209	58	20	292	58	40	0
MIN	0	.20	0	0	0	.20	13	2.4	5.0	3.4	0	0
AC-FT	15	29	5.0	0	13	1,860	1,530	538	6,260	1,060	543	0
(+)	50	46	40	48	38	46	44	45	42	48	52	49
MEAN#	1.06	1.26	.73	.78	.92	31.0	26.4	9.47	106	18.0	9.68	.83
AC-FT#	65	75	45	48	51	1,910	1,570	583	6,300	1,110	595	.49

CAL YR 1962: TOTAL 33,029.30 MEAN 90.5 MAX 4,550 MIN 0 AC-FT 65,510 MEAN # 91.2 AC-FT # 66,030

WAT YR 1963: TOTAL 5,978.70 MEAN 16.4 MAX 292 MIN 0 AC-FT 11,860 MEAN # 17.1 AC-FT # 12,400

† Diversion, in acre-feet, by city of Grafton.

# Adjusted for diversion.

5-0900. Park River at Grafton, N. Dak.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	0	0	0	0	1.1	.10	1.5	70	5.0	155	18	1.5
2	0	0	0	0	1.5	.10	3.0	64	3.4	130	16	1.8
3	0	0	0	0	1.0	.10	3.5	66	3.4	105	14	1.1
4	0	0	0	0	1.0	.10	6.0	70	2.1	85	9.0	.40
5	0	0	0	0	1.0	.10	8.0	70	2.1	70	6.0	.10
6	0	0	0	0	1.0	.10	8.5	70	12	65	3.0	.10
7	0	0	0	0	1.2	.10	10	66	11	55	2.5	.10
8	0	.10	0	0	1.2	.10	12	116	16	45	1.5	.10
9	0	.10	0	0	1.2	.10	14	222	36	60	1.5	.10
10	0	.10	0	0	1.0	.10	50	211	34	55	1.5	4.1
11	0	.10	0	0	1.4	.10	130	142	51	45	1.5	3.4
12	0	.10	0	0	1.0	.10	170	96	344	35	1.2	2.4
13	0	.10	0	0	1.2	1.2	280	70	1,220	32	1.0	2.1
14	.10	.10	0	0	1.0	1.0	370	58	943	28	.80	.60
15	.10	0	0	0	.90	1.2	800	54	982	26	.60	.10
16	.10	0	0	0	1.2	.80	1,050	45	904	22	.50	.10
17	.10	0	0	0	1.0	1.0	932	43	502	20	.40	.10
18	.10	0	0	0	.90	.80	761	36	326	18	.20	.10
19	.10	0	0	0	.90	.80	540	36	1,140	28	0	.10
20	.20	0	0	0	.30	.90	339	31	2,050	35	0	.10
21	.90	0	0	0	.20	.90	232	23	1,760	40	0	.10
22	1.8	0	0	0	.10	1.4	150	21	1,720	75	0	.10
23	2.9	0	0	0	1.4	1.4	137	21	1,860	110	0	.10
24	3.4	0	0	0	.10	1.6	120	17	1,260	120	0	.10
25	1.8	0	0	0	.10	1.4	106	16	630	140	0	.10
26	.70	0	0	0	.10	1.3	92	14	440	130	.10	6.8
27	.20	0	0	0	.10	.10	88	14	315	120	.10	2.1
28	.10	0	0	0	.10	.90	83	20	255	55	.10	3.4
29	.10	0	.10	.10	.10	1.2	83	12	215	35	.10	2.1
30	.10	0	0	1.0	-----	1.2	79	7.2	185	28	1.1	1.3
31	.10	-----	0	1.2	-----	1.0	-----	6.0	-----	22	.70	-----
TOTAL	12.90	0.70	0	2.30	21.60	22.60	6,648.5	1,807.2	17,277.0	1,989	81.40	34.70
MEAN	.42	.023	0	.074	.74	.73	222	58.3	576	64.2	2.63	1.16
MAX	3.4	.10	0	1.2	1.5	1.6	1,050	222	2,050	155	18	6.8
MIN	0	0	0	0	.10	.10	1.5	6.0	2.1	18	0	.10
AC-FT	26	1.4	0	4.6	43	45	13,190	3,580	34,270	3,950	161	69
(+)	59	51	50	53	50	58	51	56	62	66	58	58
MEAN*	1.37	57	.82	94	1.59	1.56	223	59.2	577	65.2	3.71	2.13
AC-FT*	85	52	50	58	92	96	13,250	3,640	34,330	4,010	227	127

CAL YR 1963: TOTAL 5,967.60 MEAN 16.3 MAX 292 MIN 0 AC-FT 11,840 MEAN \* 17.3 AC-FT \* 12,480

WAT YR 1964: TOTAL 27,897.90 MEAN 76.2 MAX 2,050 MIN 0 AC-FT 55,330 MEAN \* 77.1 AC-FT \* 56,020

† Diversion, in acre-feet, by city of Grafton.

\* Adjusted for diversion.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	7.2	2.9	1.2	.20	3.4	1.2	3.4	90	99	30	58	.90
2	13	2.1	1.2	.10	2.4	5.0	5.0	88	130	26	41	.70
3	27	2.4	1.0	.10	2.4	12	7.2	77	150	38	31	.70
4	24	1.8	.80	.10	2.0	8.5	7.2	68	175	30	30	16
5	19	1.8	.60	.10	2.2	9.5	8.0	75	227	26	26	13
6	13	1.5	.60	.10	2.4	9.0	8.0	94	240	24	20	33
7	11	2.1	.60	.10	2.6	10	20	328	240	20	17	24
8	8.4	2.4	.60	.10	3.0	9.5	140	589	201	20	19	30
9	7.2	1.8	.60	.10	3.0	9.5	670	629	154	20	16	38
10	6.0	1.5	.60	.10	2.6	9.0	938	424	111	17	9.6	31
11	7.2	2.1	.40	.10	2.0	8.5	1,550	302	90	16	8.4	28
12	6.0	1.5	.40	.10	1.8	8.5	3,460	261	75	23	5.0	20
13	4.1	2.1	.20	.10	1.6	8.5	5,120	224	62	16	3.4	14
14	4.1	2.8	.20	.10	1.6	9.0	4,380	188	54	36	2.9	21
15	4.1	2.8	.20	.10	1.2	10	3,290	154	51	27	1.8	30
16	5.0	2.6	.20	.10	1.0	8.0	2,410	128	45	20	4.1	34
17	4.1	2.6	.20	.10	.80	7.5	1,450	113	41	17	2.1	49
18	3.4	2.2	.20	.10	.80	6.0	743	104	38	14	1.5	70
19	2.9	2.4	.20	.10	.60	5.0	459	106	33	13	.90	88
20	2.9	2.2	.20	.10	.80	4.5	359	79	33	12	.50	90
21	2.9	1.8	.20	.10	.60	4.0	300	85	34	11	.20	85
22	2.1	1.8	.20	.10	.40	3.4	258	90	31	13	.20	70
23	2.1	1.8	.20	0	.20	2.0	224	75	17	17	.20	56
24	2.1	1.8	.20	0	.20	1.5	196	72	24	24	.60	54
25	2.4	1.8	.20	0	.10	1.5	172	72	23	30	1.1	47
26	2.1	1.5	.20	0	.10	1.2	152	72	26	28	1.3	38
27	2.1	1.5	.20	.10	.20	1.2	132	83	34	24	1.3	34
28	3.4	1.5	.20	.10	1.4	2.1	113	85	36	20	1.3	30
29	4.1	1.5	.20	.10	-----	1.7	104	85	41	17	1.8	38
30	2.4	1.2	.20	.20	-----	1.5	99	99	30	17	.90	51
31	2.1	-----	.20	.60	-----	2.8	-----	106	-----	30	.70	-----
TOTAL	207.4	59.8	12.40	3.40	41.40	180.6	26,777.8	5,045	2,555	682	307.80	1,134.30
MEAN	6.69	1.99	.40	.11	1.48	5.83	893	163	85.2	22.0	9.93	37.8
MAX	27	2.9	1.2	.60	3.4	12	5,120	629	240	38	58	90
MIN	2.1	1.2	.20	0	.10	1.2	3.4	68	23	11	.20	.70
AC-FT	411	119	25	6.7	82	358	53,110	10,010	5,070	1,350	611	2,250
(+)	51	50	54	49	50	60	52	51	57	39	75	67
MEAN*	7.52	2.83	1.28	.91	2.39	6.81	894	164	86.2	23.0	11.2	38.9
AC-FT*	462	169	79	56	132	418	53,160	10,060	5,130	1,410	686	2,320

CAL YR 1964: TOTAL 28,163.90 MEAN 77.0 MAX 2,050 MIN 0 AC-FT 55,860 MEAN \* 78.8 AC-FT \* 56,540

WAT YR 1965: TOTAL 37,006.90 MEAN 101 MAX 5,120 MIN 0 AC-FT 73,400 MEAN \* 102 AC-FT \* 74,080

† Diversion, in acre-feet, by city of Grafton.

\* Adjusted for diversion.

5-0920. Red River of the North at Drayton, N. Dak.

Location.--Lat 46°34'20", long 97°08'50", on line between secs. 24 and 25, T.159 N., R.51 W., on downstream end of east pier of interstate highway bridge, 1½ miles northeast of Drayton and at mile 207.

Drainage area.--34,800 sq mi, approximately (includes 3,800 sq mi in closed basins).

Records available.--April 1936 to June 1937, April 1941 to September 1965 (fragmentary prior to April 1949).

Gage.--Water-stage recorder and concrete control. Datum of gage is 755.00 ft above mean sea level, datum of 1929 (Minnesota Highway Department bench mark). Prior to Nov. 30, 1954, wire-weight gage at site 1½ miles upstream at datum 1.59 ft higher.

Average discharge.--16 years (1949-65), 3,307 cfs (2,394,000 acre-ft per year); median of yearly mean discharges, 2,570 cfs (1,860,000 acre-ft per year).

Extremes.--Maximum and minimum discharges for the water years 1961-65 are contained in the following table:

Water year	Maximum			Minimum		
	Date	Discharge (cfs)	Gage height (feet)	Date	Discharge (cfs)	Gage height (feet)
1961	Mar. 31, 1961	5,600	a 12.98	Sept. 5, 1961	124	3.26
1962	Apr. 24, 1962	32,300	36.26	Jan. 20-26, 1962	190	b 3.76
1963	Apr. 12, 1963	12,900	20.42	Aug. 14, 1963	977	4.71
1964	Apr. 20, 1964	15,600	23.60	Sept. 18, 1964	460	3.83
1965	Apr. 22, 1965	47,200	40.43	Nov. 27, 28, 1965	718	c 5.38

a Backwater from ice.

b Occurred Nov. 4, 1961.

c Occurred Oct. 25, 1964.

1936-37, 1941-65: Maximum discharge, 86,500 cfs May 12, 1950 (gage height, 41.58 ft, site and datum then in use); minimum observed, 7.7 cfs Oct. 16, 1936 (gage height, 1.75 ft, site and datum then in use).

Maximum discharge known since 1860, 86,500 cfs May 12, 1950 (gage height, 41.58 ft, site and datum then in use). Flood in April 1897 reached a stage of about 41 ft, at site and datum in use prior to Nov. 30, 1954.

Remarks.--Records good except those for winter periods, which are fair. Records of water temperatures for the water year 1961 are published in reports of the Geological Survey.

Revisions (water years).--WSP 1388: 1949-50.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	392	472	360	330	300	400	3,400	2,790	1,800	557	436	155
2	386	504	360	320	300	410	3,300	2,770	1,700	538	430	155
3	369	526	370	310	300	420	3,100	2,690	1,590	557	419	145
4	351	556	340	310	300	420	2,900	2,580	1,500	564	396	135
5	345	582	320	320	300	450	2,800	2,460	1,410	570	396	124
6	340	601	310	330	300	490	2,700	2,360	1,320	557	386	125
7	317	601	330	340	310	540	2,550	2,230	1,230	526	369	140
8	289	608	350	340	310	600	2,400	2,140	1,190	483	348	175
9	278	590	370	340	320	650	2,250	2,040	1,150	419	327	164
10	283	580	370	340	320	760	2,100	1,980	1,110	386	296	153
11	289	560	350	340	320	940	1,700	1,990	1,070	386	282	179
12	294	550	330	350	330	1,100	1,650	2,010	1,050	369	272	171
13	308	540	340	360	330	1,400	1,570	2,030	1,070	380	245	179
14	317	530	370	360	330	1,600	1,520	2,020	1,190	448	236	236
15	310	520	390	370	330	1,650	1,460	1,990	1,230	459	228	317
16	310	520	400	380	340	1,700	1,370	1,950	1,150	454	215	471
17	310	500	390	380	340	1,700	1,280	1,980	1,050	477	211	538
18	317	500	380	380	340	1,750	1,250	2,170	989	489	210	538
19	306	450	380	370	350	1,800	1,270	2,480	918	483	220	520
20	306	420	380	370	350	1,850	1,310	2,800	861	465	210	538
21	306	400	380	360	360	2,000	1,330	3,000	829	448	205	545
22	357	380	370	350	360	2,100	1,340	3,050	810	454	200	570
23	386	380	360	340	370	2,200	1,420	3,020	784	465	190	576
24	380	400	360	330	370	2,300	1,650	2,930	765	477	185	557
25	380	400	350	320	370	2,500	2,100	2,800	734	477	180	545
26	392	400	340	310	380	2,900	2,450	2,630	702	477	175	557
27	392	420	340	300	390	3,200	2,580	2,460	683	483	170	620
28	392	420	340	300	400	3,400	2,650	2,300	671	459	165	639
29	392	400	340	300	-----	3,450	2,710	2,100	639	442	160	645
30	441	380	340	300	-----	3,450	2,790	1,990	595	442	160	633
31	466	-----	340	300	-----	3,550	-----	1,890	-----	442	156	-----
TOTAL	10,701	14,690	11,050	10,450	9,420	51,680	62,900	73,630	31,790	14,633	8,078	11,045
MEAN	345	490	356	337	336	1,667	2,097	2,375	1,060	472	261	368
MAX	466	608	400	380	400	3,550	3,400	3,050	1,800	570	436	645
MIN	278	380	310	300	300	400	1,250	1,890	595	369	156	124
AC-FT	21,230	29,140	21,920	20,730	18,680	102,500	124,800	146,000	63,050	29,020	16,020	21,910
CAL YR 1960:	TOTAL 798,090			MEAN 2,181	MAX 24,600	MIN 278	AC-FT 1,583,000					
WAT YR 1961:	TOTAL 310,067			MEAN 849	MAX 3,550	MIN 124	AC-FT 615,000					

## 5-0920. Red River of the North at Drayton, N. Dak.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	568	504	360	200	195	200	700	14,400	23,500	14,800	11,600	3,460
2	530	504	340	200	195	200	780	12,900	24,900	12,800	10,900	3,280
3	510	510	320	200	195	200	800	11,000	24,300	11,200	10,100	3,170
4	497	447	300	210	200	210	820	9,400	24,700	9,700	9,300	3,050
5	478	510	295	220	200	210	900	8,220	25,000	8,400	8,600	2,950
6	478	480	290	230	200	210	1,200	6,900	24,800	7,800	8,100	2,910
7	472	390	290	230	195	210	2,000	6,000	23,800	8,900	7,750	2,920
8	472	380	280	220	195	215	4,300	5,220	22,300	10,900	7,500	2,930
9	472	330	260	210	195	215	6,900	4,700	20,800	12,800	7,300	3,020
10	453	380	240	205	195	220	8,700	4,380	19,600	14,400	6,940	3,120
11	542	380	230	200	195	220	9,900	4,200	18,800	16,000	6,700	3,320
12	568	380	220	200	200	230	10,800	3,950	20,100	17,500	6,350	3,400
13	568	420	220	200	200	230	11,800	3,850	21,300	18,600	6,150	3,970
14	653	400	220	200	210	240	12,600	3,840	22,800	19,600	6,000	4,230
15	750	440	225	195	210	245	13,400	3,860	24,200	20,400	6,200	4,370
16	950	450	225	195	220	245	14,600	3,900	25,100	21,000	6,800	4,390
17	1,230	430	220	195	220	250	15,800	4,100	25,600	21,300	7,500	4,340
18	1,150	420	215	195	210	260	17,200	4,600	26,000	21,600	7,900	4,220
19	1,020	460	215	195	210	265	19,200	5,800	26,300	21,700	8,100	4,010
20	904	480	210	190	210	265	22,600	7,400	26,500	19,600	8,000	3,800
21	851	420	210	190	210	270	25,600	8,850	26,600	18,300	7,400	3,570
22	825	400	210	190	210	270	28,900	10,100	26,600	17,200	6,800	3,460
23	779	350	215	190	205	275	31,300	11,800	26,500	16,100	6,500	3,250
24	732	330	215	190	205	290	32,200	13,600	25,900	15,000	6,000	3,150
25	699	380	215	190	205	310	28,500	14,700	25,000	13,900	5,600	3,050
26	640	450	215	190	200	330	24,300	16,100	23,800	13,200	5,250	2,960
27	588	450	210	195	200	360	22,200	17,900	22,400	12,700	4,900	2,890
28	575	400	205	190	200	400	20,200	19,700	20,700	12,400	4,600	2,820
29	562	400	205	200	200	460	18,200	21,100	18,900	12,200	4,250	2,780
30	536	380	200	195	200	540	16,300	22,200	16,800	12,100	3,850	2,750
31	510	-----	200	195	200	620	-----	22,900	-----	11,900	3,650	-----
TOTAL	20,562	12,675	7,475	6,215	5,685	8,665	422,700	307,570	702,600	464,000	216,590	101,690
MEAN	665	423	241	200	204	282	13,400	9,900	22,300	14,970	6,987	3,380
MAX	1,230	510	360	230	220	620	32,200	22,900	26,600	21,700	11,600	4,390
MIN	453	330	200	190	195	200	700	3,840	16,800	7,800	3,650	2,750
AC-FT	40,780	25,140	14,830	12,330	11,280	17,190	838,400	610,100	1,394M	920,300	429,600	201,700

CAL YR 1961: TOTAL 314,338 MEAN 861 MAX 3,550 MIN 124 AC-FT 623,500

WAT YR 1962: TOTAL 2,276,427 MEAN 6,237 MAX 32,200 MIN 190 AC-FT 4,515,000

M Expressed in thousands.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	2,720	2,100	2,750	1,480	1,040	1,260	5,250	3,950	4,100	4,050	1,330	1,130
2	2,690	2,100	2,600	1,500	1,004	1,260	5,260	3,950	4,850	3,920	1,310	1,380
3	2,590	2,110	2,450	1,480	1,060	1,280	5,900	3,850	5,350	3,700	1,320	1,230
4	2,520	2,140	2,350	1,480	1,020	1,300	5,700	3,800	5,830	3,580	1,350	1,270
5	2,440	2,140	2,300	1,480	1,020	1,300	5,350	3,700	6,300	3,400	1,380	1,300
6	2,410	2,180	2,200	1,500	1,020	1,300	5,650	3,650	6,800	3,280	1,420	1,330
7	2,390	2,220	2,000	1,520	1,040	1,300	5,850	3,600	7,300	3,100	1,440	1,310
8	2,380	2,190	1,700	1,540	1,040	1,310	5,700	3,550	7,800	3,050	1,420	1,330
9	2,360	2,180	1,320	1,560	1,060	1,310	6,650	3,500	8,200	2,890	1,340	1,300
10	2,360	2,120	1,040	1,560	1,080	1,310	8,700	3,450	8,150	2,750	1,250	1,270
11	2,380	1,960	1,160	1,560	1,100	1,320	11,200	3,400	8,060	2,640	1,140	1,270
12	2,400	1,780	1,120	1,520	1,100	1,320	12,800	3,380	7,940	2,550	1,060	1,250
13	2,410	1,760	1,170	1,480	1,100	1,320	11,800	3,350	7,750	2,620	1,010	1,220
14	2,440	1,910	1,100	1,440	1,100	1,320	10,200	3,330	7,620	3,080	990	1,190
15	2,460	2,080	1,020	1,380	1,100	1,320	8,750	3,300	7,550	3,970	1,000	1,180
16	2,460	2,190	1,040	1,300	1,120	1,340	7,650	3,300	7,700	4,500	1,060	1,140
17	2,440	2,270	1,180	1,260	1,140	1,340	6,800	3,300	7,950	4,300	1,180	1,110
18	2,430	2,320	1,320	1,260	1,160	1,360	6,150	3,320	8,100	3,830	1,180	1,090
19	2,440	2,360	1,440	1,240	1,180	1,380	5,700	3,350	7,900	3,340	1,190	1,060
20	2,430	2,330	1,540	1,240	1,180	1,400	5,450	3,370	7,780	2,950	1,190	1,020
21	2,400	2,380	1,600	1,220	1,180	1,420	5,300	3,450	7,250	2,650	1,140	1,010
22	2,390	2,350	1,620	1,220	1,180	1,440	5,200	3,520	6,550	2,430	1,110	1,010
23	2,360	2,200	1,600	1,220	1,200	1,480	5,000	3,600	5,950	2,240	1,080	1,030
24	2,340	2,000	1,580	1,220	1,200	1,520	4,800	3,620	5,450	2,070	1,050	1,050
25	2,290	1,800	1,520	1,200	1,200	1,580	4,650	3,620	5,080	1,910	1,030	1,120
26	2,220	1,700	1,540	1,200	1,180	1,700	4,450	3,600	4,750	1,840	1,020	1,180
27	2,170	1,700	1,520	1,180	1,240	2,200	4,300	3,550	4,500	1,800	1,030	1,250
28	2,140	1,750	1,500	1,140	1,260	3,000	4,200	3,480	4,400	1,650	1,060	1,320
29	2,100	2,400	1,480	1,100	-----	3,900	4,150	3,350	4,240	1,500	1,080	1,350
30	2,100	2,700	1,440	1,080	-----	4,500	4,000	3,280	4,120	1,410	1,080	1,380
31	2,100	-----	1,460	1,080	-----	4,950	-----	3,420	-----	1,360	1,100	-----
TOTAL	73,760	63,430	49,660	41,640	31,360	54,040	192,900	108,840	195,320	88,360	36,340	35,910
MEAN	2,379	2,114	1,602	1,343	1,120	1,743	6,430	3,511	6,511	2,850	1,172	1,197
MAX	2,720	2,700	2,750	1,560	1,260	4,950	12,800	3,950	8,200	4,500	1,440	1,380
MIN	2,100	1,700	1,020	1,080	1,020	1,260	4,000	3,280	4,100	1,360	990	1,010
AC-FT	146,300	125,800	98,500	82,590	62,200	107,200	382,600	215,900	387,400	175,300	72,080	71,230

CAL YR 1962: TOTAL 2,422,565 MEAN 6,637 MAX 32,200 MIN 190 AC-FT 4,805,000

WAT YR 1963: TOTAL 971,560 MEAN 2,662 MAX 12,800 MIN 990 AC-FT 1,927,000

## 5-0920. Red River of the North at Drayton, N. Dak.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	1,400	1,570	700	800	780	690	910	7,600	2,300	7,400	1,500	680
2	1,410	1,540	800	800	770	680	920	6,850	2,200	6,700	1,480	647
3	1,410	1,500	900	790	770	670	940	6,250	2,140	6,000	1,440	693
4	1,390	1,460	950	790	770	660	950	5,850	2,100	5,300	1,400	884
5	1,390	1,370	940	780	770	650	960	5,480	1,990	4,600	1,460	963
6	1,390	1,290	910	780	770	640	980	5,300	1,920	4,050	2,270	917
7	1,360	1,220	890	780	770	630	1,000	5,150	1,860	3,800	2,870	845
8	1,350	1,180	830	770	770	620	1,050	5,500	1,840	3,550	2,810	765
9	1,350	1,130	800	770	770	610	1,150	6,200	2,010	3,400	2,480	706
10	1,350	1,100	780	770	770	600	1,400	6,630	2,620	3,300	2,110	647
11	1,340	1,080	770	780	760	600	1,850	6,600	2,950	3,200	1,770	594
12	1,330	1,060	770	780	760	590	2,500	6,200	4,850	3,250	1,510	549
13	1,350	1,050	760	780	760	590	3,800	5,800	7,850	3,850	1,330	523
14	1,370	1,010	760	780	760	600	5,850	5,500	9,250	3,980	1,220	510
15	1,380	996	750	780	760	620	8,750	5,150	9,650	3,650	1,140	497
16	1,390	996	740	770	760	630	12,100	4,760	10,200	3,250	1,060	485
17	1,400	970	740	760	760	640	14,400	4,400	10,300	2,980	983	472
18	1,420	957	750	760	760	650	15,100	4,200	9,950	2,680	911	460
19	1,420	957	740	750	765	670	15,500	4,050	10,300	2,400	871	491
20	1,440	957	730	750	765	690	15,600	3,800	10,500	2,200	831	523
21	1,460	838	730	760	765	700	15,000	3,700	10,700	2,100	812	510
22	1,500	840	730	760	770	690	14,200	3,600	11,400	2,080	805	530
23	1,510	830	740	760	770	700	13,400	3,500	12,800	2,030	818	620
24	1,520	800	750	770	770	710	12,900	3,450	13,900	1,990	831	627
25	1,530	780	760	770	770	730	12,600	3,400	14,000	1,930	831	594
26	1,530	720	770	770	770	770	12,300	3,200	13,200	1,880	818	666
27	1,540	780	780	780	780	800	11,700	3,020	12,300	1,850	812	739
28	1,550	640	780	780	740	900	10,800	2,850	11,000	1,800	825	825
29	1,560	630	790	780	710	920	9,800	2,720	9,800	1,720	798	1,060
30	1,560	630	790	780	-----	910	8,600	2,560	8,600	1,640	792	1,820
31	1,570	-----	800	780	-----	900	-----	2,420	-----	1,560	732	-----
TOTAL	44,470	30,741	24,420	24,000	22,145	21,540	227,010	145,990	224,480	100,040	40,320	20,842
MEAN	1,435	1,025	788	774	764	695	7,567	4,707	7,483	3,227	1,301	695
MAX	1,570	1,570	950	800	780	920	15,600	7,600	14,000	7,400	2,870	1,820
MIN	1,330	630	700	750	710	590	910	2,420	1,840	1,560	732	460
AC-FT	88,200	60,970	48,440	47,600	43,920	42,720	450,300	289,000	445,200	198,400	79,970	41,340

CAL YR 1963: TOTAL 884,341

MEAN 2,423

MAX 12,800

MIN 630

AC-FT 1,754,000

WAT YR 1964: TOTAL 925,698

MEAN 2,529

MAX 15,600

MIN 460

AC-FT 1,836,000

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	2,820	1,810	796	860	890	900	1,150	29,500	6,680	6,210	2,970	1,470
2	3,000	1,780	832	860	880	900	1,200	27,400	6,850	6,380	2,910	1,500
3	2,880	1,770	800	860	880	900	1,250	25,300	7,420	6,340	2,870	1,500
4	2,570	1,750	860	860	870	900	1,300	23,300	8,000	6,110	2,760	1,600
5	2,290	1,740	900	860	860	910	1,350	21,600	9,470	5,840	2,660	1,600
6	2,140	1,720	890	860	860	920	1,400	20,200	11,200	5,990	2,570	1,600
7	2,050	1,700	870	860	860	920	1,500	18,800	12,200	5,360	2,500	1,600
8	1,970	1,690	860	860	860	930	1,600	17,400	12,300	5,100	2,450	1,610
9	1,860	1,670	830	860	850	920	3,200	16,300	12,400	4,860	2,360	1,590
10	1,780	1,660	820	870	850	920	6,800	15,200	12,500	4,640	2,310	1,550
11	1,690	1,610	815	870	850	930	11,500	14,100	12,600	4,320	2,250	1,500
12	1,630	1,540	815	870	850	940	21,400	12,800	12,700	4,240	2,250	1,470
13	1,620	1,490	815	870	850	950	22,900	11,800	12,600	4,520	2,230	1,470
14	1,610	1,470	820	870	850	970	28,300	11,100	12,300	4,580	2,180	1,500
15	1,600	1,460	820	870	850	980	32,700	10,300	11,800	5,280	2,120	1,560
16	1,580	1,460	830	880	850	990	36,600	9,700	11,000	6,510	2,020	1,590
17	1,500	1,480	830	890	870	1,010	39,200	9,200	10,500	6,980	1,940	1,700
18	1,450	1,040	830	890	870	1,020	41,700	9,050	9,850	6,880	1,840	1,760
19	1,420	850	840	910	870	1,020	43,900	9,040	9,240	6,410	1,740	1,850
20	1,390	1,300	840	930	870	1,020	46,300	9,160	8,570	5,900	1,660	2,000
21	1,330	1,190	840	920	870	1,030	46,800	9,140	7,920	5,420	1,620	2,140
22	1,280	1,040	850	920	880	1,040	47,100	8,730	7,370	5,010	1,590	2,250
23	1,260	910	850	920	900	1,050	45,800	8,250	6,980	4,610	1,580	2,340
24	1,230	832	850	900	900	1,050	45,300	7,820	6,760	4,210	1,560	2,400
25	1,210	778	850	900	910	1,050	43,700	7,520	6,480	3,960	1,530	2,420
26	1,240	734	850	910	910	1,060	42,000	7,250	6,170	3,910	1,490	2,500
27	1,440	718	850	910	910	1,060	39,600	7,020	5,940	3,790	1,470	2,660
28	1,660	718	850	910	920	1,060	37,200	6,850	5,790	3,540	1,460	2,770
29	1,760	726	860	900	-----	1,080	34,500	6,780	5,790	3,330	1,470	2,900
30	1,800	752	860	890	-----	1,080	31,700	6,740	5,970	3,160	1,480	3,040
31	1,810	-----	860	890	-----	1,100	-----	6,710	-----	3,070	1,470	-----
TOTAL	54,870	39,388	26,143	27,430	24,440	30,610	759,350	404,060	275,350	156,060	63,310	57,440
MEAN	1,770	1,313	843	885	873	987	25,310	13,030	9,178	5,034	2,042	1,915
MAX	3,000	1,810	900	930	920	1,100	47,100	29,500	12,700	6,980	2,970	3,040
MIN	1,210	718	796	860	850	900	1,150	6,710	5,790	3,070	1,460	1,470
AC-FT	108,800	78,120	51,850	54,410	48,480	60,710	1,506M	801,500	546,100	309,500	125,600	113,900

CAL YR 1964: TOTAL 946,468

MEAN 2,586

MAX 15,600

MIN 460

AC-FT 1,877,000

WAT YR 1965: TOTAL 1,918,451

MEAN 5,256

MAX 47,100

MIN 718

AC-FT 3,805,000

M Expressed in thousands.

5-0940. South Branch Two Rivers at Lake Bronson, Minn.

Location.--Lat 48°43'50", long 96°39'50", in SW1/4 sec.30, T.161 N., R.46 W., on left bank 100 ft upstream from bridge on U.S. Highway 59 at town of Lake Bronson and 2 miles downstream from dam at outlet of Bronson Lake.

Drainage area.--444 sq mi.

Records available.--September 1928 to November 1936, April to September 1937, April 1941 to October 1943, April to December 1944, April 1945 to September 1947, October 1953 to September 1965. Monthly discharge only for some periods, published in WSP 1308. Published as South Fork Two Rivers at Bronson prior to 1941.

Gage.--Water-stage recorder. Datum of gage is 928.46 ft above mean sea level, adjustment of 1928 (levels by Geodetic Survey of Canada). Prior to Nov. 23, 1953, chain gage at bridge 100 ft downstream at datum 2.00 ft higher. Nov. 23, 1953 to Oct. 5, 1963, water-stage recorder at present site at datum 2.00 ft higher.

Average discharge.--24 years (1928-36, 1941-43, 1945-47, 1953-65), 71.1 cfs (51,470 acre-ft per year).

Extremes.--Maximum and minimum discharges for the water years 1961-65 are contained in the following table:

Water year	Maximum			Minimum		
	Date	Discharge (cfs)	Gage height (feet)	Date	Discharge (cfs)	Gage height (feet)
1961	Mar. 28, 1961	451	a 4.86	Sept. 1, 1961	0.10	1.58
1962	June 13, 1962	2,960	b 12.82	Nov. 16, 17, 1961	.80	c 1.81
1963	Apr. 8, 1963	1,570	7.56	Jan. 19 to Feb. 5	d .80	-
1964	June 14, 1964	2,210	10.88	(e)	d .60	-
1965	Apr. 15, 1965	2,780	12.30	Mar. 24-27, 1965	d 4.0	-

a Backwater from ice.

b Present datum.

c Occurred Apr. 11, 12, 1962.

d Minimum daily.

e Dec. 27, 1963, to Mar. 4, 1964.

1928-37, 1941-47, 1953-65: Maximum discharge, 2,960 cfs June 13, 1962 (gage height, 12.82 ft, present datum); no flow at times in 1937, 1941, 1960.

Remarks.--Records good except those for periods of no gage-height record and those for winter periods, which are fair. Flow partly regulated since 1937 by Bronson Lake (usable capacity, 3,700 acre-ft).

Revisions (water years).--WSP 1308: 1929(M), 1931(M), 1936(M), 1944(M), 1947(M).

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	1.2	1.9	2.1	1.5	1.4	14	6.1	29	4.9	.90	1.2	.30
2	1.2	1.7	2.0	1.5	1.4	12	6.4	28	5.8	.60	1.0	.60
3	1.2	1.8	2.0	1.5	1.4	10	11	27	5.5	.80	1.0	.70
4	1.2	1.7	1.8	1.5	1.4	9.0	20	25	5.5	.90	1.0	.60
5	1.2	1.7	2.0	1.5	1.4	8.0	24	23	5.5	.70	.70	.50
6	1.5	1.9	1.8	1.5	1.4	7.0	25	23	4.9	.60	.70	.70
7	1.5	1.7	1.8	1.5	1.4	6.0	26	21	4.4	.80	.80	.70
8	2.3	1.4	1.8	1.5	1.4	5.5	26	20	4.7	.70	.70	1.5
9	1.0	1.4	1.8	1.5	1.4	4.5	26	19	4.4	.50	.80	.80
10	1.2	1.4	1.7	1.5	1.4	4.0	26	19	4.1	.50	.90	1.0
11	1.6	2.2	1.7	1.5	6.0	3.5	26	19	3.6	114	1.0	1.2
12	1.8	2.2	1.7	1.5	35	3.0	21	18	3.6	1.6	1.0	.80
13	1.9	2.2	1.7	1.4	28	2.5	19	16	2.8	.90	.90	.80
14	1.9	2.3	1.6	1.4	22	2.5	20	16	2.2	.80	.70	.60
15	1.9	2.4	1.6	1.4	16	2.0	19	14	2.0	.80	56	.50
16	1.9	2.4	1.6	1.4	10	2.0	17	13	1.4	.60	4.5	.60
17	1.9	2.2	1.6	1.4	5.5	1.8	16	13	2.2	.60	1.3	.60
18	1.9	2.2	1.6	1.4	3.0	1.8	16	11	2.0	.60	1.0	.60
19	1.8	2.2	1.6	1.4	2.5	1.6	17	11	2.2	.50	.80	.80
20	1.8	2.2	1.6	1.4	10	1.6	21	9.1	1.7	.50	.60	.90
21	1.8	2.2	1.6	1.4	40	1.5	26	8.7	2.2	.60	.60	.80
22	1.9	2.2	1.5	1.4	38	1.4	30	7.9	1.3	1.0	.60	.80
23	1.7	2.2	1.5	1.4	35	1.4	35	7.5	1.0	1.0	.60	.70
24	1.8	2.2	1.5	1.4	32	1.2	33	6.7	.70	.60	.50	.90
25	1.7	2.2	1.5	1.4	28	1.2	32	5.8	.60	.50	.50	.60
26	1.6	2.2	1.5	1.4	20	160	32	4.9	.40	.50	.40	.70
27	1.7	2.2	1.5	1.4	18	300	31	4.7	.40	.50	.40	.70
28	1.6	2.2	1.5	1.4	15	170	29	4.1	.70	.40	.40	.80
29	1.9	2.1	1.5	1.4	-----	75	29	3.6	.70	.60	.50	.90
30	2.4	2.1	1.5	1.4	-----	6.7	29	3.6	.70	4.4	.40	1.0
31	1.9	-----	1.5	1.4	-----	6.4	-----	3.9	-----	1.4	.50	-----
TOTAL	86.0	60.9	51.7	44.6	378.0	827.1	694.5	435.5	82.10	139.40	82.00	22.70
MEAN	2.77	2.03	1.67	1.44	13.5	26.7	23.2	14.0	2.74	4.50	2.65	.76
MAX	23	2.4	2.1	1.5	40	300	35	29	5.8	114	56	1.5
MIN	1.0	1.4	1.5	1.4	1.4	1.2	6.1	3.6	.40	.40	.40	.30
AC-FT	171	121	103	88	750	1,640	1,380	864	163	277	163	45

CAL YR 1960: TOTAL 20,548.60 MEAN 56.1 MAX 1,230 MIN 0 AC-FT 40,760  
WAT YR 1961: TOTAL 2,904.50 MEAN 7.96 MAX 300 MIN .30 AC-FT 5,760

## 5-0940. South Branch Two Rivers at Lake Bronson, Minn.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	1.0	1.0	5.0	3.9	3.4	3.1	13	152	1,420	237	32	10
2	1.0	1.0	5.0	3.9	3.3	5.0	13	53	1,350	173	6.4	24
3	1.0	1.0	5.0	3.9	3.3	60	13	16	1,010	118	6.4	139
4	1.0	1.0	5.0	3.8	3.3	65	13	103	662	122	7.2	66
5	1.0	1.0	4.8	3.8	3.3	60	14	99	437	122	7.2	4.8
6	1.0	1.0	4.8	3.8	3.3	55	14	94	342	124	38	4.8
7	1.0	.90	4.8	3.8	3.3	50	16	65	350	126	128	4.8
8	1.0	.90	4.6	3.8	3.3	40	14	9.0	356	132	128	5.4
9	1.1	.90	4.6	3.7	3.2	30	3.4	5.1	921	309	126	5.4
10	44	1.0	4.6	3.7	3.2	20	1.4	24	1,650	272	126	4.8
11	4.9	1.0	4.6	3.7	3.2	10	1.3	169	2,380	42	124	4.6
12	1.3	1.0	4.6	3.7	3.2	8.0	1.4	146	2,680	97	126	4.6
13	1.1	1.0	4.6	3.7	3.2	30	17	143	2,910	46	128	4.6
14	1.0	.90	4.6	3.7	3.2	35	105	143	2,740	122	150	4.6
15	1.1	.90	4.6	3.6	3.2	38	165	484	2,160	171	208	4.4
16	1.1	.80	4.4	3.6	3.2	39	173	578	1,520	117	168	4.6
17	1.0	.80	4.4	3.6	3.2	42	235	670	1,750	141	99	4.8
18	1.0	.90	4.4	3.6	3.2	43	728	766	1,150	109	104	3.7
19	1.0	.90	4.4	3.6	3.2	48	1,100	707	899	17	182	3.7
20	1.0	.90	4.2	3.6	3.2	49	1,080	673	801	119	162	3.9
21	1.0	1.0	4.2	3.6	3.2	50	1,130	738	593	164	5.8	3.9
22	1.0	1.1	4.2	3.6	3.2	32	1,190	804	515	41	45	3.7
23	1.0	1.1	4.2	3.5	3.2	15	1,190	1,300	563	39	118	3.7
24	1.0	1.1	4.0	3.5	3.1	14	1,080	2,010	443	38	105	3.5
25	1.0	1.1	4.0	3.5	3.1	16	928	2,120	301	37	11	3.5
26	1.0	1.0	4.0	3.4	3.1	15	599	2,260	267	38	9.0	3.7
27	1.0	1.1	4.0	3.4	3.1	14	413	1,980	262	36	9.0	3.7
28	1.0	4.4	4.0	3.4	3.1	14	304	1,310	184	91	8.5	4.6
29	1.0	5.0	4.0	3.4	-----	13	291	812	146	46	9.5	5.1
30	1.0	5.0	3.9	3.4	-----	13	244	703	164	45	9.5	5.1
31	1.0	-----	3.9	3.4	-----	13	-----	1,180	-----	43	9.5	-----
TOTAL	78.6	40.70	137.4	112.6	90.0	939.1	11,089.5	20,516.1	30,926	3,394	2,997.0	353.0
MEAN	2.54	1.36	4.43	3.63	3.21	30.3	370	655	1,031	109	77.3	11.8
MAX	44	5.0	5.0	3.9	3.4	65	1,190	2,260	2,910	309	208	139
MIN	1.0	.80	3.9	3.4	3.1	3.1	1.3	5.1	146	17	5.8	3.5
AC-FT	156	81	273	223	179	1,860	22,000	40,300	61,340	6,730	4,750	700
CAL YR 1961: TOTAL	2,962.60		MEAN 8.12		MAX 300		MIN .30		AC-FT 5,880			
WAT YR 1962: TOTAL	69,874.00		MEAN 191		MAX 2,910		MIN .80		AC-FT 138,600			

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.			
1	4.4	21	3.4	2.4	.80	1.2	60	111	19	25	4.5	3.2			
2	4.6	21	3.4	2.4	.80	1.4	50	18	18	4.1	4.6	3.2			
3	5.1	18	3.4	2.4	.80	1.4	40	9.0	20	3.9	5.2	3.4			
4	5.1	18	3.4	2.2	.80	1.4	30	8.5	18	3.9	5.4	3.4			
5	4.6	17	3.4	2.2	.80	1.6	22	9.5	18	3.8	5.4	3.5			
6	4.6	17	3.4	2.0	1.0	1.8	50	11	18	3.8	5.3	4.1			
7	4.8	17	3.4	2.0	1.0	1.8	400	13	16	3.4	4.2	4.5			
8	5.1	16	3.4	2.0	1.0	2.0	1,090	15	15	3.3	3.8	4.7			
9	5.1	16	3.5	2.0	1.0	2.0	1,440	17	17	3.3	3.6	4.6			
10	4.8	15	4.0	1.6	1.0	2.2	1,230	82	16	3.2	3.2	4.5			
11	5.1	15	5.0	1.4	1.0	2.4	968	122	36	3.5	3.2	4.9			
12	5.4	14	6.0	1.4	1.0	3.0	482	7.2	29	3.6	3.2	3.7			
13	5.4	13	4.5	1.4	1.0	3.2	497	6.9	12	3.6	2.9	1.7			
14	6.4	13	4.5	1.2	1.0	4.0	449	7.5	12	3.6	2.9	1.7			
15	5.8	11	4.2	1.0	1.0	5.0	378	5.2	9.4	3.8	2.9	2.0			
16	5.4	3.9	4.0	1.0	1.0	10	331	5.0	9.9	4.5	2.9	2.0			
17	5.1	3.9	3.6	1.0	1.1	10	153	4.8	11	4.0	2.9	4.0			
18	5.4	3.7	3.4	1.0	1.1	8.0	20	4.8	12	3.8	2.9	6.0			
19	4.8	3.7	3.1	.80	1.1	10	99	4.8	13	4.4	2.7	4.0			
20	4.8	3.7	3.1	.80	1.1	15	126	5.2	15	3.9	2.8	3.5			
21	5.1	3.7	2.8	.80	1.1	20	120	12	19	4.0	3.3	3.0			
22	5.8	3.5	2.8	.80	1.1	30	106	22	19	3.7	2.7	3.0			
23	5.4	3.5	2.8	.80	1.1	40	92	33	19	3.7	2.7	2.8			
24	5.4	3.5	2.8	.80	1.1	50	80	38	20	3.7	2.7	2.6			
25	5.4	3.5	2.8	.80	1.1	70	71	32	26	3.8	2.7	2.4			
26	6.1	3.4	2.8	.80	1.1	100	61	26	32	4.7	2.7	2.0			
27	5.1	3.4	2.6	.80	1.2	120	50	25	63	3.9	2.9	1.4			
28	4.8	3.4	2.6	.80	1.2	110	45	22	29	3.9	2.9	1.6			
29	4.6	3.4	2.4	.80	-----	103	40	19	33	3.8	3.0	1.8			
30	4.9	3.4	2.4	.80	-----	90	35	17	30	3.9	3.1	1.9			
31	23	-----	2.4	.80	-----	75	-----	17	-----	4.0	3.2	-----			
TOTAL	221.5	295.6	105.3	41.00	28.40	895.4	8,615	740.4	624.3	139.5	106.4	95.1			
MEAN	7.15	9.85	3.40	1.32	1.01	28.9	287	23.9	20.8	4.50	3.43	3.17			
MAX	49	21	6.0	2.4	1.2	120	1,440	122	63	25	5.4	6.0			
MIN	4.4	3.4	2.4	.80	.80	1.2	20	4.8	9.4	3.2	2.7	1.4			
AC-FT	439	586	209	81	56	1,780	17,090	1,470	1,240	277	211	189			
CAL YR 1962: TOTAL	70,239.7			MEAN	192		MAX	2,910		MIN	1.3		AC-FT	139,300	
WAT YR 1963: TOTAL	11,907.90			MEAN	32.6		MAX	1,440		MIN	.80		AC-FT	23,620	

Note.--No gage-height record Feb. 26 to Mar. 27.

## 5-0940. South Branch Two Rivers at Lake Bronson, Minn.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	.70	1.2	.90	.60	.60	.60	5.0	89	36	219	10	6.8
2	1.3	1.2	.80	.60	.60	.60	20	92	33	167	10	6.8
3	2.0	1.2	.80	.60	.60	.60	20	96	31	15	9.6	6.2
4	2.4	1.3	.80	.60	.60	.60	25	95	28	32	9.6	6.2
5	3.4	1.2	.80	.60	.60	.70	20	122	24	95	8.2	6.8
6	3.4	1.2	.80	.60	.60	.80	25	249	23	58	7.5	6.8
7	3.4	1.3	.90	.60	.60	.80	25	179	22	58	6.8	6.8
8	3.4	1.4	.90	.60	.60	.80	35	130	23	57	7.5	6.8
9	3.4	1.4	.90	.60	.60	.80	30	140	41	55	7.5	6.8
10	3.4	1.3	.80	.60	.60	.80	30	131	638	53	7.5	6.8
11	3.4	1.3	.80	.60	.60	.80	70	100	944	50	7.5	7.5
12	3.2	1.4	.80	.60	.60	.80	260	82	1,130	45	7.5	7.5
13	3.2	1.4	.80	.60	.60	.80	550	76	1,930	40	7.5	6.8
14	3.4	1.3	.80	.60	.60	.70	195	43	1,960	37	7.5	7.5
15	3.4	1.3	.80	.60	.60	.70	49	34	1,750	33	7.5	6.8
16	3.4	1.3	.70	.60	.60	.70	18	37	1,510	31	7.5	7.5
17	3.2	1.3	.70	.60	.60	.70	618	37	1,100	28	7.5	6.8
18	3.2	1.3	.70	.60	.60	.70	871	47	732	23	6.8	7.5
19	3.2	1.3	.70	.60	.60	.70	722	311	1,040	22	6.8	7.5
20	3.2	1.3	.70	.60	.60	.70	472	445	1,730	19	6.2	6.8
21	3.2	1.3	.70	.60	.60	.70	392	294	1,610	16	5.7	5.7
22	3.2	1.3	.70	.60	.60	.70	344	180	1,420	20	5.3	5.7
23	3.2	1.2	.70	.60	.60	.80	259	133	1,410	19	5.3	8.8
24	2.4	1.0	.70	.60	.60	.80	221	128	1,060	15	5.3	6.8
25	1.2	1.0	.70	.60	.60	.80	162	96	706	12	5.3	6.8
26	1.2	.90	.70	.60	.60	.80	150	77	577	11	5.7	11
27	1.2	.90	.60	.60	.60	.80	103	57	420	12	5.7	4.9
28	1.2	.90	.60	.60	.60	.80	60	47	275	12	5.7	4.3
29	1.3	.90	.60	.60	.60	.65	65	46	160	11	6.2	4.3
30	1.4	.90	.60	.60	-----	.80	74	43	55	11	6.8	4.3
31	1.3	-----	.60	.60	-----	1.5	-----	41	-----	11	6.2	-----
TOTAL	80.40	36.20	23.10	18.60	17.40	23.70	5,890.0	3,682	22,288	1,247	219.7	201.6
MEAN	2.59	1.21	.75	.60	.60	.75	196	119	763	40.2	7.09	6.72
MAX	3.4	1.4	.90	.60	.60	1.5	871	445	1,960	219	10	11
MIN	.70	.90	.60	.60	.60	.60	5.0	34	22	11	5.3	4.3
AC-FT	159	72	46	37	35	47	11,680	7,300	44,210	2,470	436	400

CAL YR 1963: TOTAL 11,425.20

MEAN 31.3

MAX 1,440

MIN .60

AC-FT 22,660

WAT YR 1964: TOTAL 33,727.70

MEAN 92.2

MAX 1,960

MIN .60

AC-FT 66,900

Note.--No gage-height record Dec. 20 to Jan. 21, Jan. 23 to Feb. 26.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	4.4	5.4	4.9	4.8	4.6	4.5	4.7	150	255	34	5.8	6.2
2	4.8	5.1	4.9	4.7	4.5	4.5	5.0	190	255	207	5.8	5.4
3	4.8	5.1	4.8	4.7	4.5	4.6	5.8	197	259	263	6.0	5.4
4	4.8	5.1	4.8	4.7	4.5	4.7	8.0	194	265	143	7.6	9.2
5	4.8	5.1	4.8	4.7	4.5	4.7	18	316	298	116	8.1	5.4
6	4.8	5.1	4.8	4.7	4.5	4.8	50	861	327	115	8.1	5.4
7	4.8	5.1	4.8	4.7	4.5	4.8	120	943	351	110	7.0	5.8
8	4.8	5.1	4.8	4.7	4.5	4.8	220	516	516	106	7.0	6.6
9	4.4	5.1	4.8	4.6	4.5	4.8	400	617	438	53	6.6	11
10	4.4	5.1	4.9	4.6	4.6	4.9	800	629	275	14	6.0	15
11	4.4	8.1	4.9	4.6	4.6	4.9	1,550	687	347	30	6.6	19
12	4.4	7.6	4.9	4.6	4.6	4.9	2,150	531	283	33	6.6	21
13	5.1	7.6	4.9	4.5	4.6	4.9	2,420	939	188	33	6.6	22
14	5.1	7.6	4.8	4.5	4.6	4.9	2,560	480	186	36	5.4	57
15	4.8	7.6	4.8	4.5	4.6	4.8	2,760	331	137	62	5.4	137
16	4.8	7.6	4.7	4.5	4.6	4.8	2,680	392	99	58	5.1	47
17	4.8	7.0	4.7	4.6	4.6	4.7	2,430	425	104	57	4.8	10
18	4.8	7.0	4.7	4.6	4.6	4.6	2,030	388	130	56	5.1	9.3
19	5.1	7.0	4.7	4.6	4.6	4.5	1,520	273	127	56	5.4	20
20	4.8	6.6	4.7	4.6	4.6	4.4	1,040	333	101	33	5.1	128
21	5.1	6.4	4.6	4.7	4.6	4.3	725	340	36	12	5.1	108
22	5.1	6.1	4.6	4.7	4.5	4.2	678	365	13	17	4.8	8.7
23	5.1	5.9	4.6	4.7	4.5	4.1	684	314	19	26	5.1	10
24	5.1	5.8	4.7	4.8	4.4	4.0	635	311	48	26	5.1	11
25	5.4	5.7	4.7	4.8	4.4	4.0	496	309	68	26	5.1	39
26	6.2	5.6	4.7	4.8	4.4	4.0	277	307	66	26	5.4	83
27	5.1	5.5	4.7	4.7	4.4	4.0	285	307	68	18	5.8	107
28	5.1	5.4	4.8	4.7	4.4	4.1	283	259	130	5.8	5.8	101
29	5.1	5.2	4.8	4.7	-----	4.2	239	215	199	5.8	6.6	7.6
30	5.1	5.0	4.8	4.6	-----	4.3	137	298	63	6.6	6.2	9.3
31	5.1	-----	4.8	4.6	-----	4.5	-----	325	-----	6.2	6.2	-----
TOTAL	152.4	181.6	147.9	144.3	126.8	140.2	27,210.5	12,520	5,651	1,790.4	185.9	1,030.3
MEAN	4.92	6.05	4.77	4.65	4.53	4.52	907	404	188	57.8	6.00	34.3
MAX	6.2	8.1	4.9	4.8	4.6	4.9	2,760	943	516	263	8.1	137
MIN	4.4	5.0	4.6	4.5	4.4	4.0	7	150	13	5.8	4.8	5.4
AC-FT	302	360	293	286	252	278	53,970	24,830	11,210	3,550	369	2,040

CAL YR 1964: TOTAL 34,069.90

MEAN 93.1

MAX 1,960

MIN .60

AC-FT 67,580

WAT YR 1965: TOTAL 49,281.3

MEAN 135

MAX 2,760

MIN 4.0

AC-FT 97,750

5-0987. Hidden Island Coulee near Hansboro, N. Dak.

(International gaging station)

Location--Lat 48°57', long 99°26', in SE 1/4 sec. 11, T.163 N., R.68 W., on right bank 400 ft downstream from bridge on county highway and 2.5 miles west of Hansboro.

Drainage area--38 sq mi, approximately.

Records available--October 1961 to September 1965.

Gage--Water-stage recorder. Prior to May 20, 1962, staff gage 400 ft upstream at same datum.

Extremes--Maximums and minimums (discharge in cubic feet per second, gage height in feet).

Annual maximum discharge (\*) and peak discharges above base (25 cfs), water years 1962-65

Date	Time	Discharge	Gage height	Date	Time	Discharge	Gage height	Date	Time	Discharge	Gage height
Apr. 6, 1962	-	* 40	-	Apr. 5, 1964	0630	-	a 5.96	May 4, 1965	2320	101	6.72
July 25, 1963	1930	* 8.9	5.23	Apr. 9, 1964	-	* 32	-	July 21, 1965	1230	86	6.76
				Apr. 11, 1965	0300	* 124	7.09				

a Backwater from ice.

No flow for several months in each year.

1961-65: Maximum discharge, 124 cfs Apr. 11, 1965 (gage height, 7.09 ft); no flow for several months in each year.

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

Cooperation--This station is one of the international gaging stations maintained by the United States under agreement with Canada.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1							* 0	0.1	1.0			
2							0	** .1	.5			
3							* 0	0	.3		(*)	
4							5	0	.2			
5							10	0	.1			
6							* 35	0	** .1			
7							* 8	0	.1			
8							* 12	0	.1			
9							* 27	0	0			
10							28	0	0			
11							20	0	0	(*)		
12							* 15	.2	0			
13							* 10	.3	0			
14							8.1	.2	0			
15							5.6	** .1	0			
16							3.5	.3	.1			
17							4.9	.8	0			
18							* 4.7	.7	0			
19							3.1	.6	0			
20							2.2	.5	0			
21							1.5	.5	0			
22							1.0	.7	0			
23							.7	.7	0			
24						(*)	* .6	* .2	0			(*)
25							.3	.2	0			
26							.4	.4	* 0			
27							.2	.2	0			
28				(*)			.2	.2	0			
29						(*)	.1	.5	0		(*)	
30							.1	1.0	0			
31		-----			-----		-----	1.5	-----			-----
TOTAL	0	0	0	0	0	0	207.2	10.0	2.5	0	0	0
MEAN	0	0	0	0	0	0	6.91	0.32	0.08	0	0	0
MAX	0	0	0	0	0	0	35	1.5	1.0	0	0	0
MIN	0	0	0	0	0	0	0	0	0	0	0	0
AO-FT	0	0	0	0	0	0	411	20	5.0	0	0	0

\* Discharge measurement or observation of no flow made on this day.

\*\* Field estimate made on this day.

## 5-0987. Hidden Island Coulee near Hansboro, N. Dak.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963											
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	SEPT.
1						0	0		0	0.1	
2						0	0		0	.1	
3						0	0		.1	0	
4						0	0		.6	0	
5						0	.1		.2	0	
6						0	0		.1	0	
7						0	0		.1	0	
8						0	0		.2	0	
9						0	0		.1	0	
10						0	0		.2	0	
11						0	0		.2	0	
12						0	0		.1	0	
13						0	0		0	0	
14						0	0		0	0	
15						0	0		0	0	
16						0	0		0	0	
17						0	0		0	0	
18						0	0		0	0	
19						0	0		0	0	
20						0	0		0	0	
21						0	0		0	0	
22						0	0		0	0	
23						0	0		1.4	0	
24						0	0		2.4	0	
25						0	0		2.6	.2	
26						0	0		2.0	.1	
27						.2	0		1.6	0	
28						.2	0		1.0	0	
29						.1	0		.6	0	
30						.1	0		.3	0	
31		-----			-----	.1	-----		-----	0	-----
TOTAL	0	0	0	0	0	0.7	0.1	0	13.7	0.5	0
MEAN	0	0	0	0	0	0.02	0.003	0	0.46	0.02	0
MAX	0	0	0	0	0	.2	.1	0	2.6	.2	0
MIN	0	0	0	0	0	0	0	0	0	0	0
AC-FT	0	0	0	0	0	1.4	0.2	0	27	1.0	0

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964											
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	SEPT.
1							* 0	0.1	* 0	0.6	0.2
2							0	.1	0	.7	.5
3	(*)					(*)	0	.2	0	.1	.4
4					(*)		* .1	.2	0	0	.1
5							15	* 1.6	0	.1	.1
6							28	3.8	0	0	0
7				(*)			24	2.3	0	0	0
8							* 14	3.2	0	* 0	0
9							30	2.0	0	0	* 0
10			(*)				* 24	.8	0	0	0
11							24	.4	* 0	0	0
12						(*)	26	.2	0	0	0
13							26	.4	0	0	0
14							19	.3	0	* 0	.1
15							* 18	.4	0	0	.1
16						(*)		1.0	* 0	0	.2
17							* 7.5	.5	0	0	.1
18					(*)		6.6	.4	.4	0	.1
19							5.0	* .2	.6	0	0
20							2.7	.1	1.0	0	0
21							* 1.6	.1	1.5	0	0
22							.7	.1	1.1	0	0
23							.3	.1	1.4	0	0
24							.1	0	1.7	0	0
25							.1	0	1.6	0	0
26							.1	0	1.3	0	3.5
27							.1	0	.8	0	2.3
28							.1	0	.3	0	1.4
29	(*)						.1	0	* .6	0	.8
30							.1	0	* .7	0	.4
31		-----			-----		-----	0	-----	0	-----
TOTAL	0	0	0	0	0	0	285.2	18.5	13.0	1.5	10.3
MEAN	0	0	0	0	0	0	9.51	0.60	0.43	0.11	0.34
MAX	0	0	0	0	0	0	30	3.8	1.7	.7	3.5
MIN	0	0	0	0	0	0	0	0	0	0	0
AC-FT	0	0	0	0	0	0	566	37	26	3.0	20

\* Discharge measurement or observation of no flow made on this day.

\*\* Field estimate made on this day.

Note.--Stage-discharge relation affected by ice Apr. 1-9.

5-0987. Hidden Island Coulee near Hansboro, N. Dak.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	** .4	0.1	(*)					0.7	# 10	0	.9	
2	.4	.1					* 0	.5	* 11	0	.8	
3	.3	** .1					0	.3	11	0	.4	
4	.4	0					0	** 9.0	11	0	** .1	
5	.4	0					0	75	7.7	0	0	
6	.4	0				(*)	* 0	85	5.9	0	0	
7	.3	0					* b 1	70	5.0	0	0	
8	.3	0					b 5	54	4.8	0	0	(*)
9	.4	0					b 20	44	4.8	0	0	
10	.4	0					* b 48	29	4.3	0	0	
11	.4	0					115	21	3.7	0	0	
12	.4	0					101	14	2.4	0	* 0	
13	.3	0					* 100	10	1.0	0	0	
14	.3	0					94	7.7	* .5	0	0	
15	.3	0					83	4.8	* .1	0	0	
16	.3	0				(*)	* 67	3.7	.1	0	0	
17	.2	0					44	3.2	0	0	0	
18	.2	0					38	2.6	0	0	0	
19	.2	0					23	1.6	0	0	0	
20	.2	0					* 14	* 3.0	0	0	0	
21	* .2	0					8.0	14	0	39	0	
22	.1	0				(*)	7.1	10	0	50	0	
23	.1	0					5.9	9.2	0	* 26	0	
24	.1	0			(*)		4.8	5.6	0	* 13	0	
25	.1	0					3.4	# 5	0	7.4	* 0	
26	.1	0					3.0	# 8	0	5.3	0	
27	.1	0					* 2.4	# 7	0	3.7	0	
28	.1	0		(*)			2.2	# 6	0	3.0	0	
29	.1	0					1.6	# 7	* 0	2.6	0	
30	.1	0	(*)					# 6	0	2.2	0	
31	.1	-----			-----	(*)	-----	# 8	-----	1.4	0	-----
TOTAL	7.7	0.3	0	0	0	0	792.2	524.9	83.3	153.6	2.2	0
MEAN	0.25	0.01	0	0	0	0	26.4	16.9	2.78	4.95	0.07	0
MAX	.4	0.1	0	0	0	0	115	85	11	50	.9	0
MIN	.1	0	0	0	0	0	0	.3	0	0	0	0
AC-FT	15	0.6	0	0	0	0	1,570	1,040	165	305	4.4	0

\* Discharge measurement or observation of no flow made on this day.

\*\* Field estimate made on this day.

a No gage-height record.

b Stage-discharge relation affected by ice.

## RED RIVER OF THE NORTH BASIN

5-0988. Long River near Saries, N. Dak.

(International gaging station)

Location.--Lat 48°57', long 98°57', in SW 1/4 sec. 9, T.163 N., R.64 W., on right bank 400 ft downstream from bridge on county highway and 2½ miles east of Saries.

Drainage area.--66 sq mi, approximately.

Records available.--May 1961 to September 1965.

Gage.--Water-stage recorder.

Extremes.--Maximums and minimums (discharge in cubic feet per second, gage height in feet).

Annual maximum discharge (\*) and peak discharges above base (50 cfs), May 1961 to September 1965

Date	Time	Discharge	Gage height	Date	Time	Discharge	Gage height	Date	Time	Discharge	Gage height
1961	-	0	-	June 2, 1963	2100	* 572	4.70	Apr. 10, 1964	1645	* 132	3.03
Apr. 9, 1962	1600	320	4.27	June 9, 1963	2000	239	4.02	Apr. 12, 1965	1330	* 140	3.41
Apr. 17, 1962	1700	126	3.49	Aug. 31, 1963	1400	252	4.03	July 22, 1965	1900	* 360	5.00
July 8, 1962	0430	* 393	4.37	Apr. 4, 1964	1730	-	a 3.72				

a Backwater from ice.

No flow for several months in each year.

1961-65: Maximum discharge, 572 cfs June 2, 1963; no flow for several months in each year.

Remarks.--Records fair. No flow May to September 1961.

Cooperation.--This station is one of the international gaging stations maintained by the United States under agreement with Canada.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1							* 0	0.4	0 9.	0	0	0.1
2							0	* .3	15	0	0	0
3							(*) 0	.3	8.4	0	* 0	0
4							10	.2	4.5	0	0	0
5							50	.2	2.9	0	0	0
6							* 100	.2	* 1.5	0	0	* 0
7							** 80	.2	.9	73	0	0
8			(*)				* 120	.4	.7	280	0	0
9							200	.4	.5	84	0	0
10							* 150	.4	.4	21	0	0
11												
12			(*)				70	.4	.2	* 6.3	0	0
13							* 48	.4	.2	2.1	0	0
14							* 25	.4	.2	.7	0	0
15							20	1.3	.1	.4	0	0
16							20	* .5	.1	.3	0	0
17							40	.5	.1	.2	0	0
18							96	1.5	.1	.2	0	0
19							* 106	1.0	.1	.1	.2	0
20							63	1.2	.1	.1	.5	0
21							37	1.4	0	.1	.5	0
22							19	.8	0	.1	.4	0
23							12	.8	0	.1	.4	0
24							6.3	1.4	0	0	.3	0
25							* 5.6	* 1.3	0	0	.3	0
26	(*)						3.1	1.1	0	0	.3	* 0
27							1.9	1.1	* 0	0	.2	0
28			(*)				1.1	.8	0	0	.2	0
29							.8	.7	0	0	.1	0
30							.6	1.0	0	0	** .1	0
31		-----			-----	(*)	-----	.5	4.8	0	.1	0
									8.7	0	.1	0
TOTAL	0	0	0	0	0	0	1,285.9	34.1	45.0	468.7	3.7	0.1
MEAN	0	0	0	0	0	0	42.9	1.10	1.50	15.1	0.12	0.003
MAX	0	0	0	0	0	0	200	8.7	15	280	.5	0.1
MIN	0	0	0	0	0	0	0	0	.2	0	0	0
AC-PT	0	0	0	0	0	0	2,550	68	89	930	7.3	0.2

\* Discharge measurement or observation of no flow made on this day.

\*\* Field estimate made on this day.

Note.--Stage-discharge relation affected by ice Apr. 3-16.

5-0988. Long River near Saries, N. Dak.--Continued

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1						0	1.2	0.1	0	0.2	232	0.1
2						0	1.1		.63	.1	150	.1
3				(*)		* 0	.8	.1	268	.1	69	.1
4			(*)			0	* .8	0	404	.1	29	** .1
5					(*)	* 0	1.4	0	* 148	.1	12	.1
6						0	1.9	0	52	0	5.6	.1
7						0	2.7	0	24	0	* 2.0	.1
8						0	2.1	0	* 16	0	1.9	0
9				(*)		0	1.8	0	68	** 0	1.5	0
10						0	1.6	0	150	* 0	1.3	0
11						0	1.6	0	64	0	1.0	0
12						0	* 1.5	0	38	0	.9	0
13						0	.9	.1	25	0	.8	0
14						0	.7	.1	13	0	.7	0
15						0	.4	.1	8.4	0	.5	0
16						0	.7	.1	4.7	0	.4	* 0
17						0	.8	0	3.2	0	.4	0
18			(*)			0	.5	0	2.4	0	.4	0
19						0	.4	0	1.6	0	.3	0
20						0	.3	0	1.0	0	.2	0
21						0	.2	0	.6	0	* .1	0
22						0	.2	** 0	1.4	0	.1	0
23						0	0	0	21	0	0	0
24	(*)					0	* .2	0	12	0	.1	0
25						0	.2	0	7.0	0	.1	0
26						0	.1	0	5.2	0	.1	0
27						* 10	.1	0	3.2	.2	.1	0
28						9.2	.1	* 0	1.6	169	.1	0
29						* 8.6	.1	0	.8	162	.1	0
30						2.9	.1	0	.3	216	.1	0
31			-----			2.1	-----	0	-----	245	.1	-----
TOTAL	0	0	0	0	0	32.8	24.7	0.7	1,407.4	792.8	511.0	0.7
MEAN	0	0	0	0	0	1.06	0.82	0.02	46.9	25.6	16.5	0.02
MAX	0	0	0	0	0	10	2.7	0.1	404	245	232	0.1
MIN	0	0	0	0	0	0	0	0	0	0	.1	0
AC-FT	0	0	0	0	0	65	49	1.4	2,790	1,570	1,010	1.4

\* Discharge measurement or observation of no flow made on this day.

\*\* Field estimate made on this day.

Note.--No gage-height record Mar. 28, Aug. 2-6, 9-12, Aug. 22 to Sept. 2, Sept. 4-30.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1							* 0	0.5	0	0.6		
2							0	.4	* 0	.4		
3	(*)					(*)	5	.4	0	.3		
4							* 60	.5	0	.2		
5							65	* .3	0	.2		
6							40	.6	0	.1		
7				(*)			* 40	.6	.3			
8							50	.6	.3	* 0		
9							70	.4	.3	.3		(*)
10			(*)				* 100	.3	.2	.2		
11							70	.3	** .2	.1	(*)	
12						(*)	47	2.2	.3	0		
13							30	.5	.3	0		
14							24	.2	.4	* 0		
15							* 46	.2	.3	0		
16						(*)	25	.2	** .3	0		
17							* 10	.2	.3	0		
18							6.8	.1	4.0	0		
19					(*)		4.1	.1	4.0	0		
20							2.3	.1	3.1	0		
21							* 1.4	.1	12	0		
22							1.2	.1	9.0	0		
23							1.0	.1	5.2	0		
24							.9	.1	2.3	0		
25							.8	0	1.2	0		
26							.8	0	1.-	0		
27							.8	0	.8	0		
28							.6	0	.7	0		
29	(*)						.5	0	.7	0		
30							.5	0	* .6	0		
31			-----			-----	-----	0	-----	0		-----
TOTAL	0	0	0	0	0	0	712.7	9.1	47.8	2.5	0	0
MEAN	0	0	0	0	0	0	23.8	0.29	1.59	0.08	0	0
MAX	0	0	0	0	0	0	100	2.2	12	0.6	0	0
MIN	0	0	0	0	0	0	0	0	0	0	0	0
AC-FT	0	0	0	0	0	0	1,410	18	95	5.0	0	0

\* Discharge measurement or observation of no flow made on this day.

\*\* Field estimate made on this day.

Note.--Stage-discharge relation affected by ice Apr. 3-10.

5-0988. Long River near Sarles, N. Dak.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965											
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	SEPT.
1	(*)		(*)				0	0.2	0.5	0	18
2							* 0	.4	* .6	0	16
3		(*)					0	.3	1.7	0	13
4							0	** .2	3.8	0	* 9.8
5							0	1.1	4.9	0	8.1
6							(*) * 0	21	3.6	0	6.2
7							* 0	11	2.8	0	5.6
8								6.2	2.2	0	4.9
9							* 2	4.2	1.6	0	4.4
10							* 30	3.2	1.3	0	3.8
11							105	2.6	1.0	0	3.6
12							108	1.8	.7	0	3.0
13							* 117	1.3	.5	0	2.8
14							78	1.0	* .4	0	2.5
15							40	.8	* .3	0	2.1
16							(*) * 29	.6	.2	0	1.7
17							19	.5	.1	0	1.4
18							13	.4	0	0	1.2
19							* 9.2	.7	0	0	1.0
20							* 6.4	* .8	0	1.2	.8
21											
22							4.2	1.3	0	20	.6
23							2.9	1.8	0	* 207	.6
24							2.1	1.2	0	239	.5
25					(*)	(*)	1.5	1.0	0	* 139	.4
26							1.2	1.0	0	94	* .5
27							* .8	.8	0	71	.6
28							* .6	.7	0	53	.6
29				(*)			.5	.6	0	41	.5
30							.3	.6	* 0	33	.6
31			(*)				.2	.6	0	25	.6
		-----			-----	(*)	-----	.5	-----	19	.6
TOTAL	0	0	0	0	0	0	571.9	68.4	26.2	942.2	116.0
MEAN	0	0	0	0	0	0	19.1	2.21	0.87	30.4	30.4
MAX	0	0	0	0	0	0	117	21	4.9	239	18
MIN	0	0	0	0	0	0	0	0.2	0	0	.4
AC-FT	0	0	0	0	0	0	1,130	136	52	1,870	230

\* Discharge measurement or observation of no flow made on this day.

\*\* Field estimate made on this day.

## 5-0991. Snowflake Creek near Snowflake, Manitoba

(International gaging station)

Location.--Lat 49°01'17", long 98°36'13", in SW $\frac{1}{4}$  sec.10, T.1, R.9 W., at traffic bridge  $1\frac{1}{2}$  miles south and  $2\frac{1}{2}$  miles east of Snowflake.

Drainage area.--348 sq mi.

Records available.--March 1961 to September 1965.

Gage.--Staff gage read once daily. Datum of gage is 1,222.63 ft above mean sea level, Geodetic Survey of Canada datum. Prior to Apr. 2, 1964, staff gage at present site and datum. Apr. 2, 1964, to May 10, 1965, staff gage at site half a mile downstream at present datum.

Extremes.--Maximum and minimum discharges for March 1961 to September 1965 are contained in the following table:

Water year	Maximum			Minimum		
	Date	Discharge (cfs)	Gage height (feet)	Date	Discharge (cfs)	Gage height (feet)
1961	Mar. 27, 1961	13.6	a 1.58	Several months	0	-
1962	Apr. 18, 1962	b 101	-	do.	0	-
1963	Mar. 21, 1963	b 9.9	-	do.	0	-
1964	Apr. 9, 1964	b 21.7	-	do.	0	-
1965	Apr. 11, 1965	44.0	2.49	do.	0	-

a Maximum gage height for period, 1.77 ft Mar. 26, 1961, backwater from ice.

b Maximum daily.

1961-65: Maximum daily discharge, 101 cfs Apr. 18, 1962; no flow for several months in each year.

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

Cooperation.--This station is one of the international gaging stations maintained by Canada under agreement with the United States.

DISCHARGE, IN CUBIC FEET PER SECOND, MARCH TO SEPTEMBER 1961

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1						N11	7.1	0.9	2.1	N11	N11	N11
2						"	7.2	0.9	2.0	"	"	"
3						"	6.1	0.8	1.8	"	"	"
4						"	3.3	0.6	1.6	"	"	"
5						"	3.6	0.6	1.2	"	"	"
6						"	3.6	1.4	0.8	"	"	"
7						"	4.9	1.5	0.6	"	"	"
8						"	2.6	1.1	1.2	"	"	"
9						"	2.4	0.8	0.5	"	"	"
10						"	2.2	0.8	0.2	"	"	"
11						"	4.3	1.4	0.0	"	"	"
12						"	2.8	1.4	0.0	"	"	"
13						"	2.6	1.2	N11	"	"	"
14						"	2.0	1.2	"	"	"	"
15						"	2.6	1.2	"	"	"	"
16						"	2.2	1.1	"	"	"	"
17						"	1.4	1.1	"	"	"	"
18						"	1.1	1.0	"	"	"	"
19						"	1.1	1.0	"	"	"	"
20						"	2.1	1.0	"	"	"	"
21						"	2.0	0.8	"	"	"	"
22						"	1.4	0.8	"	"	"	"
23						"	1.4	0.8	"	"	"	"
24						"	1.4	0.8	"	"	"	"
25						1.7	0.9	0.8	"	"	"	"
26						9.4	1.1	0.5	"	"	"	"
27						13.6	1.4	0.5	"	"	"	"
28						13.0	1.5	0.4	"	"	"	"
29						11.2	1.7	0.4	"	"	"	"
30					-----	6.8	1.4	0.4	N11	"	"	N11
31		-----			-----	7.4	-----	2.4	-----	N11	N11	-----
TOTAL						63.1	79.4	29.6	12.0	N11	N11	N11
MEAN						2.04	2.65	0.95	0.39	N11	N11	N11
MAX						13.6	7.2	2.4	2.1	N11	N11	N11
MIN						N11	0.9	0.4	N11	N11	N11	N11
AC-FT						125	157	58.7	23.8	N11	N11	N11

Note.--Stage-discharge relation affected by ice Mar. 1-27 and by beaver dam May 15 to June 14. The expressions "nil" and "0.0" represent "no flow" and less than 0.05 cfs, respectively.

## 5-0991. Snowflake Creek near Snowflake, Manitoba--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	N11	N11	N11	N11	N11	N11	N11	4.8	N11	N11	N11	N11
2	"	"	"	"	"	"	"	3.8	"	"	"	"
3	"	"	"	"	"	"	"	4.6	"	"	"	"
4	"	"	"	"	"	"	"	4.6	"	"	"	"
5	"	"	"	"	"	"	1.0	4.6	"	"	"	"
6	"	"	"	"	"	"	1.6	3.0	"	"	"	"
7	"	"	"	"	"	"	1.6	1.6	"	"	"	"
8	"	"	"	"	"	"	.5	.5	"	"	"	"
9	"	"	"	"	"	"	"	* N11	"	"	"	"
10	"	"	"	"	"	"	* .8	"	"	"	"	"
11	"	"	"	"	"	"	N11	"	"	"	"	"
12	"	"	"	"	"	"	"	"	"	"	"	"
13	"	"	"	"	"	"	.5	"	"	"	"	"
14	"	"	"	"	"	"	3.0	"	* "	"	"	"
15	"	"	"	"	"	"	7.6	"	"	"	"	"
16	"	"	"	"	"	"	"	"	"	"	"	"
17	"	"	"	"	"	"	34.0	"	"	"	"	"
18	"	"	"	"	"	"	86.0	"	"	"	"	"
19	"	"	"	"	"	"	101.0	"	"	"	"	"
20	"	"	"	"	"	"	87.0	"	"	"	"	"
21	"	"	"	"	"	"	47.0	"	"	"	"	"
22	"	"	"	"	"	"	* 27.0	"	"	"	"	"
23	"	"	"	"	"	"	18.0	"	"	"	"	"
24	"	"	"	"	"	"	15.0	"	"	"	"	"
25	"	"	"	"	"	"	12.0	"	"	"	"	"
26	"	"	"	"	"	"	9.3	"	"	"	"	"
27	"	"	"	"	"	"	8.1	"	"	"	"	"
28	"	"	"	"	"	"	7.9	"	"	"	"	"
29	"	"	"	"	"	"	10.1	"	"	"	"	"
30	"	"	"	"	"	"	8.1	"	"	"	"	"
31	N11	N11	N11	N11	N11	N11	5.6	N11	N11	N11	N11	N11
TOTAL	N11	N11	N11	N11	N11	N11	493.2	27.5	N11	N11	N11	N11
MEAN	N11	N11	N11	N11	N11	N11	16.4	0.9	N11	N11	N11	N11
MAX	N11	N11	N11	N11	N11	N11	101.0	4.8	N11	N11	N11	N11
MIN	N11	N11	N11	N11	N11	N11	N11	N11	N11	N11	N11	N11
AC-FT	N11	N11	N11	N11	N11	N11	978	54.5	N11	N11	N11	N11

\* Discharge measurement or observation of no flow made on this day.

Note.--Stage-discharge relation affected by ice Apr. 5-15. The expression "n11" and "0" represent "no flow" and "less than 0.05 cfs", respectively.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	N11	N11	N11	N11	N11	N11	0.9	0.8	1.7	0.3	0.7	N11
2	"	"	"	"	"	"	0.9	0.9	2.4	0.1	0.3	"
3	"	"	"	"	"	"	0.5	0.0	3.0	0.1	0.1	"
4	"	"	"	"	"	"	0.5	0.0	8.2	0.1	0.0	"
5	"	"	"	"	"	"	0.6	0.1	* 4.7	0.2	0.0	"
6	"	"	"	"	"	"	0.6	0.8	4.3	0.2	N11	"
7	"	"	"	"	"	"	0.5	0.9	4.8	0.1	"	"
8	"	"	"	"	"	"	0.6	0.8	4.6	0.1	"	"
9	"	"	"	"	"	"	0.5	0.5	5.6	0.3	"	"
10	"	"	"	"	"	"	0.7	0.3	2.9	0.3	"	"
11	"	"	"	"	"	"	0.9	0.1	3.0	0.4	"	"
12	"	"	"	"	"	"	* 0.6	1.1	3.2	0.2	"	"
13	"	"	"	"	"	"	* N11	0.9	1.1	2.9	0.0	"
14	"	"	"	"	"	"	0.0	0.6	3.0	"	"	"
15	"	"	"	"	"	"	0.5	0.9	0.6	2.7	"	"
16	"	"	"	"	"	"	1.6	0.5	0.8	2.2	"	"
17	"	"	"	"	"	"	3.0	0.8	1.0	2.6	"	"
18	"	"	"	"	"	"	4.6	0.8	0.9	2.4	"	"
19	"	"	"	"	"	"	6.2	0.5	0.9	2.4	"	"
20	"	"	"	"	"	"	7.9	0.6	0.8	2.3	"	"
21	"	"	"	"	"	"	* 9.9	0.5	0.8	2.0	"	"
22	"	"	"	"	"	"	9.6	0.8	0.6	1.6	"	"
23	"	"	"	"	"	"	7.9	* 0.5	0.7	2.7	"	"
24	"	"	"	"	"	"	6.2	0.5	* 0.7	2.6	"	"
25	"	"	"	"	"	"	4.6	0.9	0.4	2.6	0.0	"
26	"	"	"	"	"	"	4.0	0.8	0.2	2.6	6.5	"
27	"	"	"	"	"	"	* 2.7	0.7	0.2	2.6	2.2	"
28	"	"	"	"	"	"	* 1.2	0.7	0.2	2.4	1.9	"
29	"	"	"	"	"	"	1.0	0.9	0.1	1.9	1.6	"
30	"	N11	"	"	"	"	1.3	0.5	0.1	0.5	2.7	"
31	N11	-----	N11	N11	-----	1.0	-----	2.1	-----	1.1	N11	-----
TOTAL	N11	N11	N11	N11	N11	73.2	20.3	18.7	90.4	18.4	1.1	N11
MEAN	N11	N11	N11	N11	N11	2.36	0.68	0.60	3.01	0.59	0.04	N11
MAX	N11	N11	N11	N11	N11	9.9	0.9	2.1	8.2	6.5	0.7	N11
MIN	N11	N11	N11	N11	N11	N11	0.5	0.0	0.5	0.0	N11	N11
AC-FT	N11	N11	N11	N11	N11	145	40	37	179	36	2.2	N11

\* Discharge measurement or observation of no flow made on this day.

Note.--The expression "n11" and "0" represent "no flow" and "less than 0.05 cfs" respectively.

## 5-0991. Snowflake Creek near Snowflake, Manitoba--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	N11	N11	N11	N11	N11	N11	11.0	0.5	0.0	0.1	N11	N11
2	"	"	"	"	"	"	* 11.7	0.5	0.0	0.1	"	"
3	"	"	"	"	"	"	* 11.7	0.5	0.0	0.1	"	"
4	"	"	"	"	"	"	* 11.3	0.6	0.0	0.0	"	"
5	"	"	"	"	"	"	12.2	* 0.7	0.0	0.0	"	"
6	"	"	"	"	"	"	11.2	0.7	0.0	0.0	"	"
7	"	"	"	"	"	"	* 10.5	0.5	0.1	0.1	"	"
8	"	"	"	"	"	"	* 15.4	0.3	0.0	0.1	"	"
9	"	"	"	"	"	"	* 21.7	0.5	0.0	0.1	"	"
10	"	"	"	"	"	"	16.0	0.5	0.0	0.1	"	"
11	"	"	"	"	"	"	13.3	0.5	0.0	0.0	"	"
12	"	"	"	"	"	"	9.8	0.5	0.0	0.0	"	"
13	"	"	"	"	"	"	7.9	0.5	0.0	N11	"	"
14	"	"	"	"	"	"	5.6	0.3	0.0	"	"	"
15	"	"	"	"	"	"	7.9	0.5	0.0	"	"	"
16	"	"	"	"	"	"	* 7.9	0.3	* 0.0	"	"	"
17	"	"	"	"	"	"	* 4.7	0.3	0.2	"	"	"
18	"	"	"	"	"	"	2.1	0.3	0.5	"	"	"
19	"	"	"	"	"	* 0.0	0.1	1.2	0.2	1.0	"	"
20	"	"	"	"	"	0.3	0.6	0.2	0.6	"	"	"
21	"	"	"	"	"	0.6	* 0.7	0.2	0.5	"	"	"
22	"	"	"	"	"	0.1	0.6	0.1	0.4	"	"	"
23	"	"	"	"	"	2.0	0.8	0.0	0.4	"	"	"
24	"	"	"	"	"	3.0	* 0.6	0.0	0.1	"	"	"
25	"	"	"	"	"	4.0	1.0	0.0	* 0.1	"	"	"
26	"	"	"	"	"	5.0	0.7	0.0	0.1	"	"	"
27	"	"	"	"	"	6.0	0.7	0.0	0.1	"	"	"
28	"	"	"	"	"	7.0	0.4	0.0	0.1	"	"	"
29	"	"	"	"	N11	8.0	* 0.4	0.0	0.4	"	"	"
30	"	N11	"	"	-----	9.0	0.4	0.0	0.4	"	"	N11
31	N11	-----	N11	N11	-----	10.0	-----	0.0	-----	N11	N11	-----
TOTAL	N11	N11	N11	N11	N11	56.0	200.0	9.2	0.5	0.7	N11	N11
MEAN	N11	N11	N11	N11	N11	1.81	6.67	0.30	0.16	0.02	N11	N11
MAX	N11	N11	N11	N11	N11	10.0	21.7	0.7	1.0	0.1	N11	N11
MIN	N11	N11	N11	N11	N11	N11	0.4	0.0	0.0	N11	N11	N11
AC-FT	N11	N11	N11	N11	N11	111	397	18	9.9	1.4	N11	N11

\* Discharge measurement or observation of no flow made on this day.

Note.--Stage-discharge relation affected by ice Mar. 18 to Apr. 6. (No gage-height record Mar. 18 to Apr. 1). The expression "N11" and "0.0" represent "no flow" and "less than 0.05 cfs" respectively.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	0.0	N11	N11	N11	N11	0.0	1.0	0.5	2.5	0.9	0.5	0.0
2	0.0	"	"	"	"	0.0	7.2	1.6	2.8	1.9	0.4	0.0
3	0.0	"	"	"	"	0.0	10.9	2.0	5.2	1.9	0.3	0.0
4	0.0	"	"	"	"	0.0	12.6	2.0	5.9	2.0	0.3	0.0
5	0.0	"	"	"	"	0.0	12.4	10.9	6.2	1.5	0.2	0.3
6	0.0	"	"	"	"	0.0	13.0	8.6	* 6.0	1.3	0.2	0.2
7	0.0	"	"	* "	"	0.0	* 26.4	0.9	* 5.5	1.3	0.2	0.8
8	0.0	"	"	"	"	0.0	21.4	0.8	4.8	1.1	0.2	0.9
9	0.0	"	"	"	"	0.0	19.1	1.3	4.5	0.9	0.0	0.9
10	0.0	"	"	"	"	0.0	33.8	1.5	3.8	0.9	0.0	0.9
11	0.0	"	"	"	"	0.3	44.0	* 1.9	3.6	0.7	0.0	0.9
12	0.0	"	"	"	"	1.4	31.7	1.3	3.5	0.5	0.0	0.9
13	0.0	"	"	"	"	1.5	* 34.0	2.0	3.1	0.5	0.0	0.9
14	0.0	"	"	"	"	1.8	27.0	3.1	2.7	0.5	0.0	1.3
15	0.0	"	"	"	"	0.7	19.3	3.5	* 2.5	0.4	0.0	1.8
16	0.0	"	"	"	"	* 0.4	13.4	2.3	2.1	0.5	0.0	2.1
17	0.0	"	"	"	"	0.3	10.1	1.8	2.0	0.5	0.0	2.8
18	0.0	"	"	"	"	0.3	8.7	1.5	1.9	0.3	0.0	2.8
19	0.0	"	"	"	"	0.3	6.2	1.3	1.8	1.3	0.0	2.7
20	0.0	"	"	"	"	0.3	4.8	2.0	1.6	1.5	0.0	2.4
21	0.0	"	"	"	"	"	3.5	2.5	1.5	1.8	0.0	1.9
22	0.0	"	"	"	"	0.2	3.5	3.5	1.3	0.9	0.0	2.3
23	0.0	"	"	"	"	0.2	* 2.4	3.3	1.1	0.3	0.0	3.1
24	0.0	"	"	"	"	0.2	2.8	3.1	1.1	0.3	0.0	3.1
25	0.0	"	"	"	"	0.1	3.1	3.5	1.1	0.3	0.0	3.1
26	0.0	"	"	"	"	0.1	1.1	4.2	1.3	* 0.3	0.0	3.1
27	0.0	"	"	"	"	0.1	1.1	5.9	1.4	0.2	0.0	3.1
28	0.0	"	"	"	N11	0.1	* 1.5	5.9	1.3	0.2	0.0	3.1
29	N11	"	"	"	"	0.1	1.6	4.2	1.1	0.2	0.0	3.1
30	N11	N11	"	"	-----	0.1	1.5	2.5	0.8	0.3	0.0	* 3.1
31	N11	-----	N11	N11	-----	0.1	-----	2.1	-----	0.4	0.0	-----
TOTAL	0.0	N11	N11	N11	N11	8.8	379.1	91.5	84.0	25.6	2.3	51.8
MEAN	0.0	N11	N11	N11	N11	0.28	12.6	1.95	1.80	0.83	0.07	1.73
MAX	0.0	N11	N11	N11	N11	1.8	44.0	10.9	6.2	2.0	0.5	3.1
MIN	0.0	N11	N11	N11	N11	0.0	1.0	0.5	0.8	0.2	0.0	0.0
AC-FT	0.0	N11	N11	N11	N11	17	752	181	167	51	4.6	103

\* Discharge measurement or observation of no flow made on this day.

Note.--Stage-discharge relation affected by ice, beaver dams or aquatic growth Nov. 1 to Apr. 7, Apr. 10 to May 10, Sept. 18-30. The expression "N11" and "0.0" represent "no flow" and "less than 0.05 cfs" respectively.

## 5-0991.5. Mowbray Creek near Mowbray, Manitoba

Location.--Lat 49°00'00", long 98°27'15", in SE $\frac{1}{4}$  sec.3, T.1, R.8 W., on downstream side of bridge on Municipal Road on international boundary 1.5 miles east of Mowbray.

Drainage area.--93.9 sq mi.

Records available.--March 1962 to September 1965.

Gage.--Staff gage read once daily.

Extremes.--Maximum and minimum discharges for March 1962 to September 1965 are contained in the following table:

Water year	Maximum daily			Minimum		
	Date	Discharge (cfs)	Gage height (feet)	Date	Discharge (cfs)	Gage height (feet)
1962	Apr. 20, 1962	305	5.75	Several months	0	-
1963	June 25, 1963	9.2	2.97	do.	0	-
1964	Apr. 16, 1964	22.8	a 5.39	do.	0	-
1965	Apr. 13, 1965	202	5.38	do.	0	-

a Maximum gage height for year, 3.66 ft Apr. 5, 1964, backwater from ice.

1962-65: Maximum daily discharge, 305 cfs Apr. 20, 1962 (gage height, 5.75 ft); no flow for several months in each year.

Remarks.--Records good.

Cooperation.--Records furnished by Water Resources Branch, Department of Mines and Technical Surveys, Canada.

## DISCHARGE, IN CUBIC FEET PER SECOND, MARCH TO SEPTEMBER 1962

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1						N11	N11	3.3	4.6	0.6	N11	N11
2						"	"	2.6	4.0	.3	"	"
3						"	"	1.0	4.0	.1	"	"
4						"	0	.8	4.0	0	"	"
5						"	5.3	.8	4.0	0	"	"
6						"	"	.6	.3	4.0	.3	"
7						"	0	0	4.0	.3	"	"
8						"	0	0	4.0	.3	"	"
9						"	0	0	4.0	.3	"	"
10						"	0	0	3.3	.3	"	"
11						"	0	0	3.3	.3	"	"
12						"	0	0	3.3	.2	"	"
13						"	.2	0	3.3	.2	"	"
14						"	0	.9	3.3	.1	"	"
15						"	1.9	1.0	3.3	N11	"	"
16						"	"	7.7	1.0	3.3	"	"
17						"	"	51.3	.7	3.3	"	"
18						"	"	231	.6	3.2	"	"
19						"	"	227	12.1	2.6	"	"
20						"	"	305	8.1	2.2	"	"
21						"	"	240	4.3	3.2	"	"
22						"	"	271	3.3	2.7	"	"
23						"	"	217	2.7	2.6	"	"
24						"	"	135	2.6	1.8	"	"
25						"	"	76.3	2.6	1.8	"	"
26						"	"	39.4	2.6	1.4	"	"
27						"	"	24.3	2.6	1.2	"	"
28						"	"	14.7	2.6	.9	"	"
29						"	"	11.0	2.2	.6	"	"
30						"	"	7.4	7.7	.6	"	"
31						"		7.7	7.7		"	
TOTAL						N11	1,866.1	74.0	87.8	3.3	N11	N11
MEAN						N11	62.2	2.4	2.9	0.1	N11	N11
MAX						N11	305	12.1	4.6	0.6	N11	N11
MIN						N11	N11	0	.6	N11	N11	N11
AC-FT						N11	3,700	147	174	6.5	N11	N11
CALENDAR YEAR	: MAX	MIN	MEAN	AC-FT								
WATER YEAR	: MAX	MIN	MEAN	AC-FT								

Note.--Stage-discharge relation affected by ice Mar. 1 to Apr. 16. The expression "n11" and "0" represent "no flow" and "less than 0.05 cfs", respectively.

## 5-0991.5. Mowbray Creek near Mowbray, Manitoba--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	N11	N11	N11	N11	N11	N11	0.4	0.4	N11	5.4	0.6	0.4
2	"	"	"	"	"	"	0.2	0.2	N11	4.1	0.7	0.2
3	"	"	"	"	"	"	0.0	0.2	0.1	3.8	0.6	N11
4	"	"	"	"	"	"	0.0	0.2	0.2	3.4	0.6	"
5	"	"	"	"	"	"	0.0	0.4	0.6	3.2	0.0	"
6	"	"	"	"	"	"	0.0	0.4	0.9	3.0	N11	"
7	"	"	"	"	"	"	0.2	0.4	1.2	2.9	"	"
8	"	"	"	"	"	"	0.4	0.2	1.7	2.7	"	"
9	"	"	"	"	"	"	0.6	0.2	3.1	2.1	"	"
10	"	"	"	"	"	"	1.2	0.0	3.1	1.7	"	"
11	"	"	"	"	"	"	1.4	0.0	2.7	0.8	"	"
12	"	"	"	"	"	"	2.2	0.0	2.4	0.8	"	"
13	"	"	"	"	"	"	2.0	0.0	2.0	0.8	"	"
14	"	"	"	"	"	"	2.2	0.0	1.8	0.6	"	"
15	"	"	"	"	"	"	2.1	0.0	1.6	0.4	"	"
16	"	"	"	"	"	"	1.7	0.0	1.7	0.3	"	"
17	"	"	"	"	"	"	1.5	0.0	2.4	0.6	"	"
18	"	"	"	"	"	"	1.4	0.0	2.7	0.6	"	"
19	"	"	"	"	"	"	N11	1.2	N11	0.6	N11	"
20	"	"	"	"	"	"	0.0	1.2	4.2	0.6	0.0	"
21	"	"	"	"	"	"	2.0	2.0	6.3	0.6	0.1	"
22	"	"	"	"	"	"	1.9	1.5	7.2	0.4	0.1	"
23	"	"	"	"	"	"	1.2	1.2	7.2	0.2	0.4	"
24	"	"	"	"	"	"	1.2	1.2	8.1	0.1	-6	"
25	"	"	"	"	"	"	0.6	1.2	9.2	0.7	0.8	"
26	"	"	"	"	"	"	0.4	1.3	9.0	0.6	1.1	"
27	"	"	"	"	"	"	0.6	1.2	9.0	0.6	1.0	"
28	"	"	"	"	"	"	0.9	1.2	8.8	0.6	1.0	"
29	"	"	"	"	N11	"	1.0	0.6	8.8	0.6	0.8	"
30	"	"	"	"	-----	"	0.8	0.6	5.6	0.7	0.7	"
31	N11	-----	N11	N11	-----	"	0.6	-----	N11	-----	0.6	-----
TOTAL	N11	N11	N11	N11	N11	11.2	31.9	2.6	114.7	44.3	9.7	0.6
MEAN	N11	N11	N11	N11	N11	0.36	1.06	0.08	3.82	1.43	0.31	0.02
MAX	N11	N11	N11	N11	N11	2.0	2.2	0.4	9.2	5.4	1.1	0.4
MIN	N11	N11	N11	N11	N11	N11	0.0	N11	N11	0.1	N11	N11
AC-FT	N11	N11	N11	N11	N11	22	63	5.2	228	88	19	1.2

CALENDAR YEAR 1962: MAX MIN MEAN AC-FT  
 WATER YEAR 1962-63: MAX 9.2 MIN N11 MEAN 0.59 AC-FT 426

Note.--Stage-discharge relation affected by ice Mar. 1-22; backwater from aquatic growth July 2 to Sept. 5. The expression "n11" and "0" represent "no flow" and "less than 0.05 cfs", respectively.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	N11	N11	N11	N11	N11	N11	N11	2.1	0.0	0.6	N11	N11
2	"	"	"	"	"	"	"	1.9	"	0.6	"	"
3	"	"	"	"	"	"	"	1.8	"	0.5	"	"
4	"	"	"	"	"	"	* 0.0	2.5	"	0.4	"	"
5	"	"	"	"	"	"	4.0	2.1	"	0.4	"	"
6	"	"	"	"	"	"	4.9	2.1	"	0.3	"	"
7	"	"	"	"	"	"	3.3	1.8	"	0.3	"	"
8	"	"	"	"	"	"	1.9	1.5	"	0.3	"	"
9	"	"	"	"	"	"	* 1.0	1.4	"	0.3	"	"
10	"	"	"	"	"	"	9.4	1.2	"	0.3	"	"
11	"	"	"	"	"	"	* 17.8	0.9	"	0.3	"	"
12	"	"	"	"	"	"	16.0	0.8	"	0.3	"	"
13	"	"	"	"	"	"	10.4	0.7	"	0.3	"	"
14	"	"	"	"	"	"	14.5	0.6	"	0.2	"	"
15	"	"	"	"	"	"	20.2	0.6	"	0.2	"	"
16	"	"	"	"	"	"	22.8	0.6	"	0.2	"	"
17	"	"	"	"	"	"	* 21.5	0.6	0.0	0.2	"	"
18	"	"	"	"	"	"	21.8	0.5	0.1	0.1	"	"
19	"	"	"	"	"	"	22.0	0.5	0.8	0.2	"	"
20	"	"	"	"	"	"	21.0	0.5	1.9	0.1	"	"
21	"	"	"	"	"	"	16.0	0.5	1.8	0.1	"	"
22	"	"	"	"	"	"	12.0	0.5	1.7	0.2	"	"
23	"	"	"	"	"	"	9.8	0.4	1.6	0.1	"	"
24	"	"	"	"	"	"	* 8.0	0.4	1.4	0.1	"	"
25	"	"	"	"	"	"	6.7	0.3	* 1.4	0.1	"	"
26	"	"	"	"	"	"	5.9	0.2	1.4	0.1	"	"
27	"	"	"	"	"	"	4.6	0.1	1.0	0.0	"	"
28	"	"	"	"	"	"	3.6	0.1	0.8	0.1	"	"
29	"	"	"	"	N11	"	* 3.0	0.1	0.7	0.0	"	"
30	"	N11	"	"	-----	"	2.4	0.1	0.7	0.0	"	N11
31	N11	-----	N11	N11	-----	N11	-----	0.1	-----	0.0	N11	-----
TOTAL	N11	N11	N11	N11	N11	N11	284.5	27.5	15.3	6.9	N11	N11
MEAN	N11	N11	N11	N11	N11	N11	9.48	0.89	0.51	0.22	N11	N11
MAX	N11	N11	N11	N11	N11	N11	22.8	2.5	1.9	0.6	N11	N11
MIN	N11	N11	N11	N11	N11	N11	N11	0.1	0.0	0.0	N11	N11
AC-FT	N11	N11	N11	N11	N11	N11	564	54	30	14	N11	N11

CALENDAR YEAR 1963: MAX 9.2 MIN N11 MEAN .59 AC-FT  
 WATER YEAR 1963-64: MAX 22.8 MIN N11 MEAN .91 AC-FT

\* Discharge measurement or observation of no flow made on this day.  
 Note.--Stage-discharge relation affected by ice Mar. 1 to Apr. 9. The expression "n11" and "0.0" represent "no flow" and "less than 0.05 cfs", respectively.

## 5-0991.5. Mowbray Creek near Mowbray, Manitoba--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965												
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	N11	N11	N11	N11	N11	N11	N11	1.5	0.1	0.5	0.0	0.0
2	"	"	"	"	"	"	"	0.8	0.4	0.3	0.0	0.0
3	"	"	"	"	"	"	"	0.6	0.6	0.2	0.0	0.0
4	"	"	"	"	"	"	"	0.5	1.8	0.0	0.0	0.0
5	"	"	"	"	"	"	N11	1.8	1.5	0.0	0.0	0.0
6	"	"	"	"	"	"	0.0	23.7	2.1	0.0	0.0	0.0
7	"	"	"	"	"	"	0.0	22.5	2.5	0.0	0.0	0.0
8	"	"	"	"	"	"	0.0	32.7	2.7	0.0	0.0	0.0
9	"	"	"	"	"	"	2.0	68.7	2.2	0.0	0.0	0.0
10	"	"	"	"	"	"	11.0	71.6	1.9	0.0	0.0	0.0
11	"	"	"	"	"	"	16.8	53.7	2.5	0.0	0.0	0.0
12	"	"	"	"	"	"	66.8	36.2	2.7	0.0	0.0	0.0
13	"	"	"	"	"	"	202	21.9	2.7	0.0	0.0	0.0
14	"	"	"	"	"	"	202	11.4	2.7	0.0	0.0	0.0
15	"	"	"	"	"	"	191	4.4	2.7	0.0	0.0	0.0
16	"	"	"	"	"	"	176	2.3	2.8	0.0	0.0	0.0
17	"	"	"	"	"	"	160	1.8	2.2	0.0	0.0	0.0
18	"	"	"	"	"	"	137	1.3	2.8	0.0	0.0	0.0
19	"	"	"	"	"	"	88.2	1.0	2.4	0.0	0.0	0.0
20	"	"	"	"	"	"	63.0	0.9	2.4	0.0	0.0	0.0
21	"	"	"	"	"	"	45.3	0.8	2.2	0.0	0.0	0.0
22	"	"	"	"	"	"	34.1	0.4	1.9	0.0	0.0	0.0
23	"	"	"	"	"	"	27.4	0.3	2.5	0.0	0.0	0.0
24	"	"	"	"	"	"	22.5	0.3	1.9	0.0	0.0	0.0
25	"	"	"	"	"	"	17.2	0.4	1.7	0.0	0.0	0.0
26	"	"	"	"	"	"	13.0	0.4	1.0	0.0	0.0	0.0
27	"	"	"	"	"	"	6.9	0.3	1.4	0.0	0.0	0.0
28	"	"	"	"	N11	"	5.8	0.2	1.1	0.0	0.0	0.0
29	"	"	"	"	"	"	2.2	0.2	0.8	0.0	0.0	0.0
30	"	"	"	"	"	"	2.3	0.1	0.5	0.0	0.0	0.0
31	N11	-----	N11	N11	-----	N11	-----	0.1	-----	0.0	0.0	-----
TOTAL	N11	N11	N11	N11	N11	N11	1,492.5	362.8	56.7	1.0	0.0	0.0
MEAN	N11	N11	N11	N11	N11	N11	49.8	11.7	1.89	0.03	0.0	0.0
MAX	N11	N11	N11	N11	N11	N11	202	71.6	2.8	0.5	0.0	0.0
MIN	N11	N11	N11	N11	N11	N11	N11	0.1	0.1	0.0	0.0	0.0
AC-FT	N11	N11	N11	N11	N11	N11	2,960	720	112	2.0	0.0	0.0

CALENDAR YEAR 1964: MAX 22.8 MIN N11 MEAN 0.91 AC-FT 662  
 WATER YEAR 1964-65: MAX 202 MIN N11 MEAN 5.24 AC-FT 3,790

Note.--Stage-discharge relation affected by ice or beaver dams Apr. 6-13, June 7 to July 4. The expression "n11" and "0.0" represents "no flow" and "less than 0.05 cfs", respectively.

5-0992. Pembina River near Kaleida, Manitoba

Location.--Lat 49°03'30", long 98°27'50", in NW¼ sec.22, T.1, R.8 W., at bridge 4½ miles south of Kaleida.

Drainage area.--2,870 sq mi (revised).

Records available.--October 1957 to September 1965.

Gage.--Water-stage recorder. Datum of gage is 1,188.45 ft above mean sea level, Geodetic Survey datum of Canada. Prior to Oct. 1, 1959, at datum 79.00 ft lower.

Average discharge.--8 years, 102 cfs (73,840 acre-ft per year).

Extremes.--Maximum and minimum discharges for the water years 1961-65 are contained in the following table:

Water year	Maximum			Minimum daily		
	Date	Discharge (cfs)	Gage height (feet)	Date	Discharge (cfs)	Gage height (feet)
1961	Apr. 18, 1961	a 314	-	Aug. 31, 1961	0.30	-
1962	Apr. 20, 1962	1,280	6.37	Long periods	0	-
1963	June 5, 1963	a 298	-	do.	0	-
1964	May 10, 1964	a 412	-	do.	0	-
1965	Apr. 14, 1965	a 1,240	-	do.	0	-

a Maximum daily.

1957-65: Maximum discharge, 2,660 cfs Apr. 24, 1960 (gage height, 9.22 ft); no flow at times in most years.

Remarks.--Records good except those for winter periods, which are fair. Discharge affected by upstream regulation.

Cooperation.--Records furnished by Water Resources Branch, Department of Mines and Technical Surveys, Canada.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	22.8	14.0	2.1	3.8	0.6	3.0	196	235	62.3	7.5	0.9	0.3
2	22.8	13.8	2.3	5.1	0.6	2.3	205	232	60.2	6.7	0.8	0.3
3	22.0	13.8	2.4	4.8	0.6	3.3	207	216	57.2	6.2	0.8	0.3
4	21.2	13.6	3.4	4.8	0.5	2.7	207	208	54.1	6.2	0.8	0.3
5	21.2	13.6	3.9	4.7	0.5	3.7	210	197	50.4	5.8	0.7	0.3
6	21.2	13.6	5.5	4.8	0.5	4.1	212	200	46.7	5.4	0.6	0.3
7	21.2	13.2	2.8	4.7	0.5	3.9	222	190	44.0	4.3	0.6	0.3
8	21.2	a 12.0	4.4	4.9	0.5	3.1	225	190	41.4	3.6	0.5	0.3
9	20.4	a 10.8	2.5	5.2	0.5	2.8	230	197	38.7	3.3	0.5	0.5
10	19.6	a 9.2	3.5	5.4	0.6	2.3	234	200	35.3	2.6	0.5	0.6
11	19.6	a 7.6	5.1	5.5	0.6	2.0	241	190	32.2	2.2	0.5	0.8
12	18.8	a 6.6	6.2	5.7	0.6	1.8	260	174	30.6	2.1	0.5	0.6
13	18.8	a 5.9	5.9	5.8	5.7	1.6	268	172	27.4	1.9	0.5	0.8
14	18.0	a 5.2	5.9	6.0	4.6	1.5	284	167	24.9	1.8	0.5	0.6
15	17.6	a 4.6	2.9	6.2	3.9	1.4	290	152	22.9	1.8	0.5	0.5
16	17.2	3.9	3.8	7.2	3.4	1.3	305	139	21.0	1.7	0.5	0.4
17	16.8	3.6	4.7	6.8	2.7	1.4	274	130	19.1	1.5	0.5	0.4
18	16.8	3.5	5.1	6.0	2.1	1.3	314	120	17.9	1.5	0.5	0.5
19	16.8	3.6	5.9	5.8	2.2	1.2	308	107	16.6	1.4	0.5	0.6
20	16.4	3.5	8.2	5.7	2.5	1.5	302	100	14.9	1.4	0.4	1.0
21	16.4	3.4	8.0	5.6	3.0	1.8	286	96.8	13.8	1.5	0.4	1.0
22	16.4	3.4	7.8	5.4	3.2	1.2	283	95.1	13.8	2.0	0.5	1.4
23	16.4	3.0	7.2	5.5	3.0	0.5	280	87.3	12.2	2.6	0.5	2.0
24	16.0	2.8	2.0	4.2	2.5	0.5	275	81.9	11.7	2.2	0.4	2.1
25	15.6	2.5	1.9	1.0	2.5	0.5	250	77.9	11.2	2.9	0.4	1.5
26	15.6	2.4	1.8	0.8	2.7	0.5	244	74.2	10.1	2.1	0.4	1.2
27	15.2	2.3	1.8	0.6	2.8	0.5	241	71.7	9.2	1.5	0.4	1.3
28	14.8	2.2	2.9	0.5	2.9	40.0	259	69.3	8.4	1.2	0.4	1.2
29	14.4	2.2	3.1	0.5	-----	170	256	63.4	7.5	1.0	0.4	1.2
30	14.4	2.2	3.8	1.3	-----	210	238	58.2	7.1	1.0	0.4	1.2
31	14.4	-----	3.8	1.0	-----	195	-----	58.2	-----	0.9	0.3	-----
TOTAL	560.0	202.0	130.6	135.3	56.3	666.7	7,606	4,350.0	822.8	87.8	16.1	23.8
MEAN	18.1	6.73	4.21	4.36	2.01	21.5	254	140	27.4	2.83	0.52	0.79
MAX	22.8	14.0	8.2	7.2	5.7	210	314	235	62.3	7.5	0.9	2.1
MIN	14.4	2.2	1.8	0.5	0.5	0.5	196	58.2	7.1	0.9	0.3	0.3
AC-FT	1,110	401	259	268	112	1,320	15,090	8,630	1,630	174	32	47

CALENDAR YEAR 1960: MAX 2,620 MIN 1.8 MEAN 297 AC-FT 215,800  
 WATER YEAR 1960-61: MAX 314 MIN 0.3 MEAN 40.2 AC-FT 29,070

a No gage-height record

Note.--Stage-discharge relation affected by ice Dec. 3 to Apr. 19. Wire-weight-gage readings used Nov. 16 to Apr. 19.

## 5-0992. Pembina River near Kaleida, Manitoba--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	0.4	0	N11	N11	N11	N11	0.2	248	208	77.1	55.1	122
2	.8	0	"	"	"	"	.2	251	207	74.6	56.3	122
3	.6	0	"	"	"	"	1.4	248	206	70.8	58.7	118
4	.4	0	"	"	"	"	1.5	240	204	73.3	62.3	115
5	.2	0	"	"	"	"	2.5	231	202	73.3	65.9	114
6	.2	0	"	"	"	"	2.8	224	200	79.7	65.9	111
7	.2	0	"	"	"	"	8.0	240	199	75.9	64.7	111
8	.2	0	"	"	"	"	10.0	231	197	73.3	64.7	107
9	.2	0	"	"	"	"	17.0	218	196	69.5	64.7	104
10	.2	0	"	"	"	"	25.4	204	194	68.3	64.7	101
11	.4	0	"	"	"	"	30.0	195	192	64.7	73.3	101
12	.4	N11	"	"	"	"	32.0	194	185	62.3	74.6	97.1
13	.4	"	"	"	"	"	34.0	194	177	61.1	79.7	94.3
14	.2	"	"	"	"	"	36.0	194	172	59.9	75.9	91.5
15	.2	"	"	"	"	"	38.0	195	167	58.7	75.9	92.9
16	.2	"	"	"	"	"	40.0	196	163	57.5	75.9	92.9
17	.2	"	"	"	"	"	250	196	162	56.3	77.1	92.9
18	.2	"	"	"	"	"	600	197	163	56.3	82.3	92.9
19	.2	"	"	"	"	"	905	198	158	57.5	83.6	91.5
20	.2	"	"	"	"	"	1,220	199	144	56.3	83.6	88.8
21	.2	"	"	"	"	"	1,160	200	144	56.3	84.9	88.8
22	.2	"	"	"	"	"	967	201	127	58.7	86.2	86.2
23	.2	"	"	"	"	"	770	202	119	58.7	90.1	82.3
24	.2	"	"	"	"	0	571	203	114	58.7	88.8	81.0
25	.2	"	"	"	"	0	432	204	110	57.5	90.1	77.1
26	.2	"	"	"	"	0	360	205	103	56.3	97.1	75.9
27	0	"	"	"	"	.1	316	206	95.7	55.1	108	72.0
28	0	"	"	"	"	.2	293	207	88.8	54.1	115	69.5
29	0	"	"	"	-----	.2	275	208	81.0	52.9	119	67.1
30	0	"	"	"	-----	.2	257	209	75.9	52.9	122	64.7
31	0	-----	"	"	-----	.2	-----	209	-----	52.9	124	-----
TOTAL	7.2	0	N11	N11	N11	0.9	8,654.0	6,547	4,754.4	1,940.5	2,530.1	2,825.4
MEAN	0.2	0	N11	N11	N11	0	288	211	158	62.6	81.6	94.2
MAX	.8	0	N11	N11	N11	.2	1,220	251	208	79.7	124	122
MIN	0	0	N11	N11	N11	N11	0.2	194	75.9	52.9	55.1	64.7
AC-PT	14.3	0	N11	N11	N11	1.8	17,170	12,990	9,430	3,850	5,020	5,600

CALENDAR YEAR 1961: MAX 1,220 MIN N11 MEAN 74.6 AC-PT 54,076  
 WATER YEAR 1961-62: MAX 1,220 MIN N11 MEAN 74.6 AC-PT 54,076

Note.--Stage-discharge relation affected by ice Nov. 5 to Apr. 19. The expression "n11" and "0" represent "no flow" and "less than 0.05 cfs", respectively.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	62.3	25.5	17.6	14.5	N11	N11	133	214	166	140	98.4	87
2	58.7	25.0	20.5	14.5	"	"	135	206	181	132	98.4	84
3	57.5	24.0	21.0	16.0	"	"	128	212	212	128	98.4	81
4	56.3	25.0	18.5	15.5	"	"	153	234	271	126	100	78
5	54.1	37.0	17.6	20.0	"	"	147	256	198	119	104	75.4
6	52.9	25.0	16.5	20.0	"	"	141	239	292	111	106	72.8
7	50.6	27.0	17.6	20.0	"	"	135	234	256	106	106	68.9
8	47.3	28.0	17.0	19.0	"	"	128	236	228	104	107	67.6
9	46.2	32.0	19.0	23.0	"	"	122	206	192	102	107	65
10	43.0	22.5	18.5	24.0	"	"	116	242	248	94.8	109	64
11	42.0	24.0	20.0	19.0	"	"	111	231	277	90.0	109	63
12	41.0	21.0	20.5	10.0	"	"	107	239	262	84.0	111	61
13	40.0	20.0	18.5	5.2	"	"	111	245	256	79.5	111	60
14	39.0	19.0	20.0	1.5	"	"	114	242	242	76.7	111	58
15	39.0	22.0	21.0	0.0	"	"	98.4	254	236	79.5	113	58
16	37.0	24.0	13.6	N11	"	"	100	256	234	85.5	117	55
17	36.0	22.5	14.0	"	"	"	98.4	242	234	79.5	113	53
18	35.0	20.0	14.0	"	"	"	N11	242	228	78.0	113	52
19	34.0	20.5	13.6	"	"	0.0	145	236	223	76.7	111	52
20	33.0	20.0	14.5	"	"	0.3	135	234	212	75.4	107	51
21	35.0	19.0	14.5	"	"	0.7	140	220	204	74.1	106	49
22	35.0	19.0	14.0	"	"	1.0	145	215	192	72.8	102	48
23	33.0	17.6	13.6	"	"	25	148	209	195	71.5	98.4	46
24	32.5	18.0	14.0	"	"	50	153	190	198	70.2	94.8	45
25	32.0	18.0	15.0	"	"	75	158	184	206	75.4	91.5	43.4
26	31.0	18.5	15.5	"	"	100	166	181	201	82.5	93	41
27	30.0	18.5	14.0	"	"	125	176	179	187	81.0	93	40.2
28	29.0	17.0	15.5	"	"	135	184	176	181	82.5	91.5	41
29	28.0	17.6	14.0	"	N11	167	192	174	168	87.0	90	40.2
30	27.0	18.5	14.0	"	-----	138	201	166	153	91.5	90	39.4
31	26.0	-----	14.0	N11	-----	135	-----	168	-----	94.8	88.5	-----
TOTAL	1,243.4	665.7	511.6	222.2	N11	952.0	4,133.8	6,795	6,647	2,850.9	3,188.9	1,739.9
MEAN	40.1	22.2	16.5	7.17	N11	30.7	138	219	222	92.0	103	58.0
MAX	62.3	37.0	21.0	24.0	N11	167	201	256	298	140	117	87
MIN	26.0	17.0	13.6	N11	N11	N11	98.4	166	153	70.2	88.5	39.4
AC-PT	2,470	1,320	1,010	441	N11	1,890	8,200	13,480	13,180	5,650	6,320	3,450

CALENDAR YEAR 1962: MAX 1,220 MIN N11 MEAN 81.3 AC-PT 58,860  
 WATER YEAR 1962-63: MAX 298 MIN N11 MEAN 79.3 AC-PT 57,410

Note.--Stage-discharge relation affected by ice Nov. 21 to Apr. 11. Discharge computed from manual gage readings Dec. 16 to Apr. 22. The expression "n11" and "0" represent "no flow" and "less than 0.05 cfs", respectively.

## 5-0992. Pembina River near Kaleida, Manitoba--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	37.8	20.5	9.0	N11	N11	N11	4.0	371	201	50.5	22.4	34.4
2	36.3	19.5	8.0	"	"	"	* 5.0	368	189	45.3	20.8	32.0
3	35.6	19.0	7.0	"	"	"	10.0	374	178	39.2	21.6	28.0
4	34.9	19.0	6.0	"	"	"	* 15.0	371	166	35.6	20.4	28.0
5	34.9	18.2	5.0	"	"	"	25.0	364	157	33.2	20.8	28.0
6	33.5	17.4	4.0	"	"	"	35.0	374	148	31.2	21.6	27.0
7	32.8	16.6	3.0	"	"	"	45.0	396	141	28.8	22.0	27.0
8	31.4	16.2	2.0	"	"	"	55.0	403	133	25.6	22.0	27.0
9	30.7	15.8	1.0	"	"	"	* 65.0	409	125	24.8	23.2	27.0
10	30.0	15.4	0.8	"	"	"	195	412	114	24.0	28.8	27.0
11	28.8	14.7	0.7	"	"	"	* 313	403	112	23.2	32.0	27.0
12	27.6	15.8	0.6	"	"	"	295	390	107	22.0	30.4	27.0
13	27.0	17.0	0.5	"	"	"	280	393	98.0	20.4	32.0	27.0
14	27.0	14.4	0.4	"	"	"	223	374	103	19.7	39.2	26.0
15	26.4	14.1	0.3	"	"	"	176	358	104	18.5	32.0	26.0
16	24.6	14.4	0.2	"	"	"	248	358	95.0	17.6	30.4	26.0
17	24.0	15.4	* 0.1	"	"	"	* 241	352	90.5	17.3	26.4	26.0
18	23.5	22.5	* N11	"	"	"	275	345	95.0	16.1	23.6	26.0
19	23.5	18.6	"	"	"	*	320	330	96.5	17.3	22.8	26.0
20	23.0	12.0	"	"	"	"	374	326	100	17.0	22.4	26.0
21	23.5	13.2	"	"	"	"	358	330	107	16.1	24.0	25.0
22	23.5	14.4	"	"	"	"	339	309	109	17.0	24.8	25.0
23	23.0	14.4	"	"	"	"	336	305	106	16.7	23.2	* 27.2
24	22.5	13.5	"	"	"	"	* 326	305	96.5	15.5	22.8	24.0
25	21.5	13.2	"	"	"	"	311	296	* 92.0	17.6	22.0	24.0
26	21.0	12.9	"	"	"	"	"	275	84.5	22.8	21.6	41.6
27	20.5	12.6	"	"	"	"	311	264	74.0	22.2	22.0	39.2
28	21.0	12.0	"	"	"	0.5	348	266	65.4	23.6	22.8	33.2
29	21.5	11.0	"	"	N11	1.0	* 352	251	59.8	22.0	24.0	30.4
30	* 22.0	10.0	"	"	-----	2.0	371	248	54.4	19.7	29.6	29.6
31	22.0	-----	N11	N11	-----	3.0	-----	217	-----	21.6	32.0	-----
TOTAL	835.3	463.7	48.6	N11	N11	6.5	6,590.0	10,536	3,401.6	743.1	784.0	847.6
MEAN	26.9	15.5	1.57	N11	N11	0.21	220	340	113	24.0	25.3	28.2
MAX	37.8	22.5	9.0	N11	N11	3.0	374	412	201	50.5	39.2	41.6
MIN	20.5	10.0	N11	N11	N11	N11	4.0	217	54.4	15.5	20.4	24.0
AC-FT	1,660	920	96	N11	N11	13	13,070	20,900	6,750	1,470	1,560	1,680

CALENDAR YEAR 1963: MAX 298 MIN N11 MEAN 76.2 AC-FT 55,290  
 WATER YEAR 1963-64: MAX 412 MIN N11 MEAN 66.3 AC-FT 48,120

\* Discharge measurement or observation of no flow made on this day.  
 Note.--Stage-discharge relation affected by ice Nov. 12 to Apr. 16. No gage-height record Nov. 28 to Dec. 17.  
 Mar. 28 to Apr. 1, Apr. 3, 5-18, Sept. 4-22. The expression "n11" and "0.0" represent "no flow" and "less than 0.05 cfs", respectively.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	27.2	11.4	1.2	N11	N11	N11	0.0	620	580	267	73.8	78.0
2	24.0	11.3	1.0	"	"	"	1.0	626	582	255	79.8	79.7
3	23.6	11.2	0.8	"	"	"	2.0	623	585	242	71.0	81.4
4	23.2	11.3	0.7	"	"	"	5.0	632	582	237	66.8	91.6
5	23.2	11.3	0.6	"	"	"	10.0	739	561	224	64.0	93.3
6	23.6	11.2	0.5	"	"	"	25.0	773	555	210	62.1	96.7
7	24.0	11.1	0.4	"	"	"	50.0	809	541	200	60.2	98.4
8	23.6	11.2	0.3	"	"	"	100	767	525	194	59.2	98.4
9	22.8	11.0	0.2	"	"	"	200	764	505	182	58.3	98.4
10	22.0	11.0	0.1	"	"	"	400	761	490	168	56.4	98.4
11	21.2	11.1	0.1	"	"	"	600	755	481	158	55.4	100
12	20.4	11.2	0.1	"	"	"	800	728	462	150	54.5	102
13	19.1	11.0	0.0	"	"	"	1,000	710	445	140	53.6	103
14	17.9	11.4	N11	"	"	"	1,240	707	425	128	52.8	107
15	16.7	11.0	"	"	"	"	1,190	704	403	125	51.9	107
16	15.8	11.4	"	"	"	"	935	698	390	117	51.1	112
17	15.2	9.4	"	"	"	"	730	695	383	112	52.7	116
18	14.6	7.0	"	"	"	"	595	664	373	105	52.7	112
19	14.3	7.0	"	"	"	"	560	652	360	98.4	54.5	110
20	14.0	6.2	"	"	"	"	563	673	348	95.0	55.4	109
21	13.6	5.4	"	"	"	"	566	678	346	93.3	54.5	107
22	13.4	4.6	"	"	"	"	550	661	346	89.9	55.4	107
23	13.4	3.8	"	"	"	"	533	658	339	88.2	56.4	105
24	13.0	3.0	"	"	"	"	544	646	325	86.5	58.3	103
25	12.8	3.0	"	"	"	"	555	634	315	83.1	59.2	102
26	12.6	2.5	"	"	"	"	563	615	305	79.7	61.1	98.4
27	12.4	2.0	"	"	"	"	580	618	292	76.6	62.1	95.0
28	12.0	1.8	"	"	N11	"	590	634	282	73.8	63.0	93.3
29	11.8	1.6	"	"	-----	N11	598	632	280	71.0	73.8	91.6
30	11.7	1.4	"	"	-----	N11	607	604	275	72.4	75.2	89.9
31	11.6	-----	N11	N11	-----	0.0	-----	590	-----	71.0	76.6	-----
TOTAL	544.7	237.8	6.0	N11	N11	0.0	14,692.0	21,070	12,681	4,292.9	1,875.8	2,984.5
MEAN	17.6	7.93	0.19	N11	N11	N11	490	680	423	138	60.5	99.5
MAX	27.2	11.4	1.2	N11	N11	N11	1,240	809	585	267	76.6	116
MIN	11.6	1.4	N11	N11	N11	N11	500	275	71.0	51.1	51.1	78.0
AC-FT	1,080	472	12	N11	N11	N11	29,140	41,790	25,150	8,510	3,720	5,920

CALENDAR YEAR 1964: MAX 412 MIN N11 MEAN 64.7 AC-FT 47,040  
 WATER YEAR 1964-65: MAX 1,240 MIN N11 MEAN 161 AC-FT 115,800

Note.--Stage-discharge relation affected by ice Nov. 14 to Apr. 19 (no gage-height record except for scattered days Nov. 26 to Apr. 13). The expressions "n11" and "0.0" represent "no flow" and "less than 0.05 cfs", respectively.

5-0993. Pembina River near Windygates, Manitoba

(International gaging station)

Location.--Lat 49°01'53", long 98°16'40", in SE $\frac{1}{4}$  sec.13, T.1, R.7 W., on left bank a quarter of a mile downstream from bridge and 3 miles northeast of Windygates.

Drainage area.--3,020 sq mi.

Records available.--April 1962 to September 1965.

Gage.--Water-stage recorder and wire-weight gage read once daily. Datum of recording gage is 1,102.02 ft above mean sea level. Datum of wire-weight gage is 1,105.00 ft above mean sea level, both gages referred to Geodetic Survey of Canada datum.

Extremes.--Maximum and minimum discharges for April 1962 to September 1965 are contained in the following table:

Water year	Maximum			Minimum daily		
	Date	Discharge (cfs)	Gage height (feet)	Date	Discharge (cfs)	Gage height (feet)
1962	Apr. 21, 1962	a 1,610	-	Apr. 1, 1962	4	-
1963	June 6, 1963	a 255	-	Many days	0.0	-
1964	May 10, 1964	a 323	-	Long period	nil	-
1965	Apr. 14, 1965	1,460	7.73	do.	0.0	-

a Maximum daily.

1962-65: Maximum daily discharge, 1,610 cfs Apr. 21, 1962; no flow at times in some years.

Remarks.--Records fair.

Cooperation.--This station is one of the international gaging stations maintained by Canada under agreement with the United States.

DISCHARGE, IN CUBIC FEET PER SECOND, APRIL TO SEPTEMBER 1962

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1							4	259	217	73.6	59.2	121
2							5	250	217	84.8	* 48.0	122
3							8	* 240	204	70.4	60.8	121
4							5	240	197	75.2	59.2	* 117
5							12	222	* 197	72.0	60.8	115
6							24	204	195	80.0	67.2	113
7							28	200	200	78.4	62.4	110
8							30	204	197	76.8	62.4	108
9							* 32	187	195	* 68.8	62.4	106
10							* 35	* 180	189	65.6	62.4	103
11							90	170	185	64.0	68.8	103
12							187	162	172	60.8	72.0	97.7
13							247	154	144	56.0	* 73.6	96.0
14							236	213	* 160	52.8	76.8	92.8
15							172	195	154	48.0	75.2	89.6
16							* 202	187	154	48.0	73.6	91.2
17							411	195	150	42.4	73.6	92.8
18							* 900	195	152	43.8	76.8	91.2
19							* 1,380	195	150	41.0	78.4	89.6
20							* 1,520	215	144	45.2	81.6	89.6
21							1,610	215	138	41.0	80.0	91.2
22							* 1,280	* 204	138	46.6	81.6	89.6
23							* 1,060	197	128	43.8	84.8	86.4
24							795	193	115	45.2	* 84.8	84.8
25							606	193	110	43.8	83.2	* 84.8
26							490	204	108	34.0	84.8	81.6
27							* 382	211	101	34.0	94.4	76.8
28							332	208	96.0	34.0	103	75.2
29							305	195	88.0	34.0	110	68.8
30							286	243	78.4	48.0	117	68.8
31							-----	222		* 48.0	119	-----
TOTAL							12,635	6,352	4,673.4	1,700.0	2,397.8	2,877.5
MEAN							421	205	156	54.8	77.3	95.9
MAX							1,610	259	217	84.8	119	122
MIN							4.0	154	78.4	34.0	48.0	68.8
AC-FI							25,060	12,640	9,270	3,370	4,760	5,710

CALENDAR YEAR : MAX MIN MEAN AC-FT  
WATER YEAR : MAX MIN MEAN AC-FT

\* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Apr. 1-19.

## 5-0993. Pembina River near Windygates, Manitoba--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	67.2	16.5	41.0	21.2	0.0	0.0	145	175	144	132	93.0	86.6
2	64.0	14.3	26.8	21.1	"	"	89.6	173	137	126	94.4	85.5
3	60.8	31.6	25.6	* 21.2	"	"	146	164	* 158	123	94.4	82.5
4	59.2	42.4	34.0	21.5	"	"	229	169	202	121	95.8	81.1
5	56.0	23.2	22.0	* 21.6	"	"	120	183	222	118	95.8	* 79.8
6	54.4	22.0	20.3	20.0	"	"	174	185	255	113	97.3	77.0
7	51.2	20.9	20.8	20.0	"	"	172	179	233	113	98.9	72.7
8	48.0	* 22.0	21.1	16.7	"	"	193	177	109	123	102	70.0
9	48.0	28.0	21.7	15.0	"	"	229	* 173	183	111	102	68.5
10	46.6	32.8	22.1	13.5	"	"	112	173	185	103	102	65.7
11	31.6	14.3	* 22.8	11.8	"	* "	96.0	175	211	* 98.9	102	65.7
12	29.2	9.9	22.6	11.1	"	"	86.4	173	218	91.4	103	63.9
13	34.0	7.7	22.4	10.9	"	"	86.4	183	211	86.6	103	61.5
14	41.0	7.7	22.2	10.7	* "	"	91.2	177	202	85.5	* 102	60.3
15	39.6	15.4	22.1	10.3	"	"	* 104	179	192	90.0	103	58.8
16	41.0	12.1	21.8	10.0	"	"	111	185	188	96.9	105	58.8
17	38.2	4.4	21.3	9.4	"	"	104	179	183	94.4	106	56.2
18	* 35.4	12.1	20.8	8.6	"	"	104	175	183	85.5	105	55.0
19	32.8	7.7	20.8	7.3	"	0.0	119	173	181	84.0	103	55.0
20	32.8	13.2	21.1	6.0	"	0.1	130	173	177	81.1	102	53.7
21	25.6	14.3	21.6	4.7	"	* 0.2	126	169	169	79.8	100	52.5
22	35.4	4.4	22.2	3.6	"	1.0	126	162	164	78.4	97.3	52.5
23	35.4	11.0	22.8	3.1	"	15.0	130	* 162	166	75.5	95.8	50.0
24	34.0	13.2	23.5	2.8	"	80.0	130	154	166	75.5	94.4	48.8
25	19.8	11.0	23.8	2.2	"	* 138	134	144	168	74.2	93.0	47.6
26	24.4	12.1	23.8	1.7	"	170	* 140	146	* 166	88.5	93.0	* 46.5
27	24.4	15.4	23.7	1.3	* "	176	146	144	158	88.5	93.0	44.0
28	22.0	16.5	23.1	0.6	0.0	172	153	171	153	81.1	91.4	42.8
29	19.8	* 18.7	22.8	0.0	"	158	138	137	147	* 84.0	90.0	41.7
30	20.9	34.0	22.3	* 0.0	-----	166	166	137	140	88.5	90.0	40.5
31	19.8	-----	21.8	0.0	-----	185	-----	140	-----	95.8	88.5	-----
TOTAL	1,192.5	508.8	724.7	306.0	0.0	1,268.3	40,049.6	5,156.0	5,471.0	2,989.1	3,036.0	1,824.2
MEAN	38.5	16.9	23.4	9.87	0.0	41.5	1,350	162	96.1	97.9	97.9	60.8
MAX	67.2	42.4	41.0	21.6	0.0	185	229	185	255	132	106	86.6
MIN	19.8	4.4	20.3	0.0	0.0	0.0	86.4	137	137	74.2	88.5	40.5
AC-FT	2,340	1,010	1,440	607	0.0	2,520	8,030	10,230	10,850	5,930	6,020	3,620

CALENDAR YEAR 1962: MAX 1,610 MIN 4 MEAN 90.6 AC-FT 65,560

WATER YEAR 1962-63: MAX 255 MIN 0.0 MEAN 72.7 AC-FT 52,610

\* Discharge measurement or observation of no flow made on this day.

Note.--Stage-discharge relation affected by ice Dec. 6 to Apr. 8. Discharge computed from once daily wire-weight gage readings Oct. 1 to May 1. The expression "nil" and "0" represent "no flow" and "less than 0.05 cfs", respectively.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	39.4	19.7	* 6.1	1.8	Nil	Nil	0.0	321	192	62.8	46.3	70.3
2	38.2	20.5	* 7.2	1.8	"	"	* 3.0	319	* 183	58.4	42.5	51.5
3	36.0	18.9	6.8	1.8	"	"	* 77.0	319	* 174	52.8	38.8	42.5
4	35.0	16.5	6.4	1.7	"	"	149	319	164	46.3	* 35.3	37.6
5	33.9	17.3	6.0	1.7	"	"	227	* 315	157	43.8	40.0	32.0
6	33.9	* 15.7	5.6	1.7	"	"	164	315	149	* 41.2	36.5	32.0
7	33.9	14.9	5.2	* 1.7	"	"	164	311	142	37.6	42.5	35.3
8	32.8	13.5	4.8	* 1.9	"	"	179	319	135	35.3	43.8	38.8
9	31.8	12.8	4.4	1.8	"	"	216	321	128	32.0	47.6	42.5
10	30.8	11.5	4.1	1.7	* "	"	* 214	323	121	32.0	51.5	41.2
11	30.8	12.1	3.8	1.6	"	"	244	321	118	30.9	57.0	* 40.0
12	29.8	9.6	3.5	1.5	"	"	268	313	124	28.8	52.8	38.8
13	29.8	14.2	3.2	1.3	"	"	266	307	110	28.8	51.5	34.2
14	28.8	12.8	2.9	1.0	"	"	275	305	102	26.6	54.2	32.0
15	28.8	10.8	2.6	0.8	"	"	280	295	105	25.5	54.2	33.1
16	27.8	11.5	* 2.3	0.6	"	"	287	286	103	28.8	52.8	34.2
17	26.0	11.5	* 2.0	0.5	"	"	266	286	102	22.5	49.0	29.9
18	25.0	7.8	2.0	0.3	"	"	250	280	110	20.6	45.0	27.7
19	25.0	10.8	2.0	0.1	"	"	* 241	* 276	126	22.5	41.2	24.5
20	23.2	8.4	1.9	0.0	"	"	250	268	113	* 23.5	40.0	19.8
21	24.1	5.0	1.9	* Nil	"	"	260	274	108	23.5	43.8	17.0
22	25.0	6.1	1.9	"	"	"	269	268	111	27.7	43.8	22.5
23	24.1	9.0	1.9	"	"	"	278	253	113	27.7	38.8	26.6
24	23.2	9.0	2.0	"	* "	"	* 311	253	108	26.6	* 34.2	* 21.5
25	20.5	9.0	2.0	"	"	"	301	249	102	27.7	33.1	23.5
26	18.9	9.0	1.9	"	"	"	294	241	* 93.6	38.8	35.3	34.2
27	18.2	6.4	1.9	"	"	* 294	234	88.8	49.0	38.8	40.0	40.0
28	17.3	7.8	1.9	"	"	"	303	230	79.4	47.6	40.0	36.5
29	17.3	6.1	1.9	"	Nil	"	305	228	79.4	45.0	43.8	34.2
30	18.2	5.6	1.8	"	-----	"	313	216	70.3	41.2	52.8	32.0
31	18.9	-----	1.8	Nil	-----	Nil	-----	201	-----	42.5	51.5	-----
TOTAL	846.4	345.8	103.7	25.3	Nil	Nil	6,948.0	8,766.0	3,611.5	1,100.7	1,378.4	1,025.9
MEAN	27.3	11.5	3.35	0.82	Nil	Nil	232	283	120	35.5	44.5	34.2
MAX	39.4	20.5	7.2	1.9	Nil	Nil	313	323	192	62.8	57.0	70.3
MIN	17.3	5.0	1.8	Nil	Nil	Nil	77.0	201	70.3	20.6	33.1	17.0
AC-FT	1,680	686	206	50	Nil	Nil	13,780	17,390	7,160	2,180	2,730	2,040

CALENDAR YEAR 1963: MAX 255 MIN 0 MEAN 69.6 AC-FT 50,380

WATER YEAR 1963-64: MAX 323 MIN Nil MEAN 66.0 AC-FT 47,900

\* Discharge measurement or observation of no flow made on this day.

Note.--Stage-discharge relation affected by ice Nov. 13 to Apr. 23. Backwater from beaver dams July 22 to Sept. 30. The expression "nil" and "0.0" represent "no flow" and "less than 0.05 cfs", respectively.

## 5-0993. Pembina River near Windygates, Manitoba--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	34.2	12.1	3.0	0.0	0.0	0.0	0.0	586	538	238	70.0	* 62.7
2	32.0	12.9	3.0	0.0	0.0	0.0	0.0	585	535	225	71.2	63.8
3	27.7	12.9	3.0	0.0	0.0	0.0	0.0	583	542	211	70.0	64.8
4	27.7	11.3	2.6	0.0	0.0	0.0	0.0	* 592	545	203	66.9	71.2
5	26.6	* 9.3	2.6	0.0	0.0	0.0	0.0	* 748	529	195	64.8	73.5
6	26.6	9.3	2.6	* 0.0	0.0	0.0	0.0	870	511	185	62.7	73.5
7	25.5	10.0	2.6	0.0	0.0	0.0	0.0	916	505	* 176	60.7	74.6
8	25.5	9.3	2.4	0.0	0.0	0.0	0.0	815	490	166	58.8	75.8
9	26.6	9.3	2.2	0.0	0.0	0.0	* 0.0	752	469	157	56.9	76.9
10	27.7	9.3	* 2.0	0.0	0.0	0.0	57.0	741	452	147	55.9	78.1
11	25.5	10.6	1.8	0.0	0.0	0.0	230	730	440	136	55.0	78.1
12	20.6	9.3	1.6	0.0	0.0	0.0	661	707	422	131	54.2	78.1
13	18.8	10.0	1.4	0.0	0.0	0.0	765	684	402	123	* 53.2	78.1
14	17.0	9.3	1.2	0.0	0.0	0.0	* 1,380	661	385	115	51.5	81.5
15	18.8	10.6	1.0	0.0	0.0	0.0	1,270	644	368	* 109	50.7	82.7
16	22.5	10.0	0.8	0.0	0.0	0.0	1,090	631	* 347	109	49.9	84.0
17	23.5	12.1	0.6	0.0	0.0	0.0	858	631	338	103	48.2	87.6
18	23.5	7.4	0.4	0.0	0.0	0.0	641	618	330	97.8	49.9	86.5
19	21.5	6.3	0.2	0.0	0.0	0.0	579	602	322	92.6	50.7	86.5
20	20.6	5.8	0.0	0.0	0.0	0.0	* 563	595	310	91.4	50.7	84.0
21	19.8	5.8	0.0	0.0	0.0	0.0	579	615	300	88.8	50.7	* 85.2
22	20.6	5.3	0.0	0.0	0.0	0.0	583	602	295	86.5	50.7	88.6
23	20.6	5.3	0.0	0.0	0.0	0.0	570	589	293	85.2	49.9	91.8
24	24.5	4.8	0.0	0.0	0.0	0.0	563	586	283	82.7	50.7	90.2
25	22.5	4.3	0.0	0.0	0.0	0.0	567	576	274	80.3	52.4	90.2
26	20.6	4.3	0.0	0.0	0.0	0.0	563	567	266	78.1	52.4	87.0
27	19.8	3.8	0.0	0.0	0.0	0.0	567	557	262	76.9	53.2	87.0
28	19.8	3.4	0.0	0.0	0.0	0.0	576	563	247	73.5	53.2	83.8
29	19.8	3.4	0.0	0.0	-----	0.0	573	573	238	72.4	59.8	83.8
30	18.8	3.4	0.0	0.0	-----	0.0	576	560	234	72.4	60.7	83.8
31	16.1	-----	0.0	0.0	-----	0.0	-----	* 548	-----	71.2	61.8	-----
TOTAL	715.3	240.9	35.0	0.0	0.0	0.0	13,811.0	20,028	11,472	3,878.8	1,747.4	2,413.4
MEAN	23.1	8.03	1.13	0.0	0.0	0.0	460	646	382	125	56.4	80.4
MAX	34.2	12.9	3.0	0.0	0.0	0.0	1,380	916	545	238	71.2	91.8
MIN	16.1	3.4	0.0	0.0	0.0	0.0	0.0	548	234	71.2	48.2	62.7
AC-FT	1,420	478	69	0.0	0.0	0.0	27,390	39,720	22,750	7,690	3,470	4,790

CALENDAR YEAR 1964: MAX 323 MIN Nil MEAN 65.2 AC-FT 47,300  
 WATER YEAR 1964-65: MAX 1,380 MIN 0.0 MEAN 149 AC-FT 107,800

\* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice or beaver dams Oct. 1 to Apr. 21, Aug. 19 to Sept. 30 (no gage-height record Dec. 7-9, Dec. 11 to Apr. 11). Discharge computed from manual gage readings Apr. 12-28. The expression "nil" and "0.0" represent "no flow" and "less than 0.05 cfs", respectively.

5-0994. Little Pembina River near Walhalla, N. Dak.

Location.--Lat 48°52', long 98°01', in SW<sup>1</sup> sec.10, T.162 N., R.57 W., on right bank 25 ft upstream from county bridge, 3½ miles upstream from mouth, and 6 miles southwest of Walhalla.

Drainage area.--182 sq mi, of which 10 sq mi is noncontributing.

Records available.--April 1956 to September 1965.

Gage.--Water-stage recorder. Datum of gage is 1,099.48 ft above mean sea level, datum of 1929. Prior to Sept. 10, 1956, wire-weight gage at bridge 25 ft downstream at same datum.

Average discharge.--9 years, 13.6 cfs (9,850 acre-ft per year).

Extremes.--Maximums and minimums (discharge in cubic feet per second, gage height in feet).

Annual maximum discharge (\*) and peak discharges above base (75 cfs), water years 1961-65

Date	Time	Discharge	Gage height	Date	Time	Discharge	Gage height	Date	Time	Discharge	Gage height
Mar. 25, 1961	-	* 300	a 7.46	July 7, 1962	2040	632	8.16	Apr. 16, 1964	0300	282	7.68
May 31, 1961	1640	283	7.35					May 6, 1964	1800	114	6.77
				June 4, 1963	1050	337	7.62	June 19, 1964	0330	152	7.02
Apr. 17, 1962	1700	-	b14.38	June 11, 1963	0100	110	6.71				
Apr. 18, 1962	2120	* 3,100	b12.79	July 26, 1963	1210	* 1,510	10.11	Apr. 10, 1965	2130	* 2,770	b13.36
May 19, 1962	1045	115	6.64					May 6, 1965	1400	334	7.99
May 31, 1962	0010	105	6.57	Apr. 4, 1964	2140	-	b 8.20				
June 7, 1962	0620	92	6.46	Apr. 9, 1964	2300	* 337	7.90				

a From floodmarks, backwater from ice.

b Backwater from ice.

Annual minimum daily discharge, water years 1961-65

Water year	Date	Discharge	Water year	Date	Discharge
1961	Many days	0	1964	Many days	0.20
1962	Long period	0	1965	Feb. 3-17, 21-28, 1965	0.10
1963	do.	0			

1956-65: Maximum discharge, 4,160 cfs Apr. 11, 1960 (gage height, 13.28 ft); no flow at times in 1958, 1961-63.

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

Revisions.--WSP 1728: Drainage area.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	.20	.50	.30	.30	0	0	20	3.3	35	.10	.10	0
2	.20	.30	.30	.30	0	0	20	3.3	11	.10	.10	0
3	.20	.30	.30	.30	0	0	18	2.5	6.5	.10	.10	0
4	.20	.30	.30	.30	0	0	12	2.1	3.6	.10	0	0
5	.20	.30	.30	.30	0	0	16	2.1	2.9	.10	0	0
6	.20	.30	.30	.30	0	0	16	3.4	2.2	.10	0	0
7	.20	.30	.30	.30	0	0	14	3.6	2.1	0	0	0
8	.20	.20	.30	.20	0	0	14	2.7	2.9	0	0	0
9	.20	.20	.30	.20	0	0	16	2.2	2.2	0	0	0
10	.20	.30	.30	.20	0	0	16	2.1	1.5	0	0	0
11	.20	.30	.30	.20	0	0	16	2.5	1.4	.20	0	.10
12	.60	.30	.30	.20	0	0	14	2.2	1.2	.20	0	.10
13	.50	.20	.30	.20	0	0	12	2.1	1.4	.70	0	.10
14	.40	.20	.30	.20	0	0	8.0	1.9	1.2	.60	0	.10
15	.40	.20	.30	.20	0	.10	6.0	1.8	.90	.20	0	0
16	.40	.20	.30	.20	0	.20	6.5	1.6	.90	.10	0	0
17	.40	.20	.30	.20	0	.10	6.0	1.4	.90	.10	0	0
18	.40	.20	.30	.20	0	.20	5.9	1.4	.80	.10	0	0
19	.40	.20	.30	.20	0	.40	5.6	1.4	.70	.10	0	.10
20	.40	.20	.30	.10	0	1.0	9.1	1.3	.60	.10	0	.10
21	.40	.20	.30	.10	0	5.0	12	1.2	.70	.40	0	.20
22	.60	.40	.30	.10	0	40	9.4	1.2	.60	.80	0	.60
23	.50	.30	.30	.10	0	60	7.7	1.0	.60	.90	0	.20
24	.40	.30	.30	.10	0	100	5.9	1.0	.40	.20	0	.40
25	.50	.30	.30	.10	0	190	5.0	.90	.30	.10	0	.20
26	.40	.40	.30	0	0	150	5.3	.80	.30	.10	0	.10
27	.40	.40	.30	0	0	80	4.8	.80	.40	.10	0	.10
28	.40	.30	.30	0	0	50	4.3	.70	.40	.10	0	.10
29	.50	.30	.30	0	0	20	3.8	.70	.20	.10	0	.10
30	1.2	.30	.30	0	0	20	3.6	.60	.20	.10	0	.10
31	.60	.30	.30	0	0	20	3.6	.60	.20	.10	0	.10
TOTAL	12.00	8.40	9.30	5.10	0	737.00	312.9	107.80	84.00	5.60	0.30	2.70
MEAN	.39	.28	.30	.16	0	23.8	10.4	3.48	2.80	.18	.010	.090
MAX	1.2	.50	.30	.30	0	190	20	54	35	.80	.10	.60
MIN	.20	.20	.30	0	0	0	3.6	.60	.20	0	0	0
AC-FT	24	17	18	10	0	1,460	621	214	167	11	.6	5.4
CAL YR 1960: TOTAL	10,063.70			MEAN 27.5		MAX 2,150	MIN 0	AC-FT 19,960				
WAT YR 1961: TOTAL	1,285.10			MEAN 3.52		MAX 190	MIN 0	AC-FT 2,550				

## 5-0994. Little Pembina River near Walhalla, N. Dak.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	.10	.20	.30	.20	0	0	0	42	67	3.5	1.0	2.4
2	.10	.10	.30	.20	0	0	0	35	55	3.7	.90	3.0
3	.10	.10	.30	.20	0	0	0	29	44	3.7	1.3	2.3
4	.10	.20	.30	.20	0	0	0	25	37	6.1	7.6	1.5
5	.10	.20	.30	.20	0	0	0	23	32	3.9	29	1.3
6	.10	.20	.30	.20	0	0	0	20	28	5.5	18	1.1
7	.10	.20	.30	.20	0	0	0	21	64	119	12	.80
8	.10	.10	.30	.20	0	0	0	19	42	164	6.7	1.3
9	.10	.10	.30	.20	0	0	0	21	33	36	4.1	2.3
10	.20	.20	.20	.20	0	0	0	24	35	19	2.8	1.6
11	.70	.20	.20	.20	0	0	0	23	28	12	3.7	1.4
12	.20	.20	.20	.10	0	0	10	22	23	7.0	2.8	1.1
13	.20	.10	.20	.10	0	0	15	23	21	4.5	2.8	.80
14	.20	.10	.20	.10	0	0	15	61	19	3.5	2.4	.70
15	.20	.20	.20	.10	0	0	20	65	33	3.3	11	.70
16	.10	.20	.20	0	0	0	45	55	32	3.2	10	.80
17	.10	.10	.20	0	0	0	780	48	23	2.7	3.7	.70
18	.20	.10	.20	0	0	0	2,500	41	20	2.3	2.5	.60
19	.20	.20	.20	0	0	0	1,570	82	18	2.3	2.1	.60
20	.20	.10	.20	0	0	0	1,360	80	16	2.4	2.8	.60
21	.20	.10	.20	0	0	0	903	60	14	2.3	3.5	.60
22	.20	.20	.20	0	0	0	500	50	13	4.3	4.3	.60
23	.20	.20	.20	0	0	0	250	59	12	3.7	19	.70
24	.20	.20	.20	0	0	0	148	55	10	2.5	25	.70
25	.20	.30	.20	0	0	0	121	44	8.4	2.0	16	.70
26	.10	.20	.20	0	0	0	89	37	7.0	1.6	11	.70
27	.20	.20	.20	0	0	0	64	31	5.8	1.5	7.7	.70
28	.20	.20	.20	0	0	0	54	26	5.2	1.4	5.5	.80
29	.20	.30	.20	0	-----	0	47	29	4.5	1.4	3.9	.70
30	.20	.30	.20	0	-----	0	43	80	4.1	1.3	3.3	.80
31	.20	-----	.20	0	-----	0	-----	90	-----	1.2	2.7	-----
TOTAL	5.50	5.30	7.10	2.60	0	0	8,534	1,320	754.0	430.8	229.10	32.70
MEAN	.18	.18	.23	.084	0	0	284	42.6	25.1	13.9	7.39	1.09
MAX	.70	.30	.30	.20	0	0	2,500	90	67	164	2.8	3.0
MIN	.10	.10	.20	0	0	0	0	19	4.1	1.2	.90	.60
AC-FT	11	11	14	5.2	0	0	16,930	2,620	1,500	854	454	65

CAL YR 1961: TOTAL 1,273.30 MEAN 2.49 MAX 190 MIN 0 AC-FT 2,530  
WAT YR 1962: TOTAL 11,321.10 MEAN 31.0 MAX 2,500 MIN 0 AC-FT 22,460

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	.70	1.2	1.3	.20	0	0	10	3.0	5.8	2.3	34	.60
2	.70	1.2	1.2	.20	0	0	6.4	3.0	4.5	2.1	24	.50
3	.80	1.0	1.3	.20	0	0	6.1	2.8	17	1.9	19	.50
4	.80	1.1	1.0	.20	0	0	13	2.7	14.1	1.9	15	.50
5	.90	.90	.80	.20	0	0	14	2.5	70	1.8	12	.50
6	.90	1.2	.60	.20	0	0	22	3.0	36	1.5	10	.40
7	.80	1.3	.70	.20	0	0	24	3.0	21	2.1	8.0	.40
8	1.0	1.1	.60	.20	0	0	24	3.5	16	3.2	6.7	.40
9	.90	1.2	.50	.10	0	0	18	4.0	67	2.2	5.8	.30
10	.90	1.0	.40	.10	0	0	15	4.5	71	1.9	4.3	.30
11	1.0	1.0	.30	.10	0	0	12	5.0	84	10	3.9	.30
12	1.0	1.0	.20	.10	0	0	9.4	6.0	47	5.8	3.5	.40
13	1.0	1.0	.20	.10	0	0	8.0	6.5	33	3.7	2.8	.30
14	1.1	.90	.20	.10	0	0	7.0	6.5	24	2.7	2.4	.30
15	1.3	.80	.20	.10	0	0	6.4	6.2	19	2.4	2.1	.40
16	1.9	.80	.30	0	0	0	6.4	6.1	16	2.8	2.0	.30
17	1.5	.80	.30	0	0	0	5.7	5.2	13	2.4	1.8	.30
18	1.4	.70	.30	0	0	0	5.2	5.5	12	1.6	1.5	.30
19	1.3	.70	.30	0	0	.50	5.0	4.7	11	14	1.3	.30
20	1.0	1.0	.30	0	0	2.0	4.5	5.0	9.4	13	1.1	.30
21	1.3	.80	.30	0	0	3.0	4.1	5.0	7.4	8.4	.90	.30
22	1.1	.60	.30	0	0	8.0	3.9	4.5	6.4	5.8	.80	.30
23	1.9	.70	.30	0	0	15	3.5	4.3	6.1	3.2	.80	.30
24	1.4	.60	.30	0	0	30	3.5	4.3	5.8	2.0	.80	.30
25	1.3	.80	.20	0	0	45	3.2	3.9	5.0	18	.80	.30
26	1.3	1.0	.20	0	0	40	2.8	3.7	4.5	630	1.2	.30
27	1.3	1.0	.20	0	0	40	2.8	4.3	3.7	436	1.3	.30
28	1.3	1.5	.20	0	0	32	3.2	3.5	3.5	182	1.0	.30
29	1.3	1.6	.20	0	-----	25	3.5	2.8	3.0	107	.80	.30
30	1.1	1.3	.20	0	-----	24	3.2	2.7	2.7	58	.70	.30
31	1.1	-----	.20	0	-----	18	-----	5.0	-----	49	.70	-----
TOTAL	35.30	29.80	13.60	2.30	0	282.50	255.8	132.7	711.8	1,578.7	170.70	10.60
MEAN	1.14	.99	.44	.074	0	9.11	8.53	4.28	23.7	50.9	5.51	.35
MAX	1.9	1.6	1.3	.20	0	45	24	6.5	141	630	34	.60
MIN	.70	.60	.20	0	0	0	2.8	2.5	1.5	1.5	.70	.30
AC-FT	70	59	27	4.6	0	560	507	263	1,410	3,130	339	21

CAL YR 1962: TOTAL 11,381.90 MEAN 31.2 MAX 2,500 MIN 0 AC-FT 22,580  
WAT YR 1963: TOTAL 3,223.80 MEAN 8.83 MAX 630 MIN 0 AC-FT 6,390

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	.30	.40	.40	.20	.40	.20	1.0	14	2.5	6.0	1.2	6.8
2	.30	.40	.40	.20	.40	.20	1.5	14	2.2	5.5	1.0	2.9
3	.30	.40	.40	.20	.50	.20	15	14	2.1	4.8	.80	2.2
4	.30	.40	.40	.20	.80	.20	40	17	1.9	4.2	.70	2.8
5	.30	.40	.40	.20	.60	.20	35	16	1.7	4.2	.60	1.6
6	.30	.40	.40	.20	.50	.20	30	70	2.0	4.6	.70	1.4
7	.30	.40	.40	.20	.30	.20	26	42	1.8	4.2	.60	1.2
8	.30	.40	.40	.20	.30	.20	30	24	1.8	5.0	1.0	1.0
9	.30	.40	.40	.20	.70	.20	30	20	4.0	3.8	.50	.80
10	.30	.40	.40	.20	.30	.20	216	18	4.0	3.4	.50	.70
11	.30	.40	.40	.20	.30	.30	191	16	4.5	3.6	.50	.60
12	.30	.40	.40	.30	.30	.30	133	14	13	2.9	.60	.60
13	.30	.40	.40	.30	.30	.30	87	12	7.8	2.5	.50	.60
14	.30	.40	.40	.30	.30	.30	54	11	5.5	2.1	.40	.50
15	.30	.40	.40	.30	.30	.40	115	11	4.6	1.9	.50	.60
16	.30	.40	.30	.30	.30	.40	202	10	4.0	2.4	.40	.80
17	.30	.40	.30	.30	.40	.30	112	8.9	8.4	3.8	.40	1.0
18	.30	.40	.30	.30	.40	.30	64	8.4	20	2.2	.30	1.1
19	.30	.40	.30	.30	.40	.30	45	7.6	100	3.1	.30	1.2
20	.30	.40	.30	.30	.40	.30	36	6.8	45	2.5	.30	1.5
21	.50	.40	.30	.30	.50	.30	34	6.5	38	1.9	1.2	2.5
22	.50	.30	.30	.30	.40	.30	28	6.3	27	2.8	1.6	3.5
23	.50	.30	.30	.30	.50	.30	25	5.8	21	2.2	.90	4.5
24	.40	.20	.30	.30	.60	.30	23	5.0	17	1.5	.70	5.0
25	.40	.30	.30	.30	.60	.30	23	4.6	14	1.3	.50	7.5
26	.40	.50	.30	.30	.50	.30	20	4.2	11	1.1	.50	10
27	.40	.50	.30	.30	.40	.30	18	3.4	9.2	1.1	.50	5.0
28	.40	.50	.30	.30	.30	.30	17	3.1	7.8	1.5	.50	3.0
29	.40	.40	.30	.30	.30	.30	16	2.9	8.6	.90	.50	2.0
30	.40	.40	.20	.40	-----	.30	15	2.6	7.1	1.1	4.8	2.8
31	-----	.20	.30	-----	.30	-----	-----	2.6	-----	1.1	1.9	-----
TOTAL	10.70	11.90	10.60	8.30	11.90	9.00	1,727.5	401.7	399.5	88.7	25.10	76.50
MEAN	.35	.40	.34	.29	.41	.32	57.6	13.0	11.3	2.86	.81	2.5
MAX	.50	.50	.40	.40	.80	.50	216	70	100	6.0	4.8	10
MIN	.30	.20	.20	.20	.30	.20	1.0	2.6	1.7	1.0	.30	.50
AC-FT	21	24	21	16	24	18	3,430	797	792	176	50	152
CAL YR 1963:	TOTAL 3,178.30			MEAN 8.71		MAX 630		MIN 0		AC-FT 6,300		
MAX YR 1964:	TOTAL 2,781.40			MEAN 7.60		MAX 216		MIN .20		AC-FT 5,520		

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	2.8	1.2	.50	.40	.20	.20	.50	19	17	2.9	3.6	.90
2	2.8	1.2	.50	.40	.20	.20	.40	19	19	2.9	3.4	.70
3	2.8	1.2	.50	.30	.10	.30	.60	18	20	2.9	4.0	.70
4	2.8	1.1	.40	.30	.10	.30	.80	17	22	2.8	2.8	1.9
5	2.8	1.1	.40	.30	.10	.40	1.0	35	20	2.8	2.1	1.4
6	2.9	1.1	.40	.30	.10	.40	2.0	266	20	2.6	1.7	1.2
7	2.9	1.2	.50	.30	.10	.40	7.5	128	18	2.6	1.6	.90
8	2.9	1.3	.50	.30	.10	.40	8.0	72	18	2.5	1.3	.80
9	2.8	1.3	.60	.30	.10	.40	80	48	15	2.5	1.2	.80
10	2.6	1.3	.60	.30	.10	.40	850	39	14	2.2	1.0	.70
11	2.6	1.3	.60	.30	.10	.40	1,590	33	13	1.9	.80	.80
12	2.6	1.3	.60	.30	.10	.40	840	23	11	1.3	1.0	.80
13	2.6	1.3	.60	.30	.10	.40	708	23	10	1.7	.80	.80
14	2.8	1.3	.50	.30	.10	.40	353	21	9.8	2.0	.80	1.5
15	2.5	1.3	.40	.30	.10	.40	175	19	9.2	2.0	.80	1.9
16	2.6	1.0	.40	.30	.10	.40	102	18	7.8	2.3	.70	2.0
17	2.5	.90	.40	.30	.10	.30	86	18	6.8	2.1	.70	3.2
18	2.3	.80	.40	.30	.20	.30	82	17	6.3	1.6	.70	2.0
19	2.2	.80	.40	.30	.20	.30	65	16	5.8	3.3	.60	1.3
20	2.2	.70	.30	.40	.20	.30	55	16	5.3	6.0	.60	1.2
21	2.2	.70	.40	.40	.10	.30	45	20	4.4	5.0	.50	1.1
22	2.2	.60	.40	.30	.10	.30	38	16	5.3	3.2	.50	1.3
23	2.2	.80	.40	.30	.10	.30	33	15	5.5	2.5	.50	2.6
24	2.2	.80	.40	.30	.10	.30	28	16	4.2	1.9	.50	2.0
25	1.9	.80	.40	.30	.10	.30	27	16	4.2	1.9	.60	1.7
26	1.8	.70	.40	.30	.10	.30	25	18	4.6	1.9	.70	1.4
27	1.7	.60	.40	.30	.10	.30	23	19	5.3	1.9	.80	1.3
28	1.6	.60	.40	.20	.10	.30	22	18	4.2	1.9	.70	1.3
29	1.5	.60	.40	.20	.10	.30	21	18	4.2	1.6	.60	1.2
30	1.4	.60	.40	.20	.10	.40	19	16	3.4	4.4	1.3	4.4
31	1.4	-----	.40	.20	-----	.40	-----	17	-----	3.2	1.0	-----
TOTAL	73.1	29.50	13.90	9.30	3.30	10.60	5,287.80	1,057	312.3	81.9	38.90	44.60
MIN	2.9	1.3	.60	.40	.20	.40	1,590	266	22	6.0	4.0	4.4
MAX	1.4	.60	.30	.20	.10	.20	.40	15	3.4	1.6	.50	.70
AC-FT	145	59	28	18	6.6	21	10,490	2,100	619	162	77	88
CAL YR 1964:	TOTAL 2,864.70			MEAN 7.83		216		MIN .20		AC-FT 5,680		1.28
MAX YR 1965:	TOTAL 6,962.20			MEAN 19.1		MAX 1,590		MIN .10		AC-FT 13,810		

5-0996. Pembina River at Walhalla, N. Dak.  
(Formerly published as 5-0995. Pembina River near Walhalla)

Location.--Lat 48°55', long 97°55', in NE<sup>1</sup>/<sub>4</sub> sec.29, T.163 N., R.56 W., on left bank at downstream side of bridge on State Highway 32 at south edge of Walhalla, 7 miles downstream from Little Pembina River.

Drainage area.--3,350 sq mi, approximately. Area at site used prior to Oct. 1, 1963, 3,330 sq mi, approximately.

Records available.--October 1939 to September 1965.

Gage.--Water-stage recorder. Altitude of gage is 934 ft (from topographic map). Prior to Oct. 24, 1941, staff gage, Oct. 24, 1941, to Nov. 10, 1943, chain gage, and Nov. 10, 1943, to Sept. 30, 1963, water-stage recorder at site  $5\frac{1}{2}$  miles upstream at different datum.

Average discharge.--26 years, 191 cfs (138,300 acre-ft per year); median of yearly mean discharge, 150 cfs (109,000 acre-ft per year).

Extremes.--Maximums and minimums (discharge in cubic feet per second, gage height in feet).

Annual maximum discharge (*) and peak discharges above base (400 cfs), water years 1961-65											
Date	Time	Discharge	Gage height	Date	Time	Discharge	Gage height	Date	Time	Discharge	Gage height
Mar. 31, 1961	1700	-	a 4.45	May 30, 1962	1800	821	4.69	Apr. 16, 1964	1500	652	4.92
Apr. 9, 1961	2300	* 334	3.46	June 7, 1962	0750	600	4.16	May 6, 1964	2000	524	4.44
				July 8, 1962	0200	588	4.09	June 19, 1964	0130	* 796	5.43
Apr. 19, 1962	0140	* 5,110	11.74	June 4, 1963	1200	1,130	5.38	Apr. 11, 1965	-	* 4,960	b 12.68
May 14, 1962	0750	563	4.09	June 10, 1963	0800	469	3.80	May 6, 1965	1800	1,510	7.09
May 19, 1962	1350	762	4.56	July 26, 1963	1400	* 2,340	7.72				
May 23, 1962	1800	424	3.73								

a Backwater from ice.  
b From floodmark.

Annual minimum daily discharge, water years 1961-65					
Water year	Date	Discharge	Water year	Date	Discharge
1961	Many days	0	1964	Feb. 22-26, 1964	2.5
1962	Long period	0	1965	Mar. 23-26, 1965	1.8
1963	do.	0			

1939-65: Maximum discharge, 20,400 cfs Apr. 18, 1950 (gage height, 19.2 ft, former site and datum), from rating curve extended above 7,000 cfs on basis of contracted-opening measurement of peak flow; no flow at times in some years.

Remarks.--Records good except those for winter periods, which are fair. Records of chemical analyses, suspended-sediment loads, and water temperatures for the water years 1963-65 are published in reports of the Geological Survey.

Revisions (water years).--WSP 1728: Drainage area (at former site). WSP 1388: 1943, 1950(p). WSP 1558: 1957.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961												
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	23	16	3.5	2.4	.40	0	260	212	119	7.3	.20	.10
2	23	15	3.5	2.4	.20	0	280	206	94	6.6	.10	.10
3	23	14	3.0	2.4	.10	0	280	206	73	5.6	.10	.10
4	21	13	3.0	2.4	.10	0	260	194	64	4.8	.10	.10
5	21	13	2.8	2.4	0	0	240	188	61	4.1	.10	.10
6	20	12	2.6	2.4	0	0	235	191	58	3.2	.10	.10
7	19	10	2.5	2.4	0	0	238	188	54	2.7	.10	.10
8	19	9.5	2.5	2.4	0	0	262	176	52	2.3	.10	.20
9	19	9.0	2.5	2.4	0	0	303	173	50	2.0	.10	.10
10	18	8.0	2.5	2.4	.10	0	288	182	45	1.5	.10	.20
11	18	7.5	2.5	2.4	.10	0	266	185	42	1.1	.10	.20
12	19	7.0	2.4	2.4	.20	0	252	176	39	.90	.10	.10
13	19	6.5	2.4	2.4	.20	0	232	163	36	1.4	.10	.10
14	18	7.0	2.5	2.4	.20	0	238	155	33	2.1	.10	.10
15	17	7.0	2.6	2.4	.20	0	245	153	30	2.3	.10	.10
16	16	7.0	2.6	2.4	.10	0	242	148	28	1.5	.10	.10
17	16	6.5	2.5	2.5	.10	5.0	238	141	26	1.1	.10	.10
18	16	6.0	2.5	2.5	.10	15	225	134	25	.90	.10	.10
19	16	6.0	2.5	2.4	.10	20	245	125	22	.70	.10	.10
20	14	6.0	2.4	2.4	0	20	288	116	21	.80	.10	.20
21	14	6.0	2.4	2.2	0	30	288	108	19	1.0	.10	.10
22	17	5.5	2.3	2.0	0	70	256	104	19	2.7	.10	.20
23	17	5.5	2.3	2.0	0	120	248	102	18	3.2	.10	.20
24	16	5.0	2.3	1.8	0	100	209	76	13	.30	.10	.20
25	16	5.0	2.3	1.6	0	160	238	92	13	.90	.10	.20
26	16	5.0	2.4	1.4	0	200	225	84	12	.60	.10	.20
27	15	4.5	2.4	1.2	0	200	222	80	11	.40	.10	.20
28	15	4.5	2.4	1.0	0	100	209	76	13	.30	.10	.20
29	15	4.0	2.4	1.0	-----	60	219	73	8.9	.20	.10	.20
30	21	4.0	2.4	.80	-----	150	222	67	7.7	.20	.10	.20
31	18	-----	2.4	.60	-----	260	-----	116	-----	.20	.10	-----
TOTAL	555	235.0	79.3	63.80	2.20	1,540.0	7,492	4,414	1,108.6	64.20	3.20	4.30
MEAN	17.9	7.83	2.56	2.06	.079	49.7	250	142	37.0	2.07	.10	.14
MAX	23	16	3.5	2.5	.40	260	303	212	119	7.3	.20	.20
MIN	14	4.0	2.3	.60	0	0	209	67	7.7	.20	.10	.10
AC-FT	1,100	466	157	127	4.4	3,050	14,860	8,760	2,200	127	6.4	8.5
CAL YR 1960: TOTAL	121,681.3			332		4,360	MIN 2.3		AC-FT 241,400			
WAT YR 1961: TOTAL	15,561.60			42.6		303	MIN 0		AC-FT 30,870			

5-0996. Pembina River at Walhalla, N. Dak.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	.20	.20	.20	0	0	0	6.0	322	420	82	54	110
2	.20	.20	.20	0	0	0	5.0	300	361	80	54	110
3	.20	.20	.20	0	0	0	5.0	284	322	80	55	114
4	.20	.20	.20	0	0	0	4.0	270	296	84	66	110
5	.20	.20	.20	0	0	0	4.5	266	273	80	90	108
6	.20	.20	.20	0	0	0	10	245	256	82	86	106
7	.20	.20	.20	0	0	0	20	232	432	116	75	102
8	.20	.20	.20	0	0	0	24	235	307	284	67	104
9	.20	.20	.20	0	0	0	24	238	270	129	64	104
10	.20	.20	.20	0	0	0	15	235	259	102	61	102
11	.40	.20	.20	0	0	0	50	219	242	88	76	98
12	.20	.20	.20	0	0	0	70	212	219	78	73	96
13	.20	.20	.20	0	0	0	85	206	203	71	69	94
14	.20	.20	.20	0	0	0	125	453	194	66	73	92
15	.20	.20	.20	0	0	0	65	292	203	64	80	88
16	.20	.20	.10	0	0	0	100	330	203	64	82	88
17	.20	.20	.10	0	0	0	1,000	307	191	62	75	88
18	.20	.20	.10	0	0	0	3,340	392	179	61	73	86
19	.20	.20	.10	0	0	0	3,730	535	173	60	76	84
20	.20	.20	.10	0	0	0	3,220	461	168	61	76	82
21	.20	.20	.10	0	0	0	2,580	376	160	60	78	82
22	.20	.20	.10	0	0	0	1,880	334	150	62	86	80
23	.20	.20	.10	0	0	0	1,380	380	141	62	96	80
24	.20	.20	.10	0	0	0	1,140	349	132	58	106	78
25	.20	.20	.10	0	0	0	910	300	125	58	94	76
26	.20	.20	.10	0	0	.50	708	281	116	56	86	73
27	.20	.20	.10	0	0	2.0	555	270	108	55	84	69
28	.20	.20	.10	0	0	10	461	248	104	54	88	57
29	.20	.20	.10	0	-----	8.0	396	252	96	54	96	66
30	.20	.20	.10	0	-----	8.0	353	543	90	54	100	64
31	.20	-----	.10	0	-----	6.0	-----	580	-----	54	106	-----
TOTAL	6.40	6.00	4.60	0	0	34.50	22,265.5	9,947	6,393	2,421	2,445	2,701
MEAN	.21	.20	.15	0	0	1.11	742	321	213	78.1	78.9	90.0
MAX	.40	.20	.20	0	0	10	3,730	580	432	284	106	114
MIN	.20	.20	.10	0	0	0	4.0	206	90	54	54	64
AC-FT	13	12	9.1	0	0	68	44,160	19,730	12,680	4,800	4,850	5,360
CAL YR 1961: TOTAL 14,709.30 MEAN 40.3 MAX 303 MIN 0 AC-FT 29,180												
WAT YR 1962: TOTAL 46,224.00 MEAN 127 MAX 3,730 MIN 0 AC-FT 91,680												

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	62	36	22	20	0	0	100	171	171	134	148	84
2	61	35	20	35	0	0	70	182	163	127	127	84
3	60	31	20	25	0	0	90	182	216	121	119	78
4	56	32	18	20	0	0	100	176	779	119	110	76
5	55	30	15	20	0	0	130	191	428	116	106	75
6	55	35	14	20	0	0	140	197	338	112	104	69
7	54	35	14	18	0	0	180	197	311	112	102	66
8	54	35	16	16	0	0	180	191	270	132	102	64
9	52	34	16	15	0	0	170	188	238	127	102	60
10	50	34	15	12	0	0	170	188	376	121	102	58
11	49	35	15	11	0	0	150	188	319	112	102	60
12	48	34	15	10	0	0	141	188	273	100	102	56
13	47	30	15	9.0	0	0	125	200	273	92	102	55
14	47	26	16	8.0	0	0	119	203	242	88	102	51
15	47	25	16	7.0	0	0	116	194	225	90	100	52
16	47	24	18	6.0	0	0	121	197	209	108	100	50
17	45	20	20	5.0	0	0	125	200	200	102	100	50
18	44	20	20	4.0	0	0	121	194	200	90	100	49
19	43	20	18	3.0	0	5.0	119	188	197	92	98	48
20	42	22	18	2.0	0	40	129	188	185	96	98	48
21	43	20	20	1.0	0	80	132	185	176	88	96	47
22	44	18	22	.50	0	120	129	179	168	82	94	45
23	43	16	18	.30	0	160	132	171	163	76	92	43
24	43	16	15	.20	0	200	136	171	176	75	90	43
25	40	18	14	.10	0	250	138	160	166	80	90	42
26	43	18	12	0	0	270	141	155	166	1,020	90	41
27	41	20	12	0	0	280	145	155	163	518	90	40
28	40	22	12	0	0	210	155	150	153	281	88	39
29	38	22	12	0	-----	160	168	145	150	188	88	38
30	37	22	10	0	-----	120	168	145	145	155	86	35
31	36	-----	25	0	-----	110	-----	182	-----	219	86	-----
TOTAL	1,466	785	513	268.10	0	2,005.0	4,040	5,601	7,239	4,973	3,116	1,646
MEAN	47.3	26.2	16.5	8.65	0	64.7	135	181	241	160	101	54.9
MAX	62	36	25	35	0	280	180	203	779	1,020	148	84
MIN	36	16	10	0	0	0	70	145	145	75	86	35
AC-FT	2,910	1,560	1,020	532	0	3,980	8,010	11,110	14,360	9,860	6,180	3,260
CAL YR 1962: TOTAL 48,971.00 MEAN 134 MAX 3,730 MIN 0 AC-FT 97,130												
WAT YR 1963: TOTAL 31,652.10 MEAN 86.7 MAX 1,020 MIN 0 AC-FT 62,780												

## RED RIVER OF THE NORTH BASIN

5-0996. Pembina River at Walhalla, N. Dak.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	37		12	5.5	2.8	3.2	4.0	368	219	85	42	119
2	34	23	12	5.5	2.8	3.2	5.0	370	208	78	43	96
3	34	25	12	5.5	2.6	4.2	10	378	198	72	42	70
4	33	25	12	5.4	2.6	3.2	90	392	185	69	43	55
5	31	24	11	5.4	2.6	3.2	110	380	175	65	42	48
6	31	24	11	5.4	2.6	3.0	115	457	168	63	47	46
7	31	24	11	5.3	2.6	3.0	100	318	154	62	45	43
8	30	24	10	5.3	2.6	3.0	65	388	146	65	43	43
9	30	24	10	5.2	2.6	3.0	260	385	150	59	44	46
10	30	23	9.0	5.2	2.6	3.0	400	383	130	58	45	45
11	30	22	9.0	5.0	2.6	3.0	519	383	124	55	46	44
12	30	20	8.5	4.8	2.6	3.0	561	366	162	54	47	43
13	30	19	8.0	4.6	2.6	3.2	537	359	130	52	48	42
14	30	20	7.5	4.4	2.6	3.2	506	356	112	51	48	41
15	30	19	7.5	4.2	2.6	3.2	532	354	105	48	49	41
16	30	19	7.0	4.0	2.6	3.2	615	337	105	43	51	43
17	30	18	6.5	3.8	2.6	3.0	509	318	116	52	51	42
18	29	18	6.5	3.6	2.6	3.0	373	315	171	45	48	38
19	29	18	6.0	3.6	2.6	3.0	347	302	558	42	46	38
20	29	17	6.0	3.6	2.6	3.0	349	288	277	43	45	37
21	29	16	6.0	3.6	2.6	3.0	378	286	206	42	49	35
22	30	15	5.8	3.4	2.5	3.0	371	288	43	43	49	34
23	29	14	5.6	3.4	2.5	3.0	356	279	160	44	47	40
24	27	14	5.6	3.4	2.5	3.0	349	272	144	43	44	37
25	26	13	5.6	3.4	2.5	3.0	356	270	128	40	44	36
26	25	13	5.5	3.4	2.5	3.0	349	266	116	38	43	70
27	25	13	5.5	3.2	2.6	3.0	347	257	107	41	42	86
28	24	13	5.5	3.0	2.9	3.0	349	255	100	49	42	60
29	24	12	5.5	3.0	3.2	3.2	354	255	96	43	45	53
30	24	12	5.5	3.0	-----	3.2	356	250	91	43	59	48
31	23	-----	5.5	2.8	-----	3.2	-----	236	-----	42	53	-----
TOTAL	904	563	246.1	130.9	76.2	95.6	9,572.0	10,229	4,916	1,628	1,432	1,519
MEAN	29.2	18.8	7.87	4.22	2.63	3.08	319	330	164	52.5	46.2	50.6
MAX	37	25	12	5.5	3.2	3.2	615	457	558	85	59	119
MIN	23	12	5.5	2.8	2.5	3.0	4.0	236	91	38	42	34
AC-FT	1,790	1,120	484	260	151	190	18,990	20,290	9,750	3,230	2,840	3,010
CAL YR 1963:	TOTAL 30,599.20			MEAN 83.8	MAX 1,020	MIN 0	AC-FT 60,690					
WAT YR 1964:	TOTAL 31,309.8			MEAN 85.5	MAX 615	MIN 2.5	AC-FT 62,100					

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	48	24	16	7.0	2.5	2.1	2.2	591	559	292	95	74
2	46	23	16	7.0	2.5	2.0	2.0	604	559	279	95	75
3	44	23	16	6.5	2.5	2.0	3.0	600	572	257	95	75
4	42	21	15	6.5	2.5	2.0	3.5	604	588	244	91	86
5	41	21	14	6.5	2.5	2.0	5.0	712	562	238	85	88
6	38	21	12	6.5	2.5	2.2	12	1,410	546	225	82	75
7	37	20	10	6.5	2.5	2.2	25	1,230	533	208	78	86
8	36	20	10	6.0	2.5	2.3	50	1,060	517	196	75	86
9	34	20	10	5.5	2.4	2.3	80	953	501	185	74	95
10	33	18	11	5.0	2.4	2.2	1,350	898	483	175	70	93
11	32	18	11	4.0	2.4	2.2	4,050	865	472	165	69	91
12	30	18	11	3.8	2.3	2.2	2,930	833	459	158	68	91
13	29	18	12	3.5	2.3	2.2	2,420	797	446	146	68	96
14	27	18	13	3.5	2.3	2.2	2,200	764	439	138	65	96
15	26	18	13	3.0	2.3	2.2	1,820	738	428	132	63	98
16	24	17	13	2.6	2.3	2.0	1,500	718	415	132	63	100
17	24	17	13	2.6	2.3	2.0	1,120	705	398	128	63	105
18	24	17	12	2.6	2.5	2.0	883	695	392	120	63	103
19	24	17	11	2.5	2.7	2.0	755	655	383	116	65	100
20	24	16	11	2.2	3.0	2.0	632	639	373	122	65	98
21	24	17	10	2.2	3.0	2.0	575	658	359	114	66	98
22	24	17	10	2.2	3.0	2.0	565	655	354	109	68	100
23	24	17	10	2.2	2.6	1.8	556	636	351	107	66	103
24	24	17	10	2.4	2.6	1.8	549	629	339	101	68	100
25	24	17	9.0	2.6	2.5	1.8	546	626	330	105	69	100
26	24	17	9.0	2.6	2.4	1.8	562	610	320	105	69	96
27	24	17	9.0	2.6	2.4	1.8	552	607	325	100	69	96
28	24	16	8.0	2.6	2.3	1.8	562	597	302	96	66	96
29	24	16	8.0	2.5	-----	2.0	584	610	290	95	72	98
30	24	16	7.0	2.5	-----	2.0	581	597	279	101	74	103
31	24	-----	7.0	2.5	-----	2.0	-----	581	-----	96	75	-----
TOTAL	927	552	347.0	120.2	70.0	63.1	25,475.5	22,877	12,874	4,785	2,254	2,814
MEAN	29.9	18.4	11.2	3.88	2.50	2.04	849	738	429	154	72.7	93.7
MAX	48	24	16	7.0	3.0	2.3	4,050	1,410	588	292	95	105
MIN	24	16	7.0	2.2	2.3	1.8	2.2	581	279	95	63	74
AC-FT	1,840	1,090	688	238	139	125	50,530	45,380	25,540	9,490	4,470	5,580
CAL YR 1964:	TOTAL 31,424.7			MEAN 85.9	MAX 615	MIN 2.5						
WAT YR 1965:	TOTAL 73,156.8			MEAN 200	MAX 4,050	MIN 1.8						

5-1000. Pembina River at Neche, N. Dak.

(International gaging station)

Location.--Lat 48°59'20", long 97°33'05", in SE $\frac{1}{4}$ NW $\frac{1}{4}$  sec.31, T.164 N., R.53 W., on right bank 4 blocks east of State Highway 18 at north edge of Neche.

Drainage area.--3,410 sq mi, approximately.

Records available.--May 1903 to September 1908, June 1909 to September 1915, April 1919 to September 1965. Monthly discharge only for some periods, published in WSP 1308.

Gage.--Water-stage recorder and concrete control. Datum of gage is 809.69 ft above mean sea level, datum of 1929. Prior to May 24, 1932, staff gage at Great Northern Railway bridge 1 mile upstream, at present datum. May 25, 1932, to Apr. 17, 1939, chain gage on bridge on State Highway 18, 500 ft downstream from railway bridge, at present datum.

Average discharge.--57 years, 160 cfs; median of yearly mean discharges, 120 cfs (86,900 acre-ft per year).

Extremes.--Maximums and minimums (discharge in cubic feet per second, gage height in feet).

Annual maximum discharge (\*) and peak discharges above base (400 cfs), water years 1961-65

Date	Time	Discharge	Gage height	Date	Time	Discharge	Gage height	Date	Time	Discharge	Gage height
Apr. 3, 1961	2100	* 372	9.49	Mar. 29, 1963	-	470	-	Apr. 17, 1964	1630	* 1,080	10.07
Apr. 21, 1962	1430	* 3,650	a20.97	June 5, 1963	1940	754	10.03	May 8, 1964	0900	490	9.10
May 21, 1962	0300	820	9.13	June 12, 1963	0800	411	9.54	June 20, 1964	2350	617	9.32
June 1, 1962	0700	690	9.26	July 28, 1963	0020	* 1,150	10.55	Apr. 13, 1965	2100	-	a19.33
June 8, 1962	2300	516	8.93	Apr. 17, 1964	0900	-	a10.43	Apr. 13, 1965	2400	* 3,600	19.21
								May 7, 1965	0200	1,300	10.25

a Backwater from ice.

Annual minimum discharge, water years 1961-65

Water year	Date	Discharge	Water year	Date	Discharge
1961	Many days	0	1964	Mar. 10-12, 1964	2.2
1962	do.	0	1965	Mar. 29 to Apr. 1, 1965	1.9
1963	Mar. 9-18, 1963	.10			

1903-15, 1919-65: Maximum discharge, 10,700 cfs Apr. 20, 1950 (gage height, 21.58 ft, backwater from ice), from rating curve extended above 5,300 cfs; no flow at times in each year 1932-41, 1953, 1960-62.

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

Cooperation.--This station is maintained by the United States under agreement with Canada.

Revisions (water years).--WSP 1728: Drainage area. WSP 1308: 1904-8, 1910-15, 1920-24. WSP 1388: 1904(M), 1914, 1915(M), 1931(M), 1933, 1938(M).

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	a 30	35	8.8	5.0	2.0	* 3.0	182	* 249	119	27	5.5	0
2	a 30	33	7.9	5.0	1.8	3.0	280	249	88	27	5.5	0
3	a 32	33	7.1	* 5.2	1.8	3.0	350	242	113	24	4.7	0
4	* 32	31	7.1	* 5.2	1.5	3.0	350	235	96	20	4.0	0
5	a 24	29	8.8	5.2	1.5	3.0	316	227	84	20	3.3	* 0
6	a 0	29	7.1	5.2	* 1.5	2.4	a 250	227	76	20	3.3	0
7	a 0	27	6.3	5.2	1.5	2.4	242	227	73	16	3.3	0
8	a 3	24	* 5.5	5.2	1.8	2.4	246	224	* 68	13	* 2.2	0
9	a 30	14	5.5	5.2	1.8	2.4	249	221	68	11	4.0	0
10	a 31	15	4.7	5.2	1.8	2.2	307	210	68	* 12	5.5	.2
11	a 31	15	4.7	5.0	2.0	2.2	283	206	65	12	4.7	3.3
12	a 31	15	4.0	5.0	2.2	2.2	283	210	59	15	2.7	6.3
13	a 31	15	3.3	5.0	2.2	2.6	291	210	52	15	2.7	11
14	a 31	17	3.3	5.0	2.2	2.6	280	203	52	15	3.3	11
15	a 31	17	4.0	5.0	2.0	2.2	186	182	46	15	2.7	7.1
16	a 31	17	4.0	5.0	2.0	2.2	246	175	46	14	2.2	4.7
17	a 31	17	4.0	5.0	2.0	2.7	287	172	46	13	1.7	4.0
18	a 30	17	4.0	4.5	2.0	2.7	283	* 180	44	13	2.7	7.1
19	a 30	16	4.5	4.5	1.8	2.7	253	172	44	12	2.2	2.2
20	a 28	16	4.5	4.5	1.8	4.0	* 242	162	44	11	1.7	3.3
21	a 28	17	4.5	4.0	1.8	4.0	264	155	44	11	1.2	3.3
22	a 26	17	5.0	4.0	2.0	4.7	291	148	44	11	.6	4.7
23	a 26	19	5.0	4.0	2.0	5.5	283	145	42	11	1.2	7.1
24	a 25	19	5.0	3.5	2.0	* 6.3	268	142	35	11	1.7	8.8
25	a 26	14	5.0	3.5	2.5	37	268	135	35	8.8	1.2	11
26	a 26	14	5.0	3.0	2.5	224	268	132	35	8.8	.8	7.9
27	a 26	14	5.0	3.0	2.5	240	264	129	31	7.9	.4	4.0
28	a 31	13	5.0	2.5	2.5	250	253	126	31	7.1	.1	2.7
29	a 27	11	5.0	2.5	-----	280	246	126	27	7.1	0	2.2
30	a 31	9.7	5.0	2.5	-----	250	242	122	25	7.1	0	1.7
31	* 33	-----	5.0	2.5	-----	168	-----	119	-----	7.1	0	-----
TOTAL	824	581.7	163.6	135.1	55.0	1,522.2	8,053	5,662	4,229	75.1	109.2	
MEAN	26.6	19.4	5.28	4.36	1.96	49.1	268	183	136	2.42	3.64	
MAX	33	35	8.8	5.2	2.5	280	350	249	119	27	5.5	11
MIN	0	9.7	3.3	2.5	1.5	2.2	182	119	25	7.1	0	0
AC-FT	1,630	1,150	324	268	109	3,020	15,970	11,230	3,380	839	149	217

CALENDAR YEAR 1960: MAX 3,800 MIN 0 MEAN 339 AC-FT 246,500  
WATER YEAR 1960-61: MAX 350 MIN 0 MEAN 52.9 AC-FT 38,290

\* Discharge measurement or observation of no flow made on this day.

a No gage-height record.

Note.--Stage-discharge relation affected by ice Dec. 19 to Mar. 15, Mar. 27-30.

## 5-1000. Pembina River at Neche, N. Dak.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	1.7	4.7	1.6	0.6	0.2	0	0	* 460	658	127	68	99
2	1.7	5.5	1.6	.6	.2	0	0	426	505	118	68	104
3	* 1.2	3.3	1.4	.6	.2	0	0	397	450	92	65	107
4	1.2	2.7	1.4	.6	.2	0	0	374	402	136	70	* 110
5	1.2	2.7	1.4	.6	.2	0	0	352	370	113	74	113
6	1.7	2.7	* 1.3	.6	.2	* 0	* 0	334	* 343	110	82	113
7	3.3	2.4	1.3	.6	** .2	0	0	316	334	127	92	113
8	3.3	* 2.4	1.3	* .6	.2	0	0	* 304	421	163	94	113
9	3.3	2.4	1.2	.6	.2	0	0	300	460	288	86	113
10	4.7	2.4	1.2	.6	.2	0	0	300	370	304	* 84	113
11	7.1	2.4	1.0	.5	.2	0	0	300	338	200	82	113
12	4.7	3.2	1.0	.5	.2	0	0	292	330	150	79	110
13	7.1	3.8	1.0	.4	.2	0	0	280	304	* 118	82	107
14	7.9	3.8	.8	.4	.2	0	0	272	280	110	84	104
15	7.1	4.5	.8	.4	.2	0	0	365	268	99	82	102
16	6.3	4.5	1.0	.4	.2	0	0	470	261	94	79	99
17	5.5	3.8	1.0	.4	.2	0	0	426	265	92	82	94
18	5.5	3.8	.8	.4	.1	0	100	384	261	89	86	92
19	4.7	3.2	.8	.3	.1	0	1,600	374	246	86	84	92
20	4.7	3.0	.6	.3	.1	0	3,000	456	232	84	79	92
21	4.0	2.8	.6	.3	0	0	* 3,600	573	224	82	79	92
22	4.0	2.8	.6	.3	0	0	* 3,200	465	218	82	79	92
23	3.3	2.8	.6	.3	0	0	* 2,260	421	207	86	79	92
24	3.3	2.8	.6	.2	0	0	1,640	426	197	84	86	92
25	3.3	2.8	.6	.2	0	0	* 1,310	465	186	82	92	89
26	4.0	2.8	.8	.2	0	30	921	393	169	77	99	92
27	4.0	2.6	.8	.2	0	2	751	356	163	74	96	89
28	4.0	2.2	.6	.2	0	0	636	334	153	72	92	86
29	5.5	2.0	.6	.2	-----	0	557	321	163	72	89	89
30	6.3	1.8	.6	.2	-----	0	500	316	136	72	89	84
31	5.5	-----	.6	.2	-----	0	-----	470	-----	70	94	-----
TOTAL	131.1	92.6	29.7	12.5	3.7	32	20,185	11,702	8,894	3,553	2,576	2,995
MEAN	4.3	3.0	0.9	0.4	0.1	1.0	673	374	296	115	83.1	99.8
MAX	7.9	5.5	1.6	0.6	0.2	30	3,600	573	658	304	99	113
MIN	1.2	1.8	.6	.2	0	0	0	272	136	70	65	84
AC-FT	260	184	59	25	7.3	63	40,040	23,210	17,640	7,050	5,110	5,940

CALENDAR YEAR 1961: MAX 350 MIN 0 MEAN 49.3 AC-FT 35,680

WATER YEAR 1961-62: MAX 3,600 MIN 0 MEAN 138 AC-FT 99,590

\* Discharge measurement or observation of no flow made on this day.

\*\* Field estimate made on this day.

Note.--Stage-discharge relation affected by ice Nov. 3 to Feb. 20, Mar. 26 to Apr. 22.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	84	50	30	7.9	4.5	* 0.2	280	* 171	186	147	205	98
2	* 82	48	30	* 7.1	4.5	* .2	180	* 171	* 221	* 144	205	92
3	82	37	32	7.1	4.5	* .2	110	179	* 213	147	175	* 89
4	82	32	* 32	8.8	3.1	.2	110	182	255	140	154	89
5	77	29	32	11	2.7	.2	220	182	515	133	144	89
6	74	* 34	34	13	2.3	** .2	340	186	630	127	140	89
7	72	32	34	18	* 1.9	.2	370	194	453	124	133	86
8	70	24	22	22	1.9	.2	330	205	375	121	130	83
9	68	28	28	28	1.9	.1	260	208	336	121	124	80
10	68	39	28	48	2.7	.1	* 250	201	311	127	121	77
11	68	46	26	57	1.9	.1	280	201	311	130	124	74
12	65	43	19	57	1.9	.1	270	201	399	130	114	71
13	63	46	15	30	1.9	.1	225	201	339	121	114	71
14	63	46	14	22	2.3	.1	230	205	299	111	117	71
15	61	41	13	22	1.6	.1	154	209	283	102	127	68
16	56	27	13	22	.8	.1	* 150	209	255	108	117	68
17	56	21	13	22	1.6	.1	150	209	237	105	117	68
18	56	24	14	22	1.1	.1	150	205	221	108	117	68
19	56	26	15	28	.3	.2	150	205	217	117	117	68
20	54	31	15	28	.8	.2	150	201	209	108	114	68
21	52	31	16	16	.8	.2	147	201	201	95	114	66
22	52	31	13	13	a .5	1.0	150	205	190	95	114	66
23	52	23	24	11	a .3	.20	154	197	182	92	114	63
24	52	21	26	9.7	.2	350	154	190	182	89	114	66
25	52	20	30	7.9	* .2	420	154	186	179	83	114	66
26	52	23	28	6.4	a .2	280	154	179	179	130	117	63
27	52	23	22	6.4	a .2	250	154	175	179	463	114	68
28	52	16	22	5.7	a .2	370	154	175	175	864	114	68
29	52	22	22	5.7	-----	450	157	175	168	* 447	108	68
30	52	30	14	5.1	-----	380	164	171	157	279	105	68
31	52	-----	8.8	4.0	-----	300	-----	175	-----	221	102	-----
TOTAL	1,929	946	684.8	571.8	46.8	2,824.2	5,901	5,951	8,055	5,329	3,939	2,229
MEAN	62.2	31.5	22.1	18.4	1.67	91.1	197	192	269	172	127	74.3
MAX	84	50	34	57	4.5	450	370	209	630	864	205	98
MIN	52	16	8.8	4.0	.2	.1	110	171	182	83	102	63
AC-FT	3,830	1,880	1,360	1,130	93	5,600	11,700	11,800	15,980	10,570	7,810	4,420

CALENDAR YEAR 1962: MAX 3,600 MIN 0 MEAN 147 AC-FT 106,200

WATER YEAR 1962-63: MAX 864 MIN 0.1 MEAN 105 AC-FT 76,170

\* Discharge measurement made on this day.

\*\* Field estimate made on this day.

a No gage-height record.

Note.--Stage-discharge relation affected by ice Mar. 22 to Apr. 14. Stage-discharge relation indefinite Feb. 24, Mar. 4-21.

## 5-1000. Pembina River at Neche, N. Dak.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1964

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	63	34	12	3.5	3.6	2.6	4.0	322	229	127	54	80
2	60	34	12	3.5	3.6	2.4	4.5	229	121	117	51	77
3	54	36	12	3.5	3.6	2.4	* 5.0	335	217	108	48	121
4	54	34	12	3.5	* 3.8	2.4	6.5	345	* 205	102	* 46	117
5	51	34	* 12	3.2	* 3.8	* 2.4	9.0	381	197	98	46	114
6	51	* 34	12	* 3.2	3.8	2.4	9.7	387	190	92	46	77
7	* 48	34	11	3.1	3.8	2.4	89	399	192	89	43	66
8	48	28	10	3.1	3.8	2.4	182	459	175	86	46	60
9	48	28	7.0	3.1	3.5	2.4	161	399	171	86	48	54
10	48	28	7.0	3.1	3.5	2.2	157	375	171	83	48	51
11	48	26	6.5	3.1	3.5	2.2	334	369	168	83	48	* 46
12	48	26	6.0	3.1	3.5	2.2	656	* 363	171	83	46	43
13	48	15	6.0	3.0	3.2	2.5	656	357	171	80	48	43
14	46	16	5.5	3.0	3.2	3.0	591	157	190	77	48	43
15	46	19	5.5	3.0	3.2	3.0	640	351	175	74	51	38
16	46	24	5.5	3.2	3.2	3.0	680	345	154	74	51	38
17	43	21	5.0	3.2	3.0	2.5	* 795	345	140	* 74	51	36
18	41	15	5.0	3.2	3.0	2.5	598	339	150	68	51	36
19	38	19	5.0	3.2	3.0	2.5	447	322	186	71	51	36
20	38	21	4.5	3.4	3.0	2.5	381	316	* 419	68	51	36
21	38	14	4.5	3.4	3.0	2.5	357	305	490	66	54	34
22	41	15	4.0	3.4	2.8	2.5	369	299	305	63	54	32
23	43	13	4.0	3.4	2.8	3.0	* 375	294	246	51	57	32
24	46	14	4.0	3.4	2.8	3.0	357	288	213	43	57	32
25	43	14	4.0	3.4	2.8	3.0	345	279	197	43	54	34
26	41	13	4.0	3.4	2.8	3.0	345	269	179	43	48	41
27	41	13	4.0	3.4	2.6	3.5	345	264	161	41	48	41
28	38	13	4.0	3.4	2.6	3.5	322	260	150	41	46	73
29	38	13	3.5	3.4	2.6	3.6	322	255	140	41	46	105
30	38	13	3.5	3.6	-----	3.6	322	246	130	43	48	83
31	34	-----	3.5	3.6	-----	3.8	-----	233	-----	48	54	-----
TOTAL	1,408	659	204.5	102.0	93.4	84.9	9,864.7	10,185	6,101	2,267	1,538	1,719
MEAN	45.4	22.0	6.60	3.29	3.22	2.74	329	329	203	73.1	49.6	57.3
MAX	63	36	12	3.6	3.8	3.6	795	459	490	127	57	121
MIN	34	13	3.5	3.0	2.6	2.2	4.0	233	130	41	43	32
AC-FT	2,790	1,310	406	202	185	168	19,570	20,200	12,100	4,500	3,050	3,410

CALENDAR YEAR 1963: MAX 864 MIN 0.1 MEAN 102 AC-FT 73,610

WATER YEAR 1963-64: MAX 795 MIN 2.2 MEAN 93.5 AC-FT 67,890

\* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Dec. 1 to Apr. 5, Apr. 15-17.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	71	32	* 11	5.5	4.0	3.1	1.9	583	599	292	113	83
2	68	32	11	5.5	4.0	3.1	1.9	583	599	292	* 99	83
3	68	32	8.8	5.5	4.0	3.1	4.3	599	* 583	292	92	80
4	66	* 32	7.1	5.5	* 4.0	2.7	3.1	604	588	280	92	86
5	60	32	5.7	5.5	4.0	2.7	1.9	* 599	594	257	92	86
6	* 51	30	5.7	5.5	4.0	2.7	1.9	658	588	250	92	86
7	51	30	5.7	* 5.5	4.0	2.7	2.6	1,170	568	239	89	89
8	51	30	5.7	5.5	4.0	3.1	3.1	1,170	552	235	86	89
9	48	30	5.7	4.5	4.0	3.1	5.0	975	542	228	82	* 92
10	46	30	6.4	4.5	4.0	3.1	89	863	526	210	77	92
11	46	32	6.4	4.5	4.0	3.1	838	814	510	204	74	92
12	46	* 30	6.4	4.5	3.1	3.1	2,450	785	490	197	72	92
13	43	30	6.4	4.5	3.1	3.1	3,340	757	485	193	70	95
14	43	30	8.8	4.0	3.1	3.1	* 3,400	728	470	* 173	68	95
15	43	28	9.7	4.0	3.1	3.1	2,780	701	479	166	68	95
16	41	19	8.8	4.0	3.1	3.1	2,110	685	440	159	65	102
17	41	18	7.9	4.0	3.1	3.1	1,640	669	416	153	63	108
18	38	14	7.9	3.5	4.0	3.1	1,290	658	407	153	58	105
19	34	18	7.1	3.5	4.0	3.1	996	658	397	146	58	105
20	34	16	7.1	3.7	4.0	3.1	826	636	388	143	56	105
21	38	16	6.4	a 3.8	4.5	3.1	* 723	626	374	140	56	105
22	36	16	6.4	a 3.8	4.5	2.7	683	626	365	140	58	102
23	34	14	6.4	a 3.8	4.0	2.3	620	626	356	136	46	98
24	34	13	6.4	4.0	3.5	2.3	609	631	352	133	65	95
25	34	13	6.4	4.0	3.5	2.3	594	626	338	127	71	98
26	34	13	6.4	4.0	3.5	2.3	573	626	334	118	71	98
27	34	13	6.4	4.0	3.1	2.3	573	626	334	116	71	98
28	32	13	5.7	4.0	3.1	2.3	573	626	325	118	74	92
29	32	13	5.5	4.0	-----	1.9	573	620	312	116	80	95
30	32	11	5.5	4.0	-----	1.9	578	615	300	113	80	95
31	32	-----	5.5	4.0	-----	1.9	-----	609	-----	110	77	-----
TOTAL	1,361	680	216.3	136.6	104.3	85.7	25,878.8	21,752	13,606	5,629	2,315	2,836
MEAN	43.9	22.7	6.98	4.41	3.72	2.76	863	702	452	182	74.7	94.5
MAX	71	32	11	5.5	4.5	3.1	3,400	1,170	599	292	113	108
MIN	32	11	5.5	3.5	3.1	1.9	1.9	583	300	110	46	80
AC-FT	2,700	1,350	429	271	207	170	51,330	43,140	26,990	11,160	4,590	5,620

CALENDAR YEAR 1964: MAX 795 MIN 2.2 MEAN 93.5 AC-FT 67,860

WATER YEAR 1964-65: MAX 3,400 MIN 1.9 MEAN 204 AC-FT 148,000

\* Discharge measurement made on this day.

a No gage-height record.

Note.--Stage-discharge relation affected by ice Dec. 4 to Apr. 3, Apr. 9-13.

5-1005. Herzog Creek near Concrete, N. Dak.

Location.--Lat 48°45', long 97°54', in SW $\frac{1}{4}$  sec. 21, T.161 N., R.56 W., on right bank  $1\frac{1}{2}$  miles north-east of Concrete and  $1\frac{1}{2}$  miles upstream from mouth.

Drainage area.--18.9 sq mi.

Records available.--June 1954 to September 1965.

Gage.--Water-stage recorder and wooden control. Datum of gage is 1,108.95 ft above mean sea level, datum of 1929, Emerson-Crookston supplementary adjustment of 1941 (levels by Soil Conservation Service).

Average discharge.--11 years, 2.74 cfs (1,980 acre-ft per year); median of yearly mean discharges, 2.3 cfs (1,670 acre-ft per year).

Extremes.--Maximum and minimum discharges for the water years 1961-65 are contained in the following table:

Water year	Maximum			Minimum		
	Date	Discharge (cfs)	Gage height (feet)	Date	Discharge (cfs)	Gage height (feet)
1961	Apr. 1, 1961	2.0	3.12	At times	0	-
1962	Apr. 20, 1962	102	6.67	do.	0	-
1963	July 26, 1963	63	a 5.81	do.	0	-
1964	June 19, 1964	46	b 5.25	do.	0	-
1965	Apr. 11, 1965	115	c 7.41	do.	0	-

a Maximum gage height for year, 5.85 ft Dec. 28, 1962, backwater from ice.

b Maximum gage height for year, 5.53 ft Apr. 11, 1964, backwater from ice.

c From floodmarks, backwater from ice.

1954-65: Maximum discharge, 260 cfs Apr. 2, 1955 (gage height, 9.74 ft, from floodmarks, backwater from ice); no flow at times in each year.

Remarks.--Records good except those for winter periods, which are fair. Flood flow affected by temporary retention in four retarding basins above station. The farthest downstream retarding basin, located 1 mile above station, is used to regulate summer flow.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	0	0	0	0	0	0	.50	0	0	0	0	0
2	0	0	0	0	0	0	.70	0	0	0	0	0
3	0	0	0	0	0	0	.30	0	0	0	0	0
4	0	0	0	0	0	0	.30	0	0	0	0	0
5	0	0	0	0	0	0	.30	0	0	0	0	0
6	0	0	0	0	0	0	.20	0	0	0	0	0
7	0	0	0	0	0	0	.20	0	0	0	0	0
8	0	0	0	0	0	0	.30	0	0	0	0	0
9	0	0	0	0	0	0	.30	0	0	0	0	0
10	0	0	0	0	0	0	.20	0	0	0	0	0
11	0	0	0	0	0	0	.20	0	0	0	0	0
12	0	0	0	0	0	0	.10	0	0	0	0	0
13	0	0	0	0	0	0	.10	0	0	0	0	0
14	0	0	0	0	0	0	.10	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	.10	0	0	0	0	0
20	0	0	0	0	0	0	.50	0	0	0	0	0
21	0	0	0	0	0	0	.40	0	0	0	0	0
22	0	0	0	0	0	0	.30	0	0	0	0	0
23	0	0	0	0	0	0	.20	0	0	0	0	0
24	0	0	0	0	0	0	.20	0	0	0	0	0
25	0	0	0	0	0	0	.20	0	0	0	0	0
26	0	0	0	0	0	0	.10	0	0	0	0	0
27	0	0	0	0	0	0	.10	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0	0	0	0
29	0	0	0	0	0	0	.10	0	0	0	0	0
30	0	0	0	0	0	0	.30	0	0	0	0	0
31	0	0	0	0	0	0	.30	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0.70	5.90	0	0	0	0
MEAN	0	0	0	0	0	0	.023	.20	0	0	0	0
MAX	0	0	0	0	0	0	.30	.70	0	0	0	0
MIN	0	0	0	0	0	0	0	0	0	0	0	0
AC-FT	0	0	0	0	0	0	1.4	12	0	0	0	0

CAL YR 1960: TOTAL 1,010.80 MEAN 2.76 MAX 94 MIN 0 AC-FT 2,000

WAT YR 1961: TOTAL 6.60 MEAN .018 MAX .70 MIN 0 AC-FT 13

## 5-1005. Herzog Creek near Concrete, N. Dak.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	0	0	0	0	0	0	0	31	15	.10	0	0
2	0	0	0	0	0	0	0	29	12	.20	0	0
3	0	0	0	0	0	0	0	27	9.6	.10	0	0
4	0	0	0	0	0	0	0	23	7.9	.10	1.0	0
5	0	0	0	0	0	0	0	15	6.1	.10	4.0	0
6	0	0	0	0	0	0	0	16	4.5	.10	3.2	0
7	0	0	0	0	0	0	0	18	30	.20	2.9	.90
8	0	0	0	0	0	0	0	18	18	.10	1.4	3.3
9	0	0	0	0	0	0	0	17	12	8.1	.50	3.3
10	0	0	0	0	0	0	0	17	22	24	.30	3.3
11	0	0	0	0	0	0	0	16	18	24	.60	3.3
12	0	0	0	0	0	0	0	15	13	22	.40	3.3
13	0	0	0	0	0	0	0	15	14	12	.20	3.3
14	0	0	0	0	0	0	.50	15	12	3.7	.10	3.2
15	0	0	0	0	0	0	.50	15	13	1.1	.40	3.0
16	0	0	0	0	0	0	.50	7.2	13	.50	.20	3.1
17	0	0	0	0	0	0	1.0	1.0	12	.20	0	3.1
18	0	0	0	0	0	0	1.0	.80	12	.20	0	3.0
19	0	0	0	0	0	0	25	1.8	12	.10	0	2.9
20	0	0	0	0	0	0	90	1.1	12	.10	0	2.4
21	0	0	0	0	0	0	95	1.0	11	.10	0	2.2
22	0	0	0	0	0	0	70	1.0	11	.20	0	2.2
23	0	0	0	0	0	0	50	4.8	11	.30	0	2.1
24	0	0	0	0	0	0	49	17	4.3	.30	0	1.8
25	0	0	0	0	0	0	45	12	.40	.20	0	1.5
26	0	0	0	0	0	0	42	8.4	.30	.10	0	1.4
27	0	0	0	0	0	0	38	6.7	.20	.10	0	1.2
28	0	0	0	0	0	0	37	5.5	.20	.10	0	1.2
29	0	0	0	0	---	---	35	7.0	.10	.10	0	1.2
30	0	0	0	0	---	---	0	29	.10	0	0	1.2
31	---	---	---	0	---	---	0	22	---	---	0	---
TOTAL	0	0	0	0	0	0	612.00	413.30	306.70	98.50	15.20	57.40
MEAN	0	0	0	0	0	0	20.4	13.3	10.2	3.18	.49	1.91
MAX	0	0	0	0	0	0	95	31	30	24	4.0	3.3
MIN	0	0	0	0	0	0	0	.80	.10	0	0	0
AC-FT	0	0	0	0	0	0	1,210	820	608	195	30	114
CAL YR 1961:	TOTAL	6.60		MEAN .018		MAX .70	MIN 0	AC-FT 13				
WAT YR 1962:	TOTAL	1,503.10		MEAN 4.12		MAX 95	MIN 0	AC-FT 2,980				

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	1.1	1.7	.20	.50	0	0	.40	.20	.10	1.1	.60	0
2	1.0	3.8	.10	.20	0	0	.30	.10	.10	1.1	0	0
3	.80	3.8	.10	.10	0	0	.10	.10	1.8	.10	.20	3.1
4	1.7	3.6	.10	2.0	0	0	0	.10	4.0	.10	.10	6.0
5	9.4	4.4	.10	7.5	0	0	0	.10	9.5	.10	.10	6.3
6	9.2	8.8	.10	8.0	0	0	.10	.10	9.5	.10	.10	7.4
7	8.8	7.5	.10	8.0	0	0	.20	.10	7.8	.10	.10	12
8	8.4	6.5	.10	4.0	0	0	.30	.10	6.5	.10	0	11
9	4.6	4.5	.10	1.0	0	0	.30	.10	9.0	.10	0	11
10	.40	3.5	.10	.50	0	0	.40	.10	35	.10	0	10
11	.30	3.2	.10	.20	0	0	.40	.10	17	.10	0	10
12	.30	2.8	1.5	.10	0	0	.40	.10	9.8	.10	0	12
13	.30	1.0	5.0	.10	0	0	.40	.10	7.8	.10	0	16
14	.30	.60	4.0	0	0	0	.30	.10	6.5	.10	0	13
15	.30	.50	3.0	0	0	0	.30	.10	5.5	.10	0	11
16	.20	.50	2.0	0	0	0	.30	.10	4.9	.10	0	8.4
17	.20	.50	1.5	0	0	0	.30	.10	4.7	.10	0	6.7
18	.20	.40	1.0	0	0	0	.20	.10	4.7	.10	0	5.2
19	.20	.40	1.0	0	0	.50	.20	.10	3.6	3.8	0	4.5
20	.20	.40	4.0	0	0	4.5	.10	.10	1.3	4.5	0	3.6
21	.30	.30	3.5	0	0	8.0	.10	.10	.60	1.1	0	1.6
22	.40	.30	3.0	0	0	8.0	.10	.10	.30	.40	0	1.3
23	.30	.20	2.5	0	0	7.0	.10	.10	.20	.10	0	1.1
24	.30	.20	2.0	0	0	5.5	.20	.10	.20	.10	0	1.3
25	.20	.20	3.0	0	0	2.0	.20	.10	.30	.10	0	1.1
26	.30	.20	4.0	0	0	.50	.20	.10	.20	39	0	1.0
27	.30	.20	4.0	0	0	.30	.20	.10	.10	41	0	.80
28	.30	.20	3.5	0	0	.40	.20	.10	.10	13	0	.80
29	.30	.20	3.0	0	-----	.50	.20	.10	6.6	6.0	0	.60
30	.30	.20	2.0	0	-----	.50	.20	.10	3.9	3.9	0	.50
31	.30	-----	1.0	0	-----	.40	-----	.10	-----	1.1	0	-----
TOTAL	51.20	60.60	55.70	32.20	0	38.10	6.70	3.20	161.60	116.90	2.30	167.30
MAX	1.65	2.02	1.80	1.04	0	1.23	.22	.10	5.39	3.77	.074	5.58
MEAN	9.4	8.8	5.0	8.0	0	8.0	.40	.20	35	41	1.1	16
MIN	.20	.20	.10	0	0	0	0	0	.10	.10	0	0
AC-FT	102	120	110	64	0	76	13	6.4	321	232	4.6	332
CAL YR 1962: TOTAL	1,670.60			MEAN 4.58	MAX 95	MIN 0	AC-FT 3,310					
MAY YR 1963: TOTAL	695.80			MEAN 1.91	MAX 41	MIN 0	AC-FT 1,380					



Location.--Lat 48°46'40", long 97°42'55", in SE $\frac{1}{4}$  sec.11, T.161 N., R.55 W., on right bank 0.6 mile east of Akra and 4.2 miles west of Cavalier.

Records available.--April to June 1950 (in WSP 1137-B), October 1951 to September 1965.

Gage.--Water-stage recorder. Datum of gage is 920.90 ft above mean sea level, datum of 1929 (levels by Soil Conservation Service). Prior to July 10, 1954, chain gage  $1\frac{1}{2}$  miles upstream at datum 20.90 ft lower.

Average discharge, --14 years (1951-65), 17.7 cfs (12,810 acre-ft per year); median of yearly mean discharges, 13 cfs (9,400 acre-ft per year).

Extremes.--Maximum and minimum discharges for the water years 1961-65 are contained in the following table:

Water year	Maximum			Minimum		
	Date	Discharge (cfs)	Gage height (feet)	Date	Discharge (cfs)	Gage height (feet)
1961	Mar. 27, 1961	60	a 4.56	Aug. 13, 14, 1961	0	-
1962	Apr. 23, 1962	473	b 7.03	Sept. 2, 1962	10	c 0.19
1963	June 15, 1963	210	d 4.57	Mar. 4-21, 1963	10	e .27
1965	June 20, 1964	286	f 5.8		h 10	
1965	Apr. 14, 1965	580	g 8.10	Aug. 31, 1965	1.0	.41

a Backwater from ice.

b Maximum gage height for year, 7.55 ft Apr. 21, 1962, backwater from ice.

c Occurred Oct. 13, 1961.

d Maximum gage height for year, 6.52 ft Mar. 26, 1963, backwater from ice.

Maximum gage height for  
e Occurred Dec. 4, 1962.

f Maximum gage height for year. 6.33 ft Apr. 4, 1964. backwater from ice.

g Mar. 5-12, Mar. 15 to Apr. 1, 1964.

h Minimum daily.

1950-65: Maximum discharge, 11,800 cfs Apr. 18, 1950 (gage height, 48.7 ft, from floodmarks, site and datum then in use), from rating curve extended above 1,500 cfs on basis of contracted-opening measurement of peak flow; no flow Dec. 1-27, 1952, for part of Aug. 13, 14, 1961.

Flood of Apr. 18, 1950, is the highest known since settlement of the region (about 1860).

Remarks --Records good except those for winter periods, which are fair. Flow regulated by temporary retention in ten retarding basins above station four of which have slow release outlet structures to regulate low flow. Retarding basins were completed during period 1955 to 1961 and have a combined capacity of 19,245 acre-ft.

Revisions.--WSP 1728: Drainage area.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	.70	5.6	1.4	1.2	.80	3.6	12	5.8	1.6	1.0	.20	.20
2	.60	6.0	1.4	1.2	.80	3.6	12	5.1	1.7	.50	.20	.30
3	.60	7.4	1.6	1.2	.80	3.6	10	5.1	1.7	.60	.20	.20
4	.70	4.3	1.6	1.4	.60	3.6	12	4.8	1.7	.60	3.0	1.0
5	.70	4.4	1.4	1.6	.60	3.8	8.0	4.6	1.7	.50	2.0	.10
6	.70	3.7	1.3	1.6	.60	3.8	6.5	4.8	.70	.40	.50	.40
7	.70	6.0	1.3	1.6	.50	3.8	8.0	5.6	.60	.30	.20	.90
8	.70	4.8	1.3	1.6	.50	3.6	9.0	7.4	.50	.40	.10	.70
9	.70	4.0	1.3	1.6	.80	3.4	10	7.8	.50	.40	.10	.60
10	1.4	3.5	1.3	1.6	.60	3.2	12	6.5	.40	.40	.10	.70
11	3.4	3.0	1.2	1.6	.80	3.2	12	5.6	.40	.40	.20	.60
12	1.0	2.5	1.2	1.6	.80	3.2	10	5.0	.40	.50	.10	.40
13	.90	2.5	1.2	1.6	.80	3.4	9.0	5.0	.40	.50	.10	.30
14	.90	2.0	1.2	1.6	.60	4.2	8.5	4.6	.40	.40	.10	.20
15	1.9	2.0	1.2	1.6	.60	4.4	8.0	4.3	.30	.50	.10	.10
16	2.5	2.4	1.2	1.6	.60	4.6	8.0	4.1	.30	1.0	.10	.10
17	3.8	1.0	1.2	1.6	.70	7.5	7.5	3.5	.40	1.1	.10	.40
18	2.0	2.6	1.2	1.6	.60	8.0	7.8	3.4	.50	.40	.10	.10
19	3.0	2.4	1.2	1.4	.60	10	8.9	2.9	.50	.30	.10	.10
20	2.7	2.2	1.2	1.4	.60	12	9.1	2.9	.50	.30	.10	.20
21	2.5	2.2	1.2	1.4	.60	14	9.7	2.8	.60	.40	.10	.40
22	2.0	2.0	1.2	1.6	.80	28	13	3.4	.40	.30	.10	.40
23	2.4	2.0	1.2	1.2	.80	30	12	2.6	.70	.30	.10	.40
24	2.0	1.5	1.2	1.2	.80	32	9.5	2.0	.70	.30	.10	.20
25	1.8	3.0	1.2	1.2	1.0	34	8.7	2.2	.70	.30	4.0	.10
26	1.8	2.0	1.2	1.0	1.4	42	7.6	1.9	.70	.30	.70	.10
27	1.8	1.8	1.2	1.0	2.0	38	7.0	1.7	.80	.30	.40	.10
28	1.6	1.8	1.2	1.0	2.6	36	6.9	1.6	.80	.30	.60	.10
29	1.8	1.8	1.2	1.0	---	34	6.5	1.5	.60	.30	.40	.20
30	4.6	1.8	1.2	1.0	---	22	6.2	1.5	.50	.30	.30	.20
31	4.0	---	1.2	1.0	---	18	---	1.8	---	.30	.30	---
TOTAL	54.70	94.2	39.1	42.4	23.20	424.0	276.0	121.8	22.00	14.40	14.80	8.30
MEAN	1.76	3.14	1.26	1.37	.83	13.7	9.20	3.93	.73	.46	.48	.25
MAX	4.6	7.4	1.6	1.6	2.6	42	13	7.8	1.7	1.1	4.0	.90
MIN	.60	1.5	1.2	1.0	.50	3.2	6.2	1.5	.30	.30	.10	.10
AC-FT	109	187	78	84	46	841	547	242	44	29	29	16
CAL YR 1960:	TOTAL 7,788.10			MEAN 21.3	MAX 620	MIN .60	AC-FT 15,450					
YR 1961:	TOTAL 1,134.90			MEAN 3.11	MAX 42	MIN .10	AC-FT 2,250					

## 5-1010. Tongue River at Akra, N. Dak.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	.20	1.5	2.2	1.7	.70	.50	.80	145	141	9.9	1.6	.20
2	.20	6.2	2.2	1.6	.70	.50	.80	137	113	8.7	2.8	.30
3	.20	2.9	2.4	1.6	.70	.50	.80	130	86	8.2	2.8	.90
4	.30	2.2	2.4	1.6	.60	.50	.80	121	68	8.2	4.8	.80
5	.30	2.6	2.8	1.6	.60	.50	.90	109	56	7.4	17	.60
6	3.4	2.6	2.8	1.6	.60	.50	1.0	93	46	7.1	44	.50
7	.50	2.3	2.4	1.6	.60	.50	1.0	85	62	9.6	44	.40
8	.40	2.3	2.2	1.5	.60	.50	1.2	79	103	24	36	.80
9	.40	2.6	2.0	1.5	.60	.50	1.2	72	105	85	28	.70
10	.40	2.6	2.0	1.5	.60	.50	1.2	65	95	96	22	.80
11	.60	2.9	2.0	1.5	.60	.50	1.2	56	124	73	18	2.6
12	.40	2.9	2.0	1.4	.60	.50	1.2	50	112	59	15	4.8
13	.40	2.6	2.0	1.4	.60	.50	1.2	46	88	48	12	6.0
14	.40	2.6	2.0	1.4	.60	.50	1.0	52	71	38	9.6	6.8
15	.40	2.6	1.9	1.3	.60	.50	1.0	62	68	28	8.7	7.6
16	.40	2.5	1.9	1.3	.60	.40	1.0	65	80	22	6.8	8.5
17	.40	2.5	1.9	1.3	.60	.40	2.0	63	86	17	5.8	8.7
18	.40	2.5	1.9	1.2	.50	.40	15	52	73	14	5.0	9.3
19	.40	2.5	1.9	1.2	.50	.40	20	56	68	10	4.3	9.9
20	.40	2.4	1.9	1.2	.50	.40	300	86	59	9.6	3.0	9.6
21	.40	2.4	1.8	1.1	.50	.40	420	91	53	8.7	2.1	10
22	.40	2.4	1.8	1.1	.50	.40	440	79	47	9.6	2.1	9.9
23	.40	2.3	1.8	1.1	.50	.40	462	79	42	9.0	2.3	9.9
24	.50	2.3	1.8	1.0	.50	.40	445	93	37	8.2	1.7	10
25	.50	2.2	1.8	1.0	.50	.40	434	96	31	7.1	1.4	12
26	.50	2.0	1.7	1.0	.50	.40	398	83	25	6.3	1.0	18
27	.50	2.0	1.7	.90	.50	.50	336	67	20	5.8	1.0	21
28	.50	1.8	1.7	.90	.50	.60	240	54	16	6.6	1.2	19
29	.50	1.8	1.7	.90	-----	.70	183	48	14	6.3	.70	17
30	.60	2.0	1.7	.80	-----	.80	155	78	11	5.6	.40	16
31	.60	-----	1.7	.80	-----	.80	-----	140	-----	4.3	.30	-----
TOTAL	15.90	75.2	62.0	39.60	16.00	15.30	3,866.30	2,532	2,005	660.2	307.40	222.60
MEAN	.51	2.51	2.00	1.28	.57	.49	129	81.7	66.8	21.3	9.92	7.42
MAX	3.4	6.2	2.8	1.7	.70	.80	462	145	141	96	44	21
MIN	.20	1.5	1.7	.80	.50	.40	.80	46	11	4.3	.30	.20
AC-FT	32	149	123	79	32	30	7,670	5,020	3,980	1,310	610	442

CAL YR 1961: TOTAL 1,100.00

MEAN 3.01

MAX 42

MIN .10

AC-FT 2,180

WAT YR 1962: TOTAL 9,817.50

MEAN 26.9

MAX 462

MIN .20

AC-FT 19,470

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	15	1.5	1.1	3.0	7.0	.40	18	8.7	53	11	41	1.7
2	14	1.4	1.0	1.8	7.0	.30	10	9.0	60	7.9	33	1.7
3	14	1.4	.90	1.2	6.8	.20	3.0	8.2	67	5.8	26	1.4
4	14	1.4	.70	1.1	6.8	.10	3.0	7.4	93	4.0	21	1.2
5	14	1.5	.70	1.1	6.8	.10	5.0	7.4	102	3.2	17	1.2
6	14	1.8	.60	1.0	6.7	.10	10	7.6	91	2.3	14	1.7
7	14	2.0	.60	1.0	6.7	.10	14	7.9	75	2.3	12	1.4
8	14	3.0	.60	1.0	6.7	.10	15	8.2	62	5.6	10	1.4
9	16	6.0	.50	.90	6.6	.10	16	8.2	72	9.6	8.7	3.0
10	31	9.0	.50	.80	6.6	.10	15	8.5	128	9.9	7.9	4.3
11	71	9.0	.50	.60	6.6	.10	15	8.2	196	7.6	7.1	6.0
12	33	10	.50	.50	6.4	.10	15	8.7	200	5.8	6.8	6.8
13	2.8	10	.50	1.0	6.4	.10	15	10	148	3.8	5.3	11
14	1.7	9.8	.50	6.0	6.4	.10	15	11	106	2.6	5.0	16
15	1.5	9.0	.50	9.0	6.2	.10	15	12	79	3.0	4.6	17
16	1.4	7.0	.60	8.5	6.2	.10	17	13	63	4.3	4.6	17
17	1.1	25	.70	8.0	6.2	.10	16	12	54	4.3	4.0	16
18	1.1	30	.70	7.8	6.0	.10	14	11	51	3.8	3.8	14
19	1.0	28	.60	7.8	6.0	.10	13	9.9	45	3.6	3.8	13
20	1.2	27	.50	7.6	5.8	.10	12	9.6	39	3.8	3.2	11
21	1.9	27	.50	7.6	5.8	.10	10	9.6	32	4.3	2.8	9.6
22	1.9	60	.50	7.6	4.0	.20	9.3	8.7	27	4.0	2.3	8.5
23	1.5	48	.50	7.6	2.0	.50	8.7	8.5	23	2.6	1.9	7.9
24	1.5	29	.50	7.4	1.5	.60	8.2	7.9	22	1.5	1.9	7.9
25	1.5	17	.50	7.4	1.0	10	8.2	7.6	36	1.2	1.4	7.4
26	1.5	3.2	.50	7.4	.80	28	7.9	7.4	29	18	1.9	6.8
27	1.5	1.5	1.0	7.4	.60	30	7.9	7.4	22	59	2.3	6.6
28	1.5	1.5	5.0	7.2	.50	24	7.9	7.1	18	108	2.3	6.6
29	1.5	1.2	10	7.2	-----	20	8.7	7.1	15	99	2.1	6.3
30	1.4	1.1	10	7.2	-----	22	8.7	6.8	14	72	2.1	5.6
31	1.4	-----	5.0	7.0	-----	22	-----	30	-----	53	1.9	-----
TOTAL	292.9	383.3	46.80	150.70	146.10	160.00	341.5	294.6	2,022	526.8	261.7	220.3
MEAN	9.45	12.8	1.51	4.86	5.22	5.16	11.4	9.50	67.4	17.0	8.44	7.34
MAX	60	71	60	9.0	7.0	30	18	30	200	108	41	17
MIN	1.0	1.1	.50	.50	.50	.10	3.0	6.8	14	1.2	1.4	1.2
AC-FT	581	760	93	299	290	317	677	584	4,010	1,040	519	437

CAL YR 1962: TOTAL 10,387.40

MEAN 28.5

MAX 462

MIN .20

AC-FT 20,600

WAT YR 1963: TOTAL 4,846.70

MEAN 13.3

MAX 200

MIN .10

AC-FT 9,610

## 5-1010. Tongue River at Akra, N. Dak.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	3.8	9.3	4.0	2.4	1.6	1.4	.10	36	6.8	24	9.9	20
2	3.0	7.9	3.5	2.4	1.6	1.4	.50	34	5.4	22	9.4	18
3	3.0	7.1	3.0	2.4	1.5	.80	15	35	4.6	19	8.2	18
4	2.6	5.8	2.5	2.4	1.5	.20	100	42	4.2	16	7.0	14
5	2.3	5.3	2.4	2.3	1.5	.10	90	45	3.9	14	6.3	11
6	2.6	4.6	2.2	2.3	1.5	.10	80	62	3.7	13	5.8	9.4
7	2.6	4.0	2.0	2.3	1.4	.10	70	102	3.9	11	4.4	7.7
8	2.1	3.6	2.5	2.3	1.4	.10	57	116	4.6	10	3.2	6.5
9	1.9	3.2	2.5	2.2	1.4	.10	55	100	13	9.6	3.0	6.1
10	1.5	3.0	2.5	2.2	1.4	.10	58	78	14	10	3.2	5.8
11	1.7	7.4	5.0	2.2	1.4	.10	67	61	18	11	3.0	5.1
12	1.7	14	30	2.2	1.4	.10	132	48	101	12	2.1	4.4
13	1.5	13	26	2.0	1.4	.20	158	39	149	12	1.9	4.2
14	1.5	8.6	22	2.0	1.4	.20	132	33	128	11	1.9	3.5
15	1.5	.90	15	2.0	1.4	.10	178	29	101	8.9	3.0	14
16	1.7	.30	12	2.0	1.4	.10	191	26	80	8.2	2.8	22
17	1.7	.30	10	2.0	1.4	.10	204	24	71	8.0	2.5	18
18	1.9	.30	8.0	2.0	1.4	.10	173	22	74	7.5	2.3	14
19	2.3	.30	6.0	1.8	1.4	.10	134	21	183	11	1.9	12
20	2.8	.30	5.5	1.8	1.4	.10	111	19	279	25	1.7	10
21	5.8	.30	5.0	1.8	1.4	.10	92	18	272	52	3.0	8.4
22	11	.30	4.0	1.8	1.4	.10	78	17	237	52	4.2	8.0
23	14	.30	3.8	1.8	1.4	.10	54	16	177	42	4.6	17
24	17	.30	3.6	1.8	1.4	.10	11	14	121	32	4.9	7.3
25	18	.30	3.4	1.8	1.4	.10	30	12	89	24	4.4	1.0
26	17	.30	3.2	1.8	1.4	.10	44	11	66	20	3.9	4.2
27	15	1.5	3.0	1.8	1.4	.10	49	10	50	17	3.7	4.2
28	14	3.0	2.8	1.6	1.4	.10	48	9.6	4.0	15	3.7	17
29	13	5.0	2.6	1.6	1.4	.10	44	8.9	34	13	3.9	22
30	12	4.0	2.5	1.6	1.4	.10	39	7.7	28	11	7.5	22
31	11	-----	2.4	1.6	1.4	.10	-----	7.3	-----	10	8.4	-----
TOTAL	191.5	114.50	202.9	62.2	41.4	6.70	2,494.60	1,103.5	2,362.1	551.2	135.7	328.8
MEAN	6.18	3.82	6.55	2.01	1.43	.22	83.2	35.6	78.7	17.8	4.38	11.0
MAX	18	14	30	2.4	1.6	1.4	204	116	279	52	9.9	22
MIN	1.5	.30	2.0	1.6	1.4	.10	10	7.3	3.7	7.5	1.7	1.0
AC-FT	380	227	402	123	82	13	4,950	2,190	4,690	1,090	269	652

CAL YR 1963: TOTAL 4,632.60

MEAN 12.7

MAX 200

MIN .10

AC-FT 9,190

WAT YR 1964: TOTAL 7,595.10

MEAN 20.8

MAX 279

MIN .10

AC-FT 15,060

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	21	15	6.3	4.8	3.2	2.6	4.0	101	65	10	9.4	1.3
2	20	15	5.8	4.8	3.1	2.2	6.0	90	74	8.0	8.9	1.9
3	18	15	6.0	4.8	3.1	2.3	16	77	94	7.0	8.7	2.8
4	16	14	6.5	4.8	3.1	2.3	15	67	109	6.5	8.7	6.5
5	14	14	6.4	4.8	3.0	2.8	14	68	107	6.0	8.7	8.7
6	13	14	6.4	4.8	3.0	5.0	12	168	93	6.0	7.7	8.4
7	12	13	6.2	4.8	3.0	7.0	11	328	80	5.5	6.8	7.5
8	12	13	6.2	4.8	3.0	10	10	340	68	5.0	5.8	6.3
9	15	13	6.0	4.8	3.0	10	12	317	54	4.2	5.1	9.4
10	19	13	5.8	4.8	2.9	10	95	269	43	4.6	3.7	4.2
11	23	13	5.8	4.8	2.9	10	320	197	36	4.9	3.2	3.5
12	26	13	5.6	4.7	2.9	10	548	147	30	5.0	3.0	3.2
13	27	12	5.5	4.7	2.8	10	568	114	26	5.0	3.2	3.2
14	27	12	5.2	4.7	2.8	10	578	93	24	4.9	2.3	5.8
15	27	12	5.0	4.7	2.6	10	575	78	21	4.9	1.3	8.0
16	26	11	5.0	4.6	2.6	9.0	564	67	19	3.9	1.2	9.4
17	24	11	5.0	4.6	2.4	9.0	537	59	18	3.7	1.3	13
18	23	10	5.0	4.6	2.2	8.0	497	56	16	2.8	2.5	15
19	22	9.0	5.0	4.5	2.0	7.5	435	52	13	3.9	3.0	15
20	21	8.5	5.0	4.5	2.0	7.0	350	48	10	11	3.0	13
21	20	8.0	5.0	4.5	2.0	6.0	232	48	10	22	3.2	12
22	19	7.5	5.0	4.5	1.8	5.0	162	44	9.0	30	3.5	11
23	18	7.0	5.0	4.4	1.8	4.0	127	43	9.0	31	3.2	12
24	17	6.6	5.0	4.2	2.0	2.2	108	43	10	28	3.0	13
25	17	6.4	5.0	4.2	2.1	1.8	97	46	8.5	23	4.4	15
26	16	6.0	4.9	4.2	2.2	1.4	90	52	7.0	19	5.4	15
27	16	5.8	4.9	4.0	2.3	1.3	108	60	10	16	11	16
28	15	5.6	4.8	3.8	2.6	1.3	118	65	12	14	31	16
29	15	5.4	4.8	3.6	-----	1.2	118	63	9.0	11	18	17
30	15	5.4	4.8	3.4	-----	1.2	110	60	8.0	11	2.1	21
31	15	-----	4.8	3.2	-----	3.0	-----	59	-----	10	1.0	-----
TOTAL	589	314.2	167.7	138.3	72.4	173.1	6,437.0	3,321	1,091.5	327.8	183.3	290.1
MEAN	19.0	10.5	5.41	4.46	2.59	5.58	215	107	36.4	10.6	5.91	9.67
MAX	27	15	6.5	4.8	3.2	1.0	578	340	109	31	31	21
MIN	12	5.4	4.8	3.2	1.8	1.2	4.0	43	7.0	4.8	1.0	1.3
AC-FT	1,170	623	333	274	144	343	12,770	6,590	2,160	650	364	575

CAL YR 1964: TOTAL 8,157.10

MEAN 22.3

MAX 279

MIN .10

AC-FT 16,180

WAT YR 1965: TOTAL 13,105.4

MEAN 35.9

MAX 578

MIN 1.0

AC-FT 25,990

## 5-1025. Red River of the North at Emerson, Manitoba

(International gaging station)

Location.--Lat 49°00'30" long 97°13'00", in sec.2, T.1, R.2 E., on right bank 1,500 ft downstream from Canadian National Railway bridge in Emerson, three-quarters of a mile downstream from international boundary, 3.6 miles downstream from Pembina River, and at mile 154.3.

Drainage area.--40,200 sq mi, approximately (includes 3,800 sq mi in closed basins).

Records available.--March to November 1902 (gage heights only), May 1912 to September 1929 (monthly discharge only, published in WSP 1308), October 1929 to September 1965.

Gage.--Water-stage recorder. Datum of gage is 700.00 ft above mean sea level, datum of 1929, by Geodetic Survey of Canada. Prior to 1912, staff gage at different datum. May 3, 1912, to Apr. 10, 1953, chain gage and/or staff gage on Canadian National Railway bridge, 1,500 ft upstream. May 3, 1912, to Sept. 30, 1923, at datum 2.55 ft lower than present datum; Oct. 1, 1923, to Sept. 30, 1925, at datum 1.14 ft lower than present datum; Oct. 1, 1925, to Sept. 30, 1947, at datum 0.57 ft higher than present datum; and Oct. 1, 1947, to Sept. 30, 1948, at datum 0.21 ft higher than present datum.

Average discharge.--53 years (1912-65), 2,818 cfs (2,040,000 acre-ft per year); median of yearly mean discharges, 2,400 cfs (1,740,000 acre-ft per year).

Extremes.--Maximum and minimum discharges for the water years 1961-65 are contained in the following table:

Water year	Maximum			Minimum		
	Date	Discharge (cfs)	Gage height (feet)	Date	Discharge (cfs)	Gage height (feet)
1961	Mar. 31, 1961	4,320	57.26	Sept. 8, 1961	106	-
1962	Apr. 25, 1962	33,400	81.93	Jan. 28, 1962	a 158	-
1963	Apr. 13, 1963	13,800	64.14	Jan. 30, 31, 1963	a 965	-
1964	June 25, 1964	b 17,500	-	Sept. 20, 1964	a 382	-
1965	Apr. 26, 1965	46,200	85.19	Feb. 4-7, 20-22	a 875	-

a Minimum daily.

b Maximum daily.

1912-65: Maximum discharge, 95,500 cfs May 13, 1950 (gage height, 90.89 ft); minimum observed, 0.9 cfs Feb. 6-8, 1937 (gage height, 44.00 ft).

Remarks.--Records good except those for winter periods, which are fair. Discharge partially regulated by reservoirs on tributaries.

Cooperation.--This station is one of the international gaging stations maintained by Canada under agreement with the United States.

Revisions (water years).--WSP 925: 1940. WSP 1388: 1930, 1933, 1949-50.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	374	417	388	344	311	303	4,260	2,840	1,870	562	410	138
2	361	444	402	336	295	299	4,200	2,840	1,760	503	410	138
3	370	482	406	328	287	328	4,080	2,840	1,690	483	407	130
4	357	520	410	320	280	353	3,930	2,730	1,620	479	391	138
5	340	550	417	315	280	349	3,620	2,620	1,540	488	383	130
6	336	590	413	* 320	280	370	3,300	2,520	1,450	496	375	134
7	340	640	385	332	284	382	3,040	2,420	1,360	500	363	122
8	328	627	349	344	287	406	2,950	2,300	1,280	488	355	126
9	303	586	328	353	303	461	3,180	2,230	1,240	459	347	134
10	276	524	349	361	320	520	3,270	2,150	1,210	422	331	138
11	276	559	336	365	328	613	2,900	2,070	1,150	414	314	150
12	291	744	328	365	332	748	3,060	2,080	1,110	368	298	134
13	299	784	303	370	336	908	2,520	2,100	1,090	371	287	134
14	303	739	291	374	336	1,230	2,180	2,110	1,070	383	272	126
15	311	683	311	370	328	1,550	1,860	2,080	1,130	406	256	134
16	311	609	357	370	316	1,860	1,710	2,070	1,190	430	252	187
17	315	586	402	374	303	2,010	1,660	2,020	1,160	430	248	250
18	307	568	436	374	299	2,090	1,650	2,020	1,080	422	232	348
19	311	559	448	374	276	2,120	1,620	2,160	1,010	426	236	394
20	328	572	448	374	268	2,120	1,560	2,440	948	430	236	410
21	324	541	440	370	261	2,120	1,590	2,710	888	430	232	399
22	332	503	433	353	287	2,150	1,590	2,860	830	430	213	410
23	336	465	406	344	291	2,200	1,610	2,880	803	426	213	422
24	380	452	396	332	245	2,240	1,640	2,840	781	426	209	434
25	385	448	385	328	257	2,450	1,840	2,760	760	430	205	446
26	385	478	385	324	268	3,030	2,220	2,660	724	426	198	422
27	392	529	382	320	272	3,660	2,540	2,490	690	438	194	418
28	399	568	370	315	265	3,880	2,680	2,360	656	442	178	455
29	399	491	353	315	-----	4,060	2,720	2,220	626	434	166	499
30	413	402	353	311	-----	4,290	2,780	2,070	609	426	154	500
31	417	-----	344	311	-----	4,270	-----	1,930	-----	414	146	-----
TOTAL	10,599	16,660	11,754	10,686	8,195	53,350	77,760	74,400	33,325	13,682	8,511	8,000
MEAN	342	555	379	345	293	1,721	2,592	2,400	1,111	441	275	267
MAX	417	784	468	374	336	4,290	4,260	2,880	1,870	562	410	500
MIN	276	402	291	311	245	299	1,560	1,930	609	368	146	122
AC-FT	21,020	33,040	23,310	21,200	16,250	105,800	154,200	147,600	66,100	27,140	16,880	15,870

CAL YR 1960: TOTAL 947,064

MEAN 2,588

MAX 30,500

MIN 276

AC-FT 1,878,000

MAT YR 1961: TOTAL 326,922

MEAN 896

MAX 4,290

MIN 122

AC-FT 648,400

## 5-1025. Red River of the North at Emerson, Manitoba--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	508	471	387	201	190	217	430	23,400	24,200	22,000	12,100	3,830
2	504	427	371	201	194	217	506	21,400	24,800	20,100	11,600	3,460
3	475	368	339	194	198	220	588	19,100	25,200	18,000	11,000	3,450
4	451	422	314	190	201	228	673	16,500	25,600	15,700	10,100	3,310
5	430	310	302	182	209	228	754	13,900	25,700	13,400	9,260	3,200
6	414	359	291	190	205	228	833	11,400	25,800	11,500	8,440	3,140
7	391	438	276	201	209	228	974	9,340	25,700	10,500	8,060	3,060
8	391	475	279	209	205	220	1,410	7,680	25,000	10,600	7,730	3,010
9	395	414	287	217	205	217	3,210	6,560	25,000	11,100	7,530	3,010
10	403	339	287	224	209	213	5,800	5,770	24,400	12,200	7,310	3,040
11	418	318	283	220	213	224	7,760	5,230	23,800	13,700	7,100	3,120
12	438	351	279	220	205	232	9,290	4,870	23,200	15,100	6,790	3,240
13	463	347	272	220	194	232	10,500	4,460	23,000	16,100	6,490	3,460
14	475	318	264	224	190	228	11,200	4,630	23,400	17,100	6,250	3,710
15	496	318	260	228	182	228	12,200	4,620	24,200	17,900	6,140	3,920
16	620	367	256	232	178	224	13,200	4,770	25,000	18,600	6,170	4,030
17	842	430	252	228	178	217	14,100	5,060	25,700	19,200	6,420	4,060
18	1,040	451	248	228	182	201	15,800	5,440	26,300	19,600	6,810	4,030
19	1,080	463	248	219	178	194	17,800	6,080	26,700	19,800	7,150	3,930
20	1,000	467	244	209	186	194	22,400	7,310	27,000	19,900	7,360	3,780
21	885	483	240	200	190	186	27,400	8,650	27,200	19,800	7,390	3,610
22	815	487	236	190	205	186	29,900	9,970	27,300	19,600	7,260	3,460
23	746	471	232	181	217	182	31,500	11,600	27,300	19,100	6,920	3,310
24	729	442	224	171	217	174	32,700	14,100	27,200	18,200	6,880	3,180
25	676	391	217	162	217	166	33,300	15,900	27,000	17,000	6,070	3,090
26	651	351	213	162	213	174	31,000	17,300	26,700	15,700	5,720	3,010
27	621	418	209	162	213	228	28,400	18,900	26,200	14,500	5,400	2,940
28	551	483	209	158	213	279	27,500	20,400	25,600	13,600	5,070	2,880
29	520	487	209	162	-----	314	26,400	21,700	24,800	13,000	4,730	2,820
30	504	448	205	170	-----	331	25,100	22,700	23,600	12,700	4,410	2,780
31	479	-----	205	178	-----	371	-----	23,500	-----	12,500	4,110	-----
TOTAL	18,411	12,324	8,138	6,133	5,596	6,977	442,626	372,420	763,000	497,800	223,570	101,030
MEAN	594	411	263	198	200	225	14,750	12,010	25,430	16,060	7,212	3,368
MAX	1,080	487	387	232	217	371	33,300	23,500	27,300	22,000	12,100	4,060
MIN	391	310	205	158	178	166	430	4,460	23,000	10,500	4,110	2,780
AC-FT	36,520	24,440	16,140	12,160	11,100	13,840	877,900	738,700	1,513M	987,400	443,400	200,400

CAL YR 1961: TOTAL 326,762 MEAN 895 MAX 4,290 MIN 122 AC-FT 648,200

WAT YR 1962: TOTAL 2,458,025 MEAN 6,734 MAX 33,300 MIN 158 AC-FT 4,875,000

M Expressed in thousands.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	2,740	2,200	2,880	1,390	1,040	1,100	4,980	4,620	3,770	4,610	2,020	1,140
2	2,720	2,200	3,000	1,380	1,090	1,120	5,280	4,500	4,380	4,450	1,800	1,160
3	3,680	2,220	2,850	1,380	1,090	1,140	5,630	4,400	5,320	4,260	1,600	1,200
4	2,640	2,220	2,650	1,380	1,080	1,140	5,720	4,330	5,480	4,050	1,530	1,230
5	2,580	2,220	2,280	1,370	1,060	1,140	5,830	4,220	7,610	3,780	1,500	1,260
6	2,510	2,230	1,900	1,360	1,060	1,150	6,130	4,110	8,090	3,580	1,480	1,300
7	2,460	2,260	1,840	1,370	1,040	1,150	7,610	4,000	8,500	3,370	1,500	1,330
8	2,450	2,300	1,890	1,390	1,030	1,160	8,400	3,900	8,630	3,200	1,510	1,360
9	2,440	2,280	1,860	1,400	1,020	1,150	11,600	3,810	8,710	3,040	1,500	1,340
10	2,420	2,260	1,640	1,400	1,030	1,150	11,700	3,710	9,250	2,910	1,460	1,330
11	2,410	2,240	1,430	1,400	1,030	1,150	12,600	3,610	9,970	2,850	1,380	1,300
12	2,420	2,110	1,250	1,400	1,040	1,160	13,400	3,530	10,100	2,650	1,290	1,300
13	2,460	1,970	1,180	1,400	1,050	1,170	13,700	3,530	9,750	2,530	1,220	1,300
14	2,480	1,710	1,170	1,400	1,060	1,180	13,300	3,500	9,300	2,200	1,160	1,280
15	2,490	1,800	1,190	1,390	1,070	1,190	12,200	3,440	8,910	2,830	1,110	1,230
16	2,490	1,920	1,140	1,360	1,080	1,210	10,800	3,410	8,610	3,460	1,090	1,210
17	2,500	2,110	1,130	1,310	1,090	1,230	9,370	3,420	8,510	3,910	1,120	1,200
18	2,470	2,180	1,100	1,260	1,090	1,250	8,190	3,420	8,510	3,830	1,190	1,190
19	2,460	2,310	1,150	1,210	1,090	1,280	7,330	3,430	8,510	3,590	1,260	1,160
20	2,460	2,370	1,200	1,160	1,100	1,310	6,720	3,450	8,420	3,210	1,280	1,120
21	2,450	2,420	1,290	1,120	1,090	1,340	6,370	3,470	8,100	2,920	1,280	1,090
22	2,440	2,400	1,430	1,090	1,100	1,360	6,480	3,520	7,540	2,650	1,240	1,070
23	2,420	2,390	1,480	1,080	1,110	1,380	6,000	3,580	6,950	2,410	1,210	1,050
24	2,400	2,250	1,510	1,080	1,120	1,400	5,790	3,640	6,280	2,280	1,190	1,050
25	2,380	2,180	1,490	1,080	1,120	1,470	5,570	3,680	6,100	2,110	1,150	1,080
26	2,360	2,040	1,470	1,070	1,110	1,640	5,350	3,700	6,430	2,100	1,120	1,120
27	2,310	1,970	1,480	1,050	1,090	1,780	5,140	3,740	6,180	2,170	1,100	1,080
28	2,270	1,890	1,470	1,030	1,080	2,110	4,960	3,680	5,680	2,280	1,100	1,220
29	2,240	2,100	1,490	1,000	-----	2,890	4,830	3,600	5,240	2,650	1,100	1,280
30	2,210	2,550	1,450	965	-----	3,650	4,740	3,500	4,860	2,310	1,120	1,320
31	2,200	-----	1,420	965	-----	4,420	-----	3,510	-----	2,020	1,140	-----
TOTAL	75,960	65,300	50,710	38,640	30,060	46,970	235,420	115,920	224,690	94,530	40,750	36,380
MEAN	2,450	2,177	1,636	1,246	1,074	1,515	7,847	3,739	7,490	3,049	1,315	1,213
MAX	2,740	2,550	3,000	1,400	1,120	1,420	13,700	4,620	10,100	4,610	2,020	1,360
MIN	2,200	1,710	1,100	965	1,020	1,100	4,740	3,410	3,770	2,020	1,090	1,050
AC-FT	150,700	129,500	100,600	76,640	59,620	93,160	466,900	229,900	445,700	187,500	80,830	72,160

CAL YR 1962: TOTAL 2,611,122 MEAN 7,154 MAX 33,300 MIN 158 AC-FT 5,179,000

WAT YR 1963: TOTAL 1,055,330 MEAN 2,891 MAX 13,700 MIN 965 AC-FT 2,093,000

## 5-1025. Red River of the North at Emerson, Manitoba--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	1,330	1,510	710	770	720	750	830	8,850	2,720	8,760	1,590	919
2	1,340	1,400	700	780	720	720	830	7,780	2,590	7,440	1,520	854
3	1,360	1,300	700	790	720	690	810	7,080	2,490	6,460	1,470	755
4	1,370	1,200	690	800	720	650	850	6,540	2,380	5,800	1,430	699
5	1,340	1,060	680	810	730	610	960	6,140	2,260	5,240	1,410	1,410
6	1,330	1,020	680	810	730	580	995	6,060	2,190	4,790	1,390	866
7	1,340	1,000	680	820	730	595	1,010	6,160	2,060	4,490	2,090	949
8	1,320	980	680	810	730	605	1,040	6,190	2,030	4,210	2,680	940
9	1,320	970	680	810	730	585	1,200	6,490	2,080	4,010	2,650	861
10	1,300	970	680	800	740	585	2,000	6,870	2,310	3,920	2,380	759
11	1,290	960	680	800	740	620	2,940	7,120	3,010	3,730	2,040	688
12	1,300	960	680	790	750	645	3,720	6,940	5,100	3,610	1,880	630
13	1,290	950	680	790	750	665	4,470	6,600	10,900	3,740	1,560	565
14	1,300	950	680	790	760	640	5,160	6,270	11,800	4,130	1,370	555
15	1,320	950	680	790	760	625	8,490	5,940	12,200	4,090	1,260	475
16	1,340	940	680	780	770	605	13,100	5,550	12,400	3,870	1,180	450
17	1,360	940	680	770	770	610	16,000	5,230	12,600	3,350	1,120	450
18	1,360	940	680	760	770	605	16,200	5,110	12,600	2,980	1,040	450
19	1,380	930	690	760	770	683	16,500	5,070	15,700	2,760	970	425
20	1,400	920	690	750	780	710	16,800	4,830	16,800	2,530	896	362
21	1,440	910	690	750	780	730	17,000	4,400	15,200	3,040	849	439
22	1,450	890	690	740	780	735	16,600	4,490	14,900	2,070	830	435
23	1,460	870	700	730	780	750	15,800	4,410	15,500	2,170	805	420
24	1,490	850	700	730	780	750	14,700	4,330	16,900	2,120	805	467
25	1,510	820	710	730	780	750	14,300	4,100	17,500	2,040	805	550
26	1,510	800	710	720	780	750	14,100	3,860	16,800	2,000	830	580
27	1,510	780	720	720	780	750	13,500	3,650	15,600	1,920	830	667
28	1,520	760	730	720	770	775	12,700	3,480	14,100	1,890	805	742
29	1,570	740	740	720	760	800	11,500	3,220	12,200	1,820	805	790
30	1,550	720	750	720	-----	820	10,100	3,030	10,400	1,740	830	982
31	1,550	-----	760	720	-----	830	-----	2,870	-----	1,640	830	-----
TOTAL	43,250	28,990	21,600	23,780	21,880	21,258	254,225	169,110	285,320	112,360	40,950	20,154
MEAN	1,395	966	697	767	754	686	8,474	5,455	9,511	3,625	1,321	672
MAX	1,570	1,510	760	820	780	830	17,000	8,850	17,500	8,760	2,680	1,410
MIN	1,290	900	680	720	730	610	830	2,870	2,030	1,460	805	362
AC-FT	85,790	57,500	42,840	47,170	43,400	42,160	504,200	335,400	565,900	222,900	81,220	39,970
CAL YR 1963: TOTAL	957,200			MEAN 2,622		MAX 13,700	MIN 680		AC-FT 1,899,000			
WAT YR 1964: TOTAL	1,042,877			MEAN 2,849		MAX 17,500	MIN 362		AC-FT 2,069,000			

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	1,340	1,700	920	945	890	905	940	39,700	8,680	6,480	3,520	1,720
2	2,220	1,700	920	950	880	905	955	38,200	8,740	6,940	3,380	1,710
3	2,550	1,700	920	930	880	905	1,020	36,500	8,910	7,000	3,270	1,720
4	2,580	1,690	920	925	875	910	1,090	34,300	9,210	6,960	3,180	1,800
5	2,430	1,690	920	905	875	915	1,180	32,000	9,920	6,900	3,080	1,860
6	2,290	1,660	920	905	875	920	1,390	30,300	11,000	6,710	2,960	1,870
7	2,140	1,650	915	900	875	925	1,670	28,800	12,300	6,440	2,840	1,860
8	2,080	1,640	900	900	880	925	2,470	27,300	12,600	6,170	2,750	1,840
9	2,030	1,640	900	905	900	930	3,750	25,700	12,700	5,880	2,680	1,840
10	1,950	1,640	890	905	900	930	6,340	24,100	12,800	5,590	2,620	1,820
11	1,850	1,630	890	905	900	935	11,100	22,300	12,900	5,320	2,530	1,800
12	1,780	1,600	890	905	900	940	16,000	20,400	12,900	5,070	2,470	1,770
13	1,720	1,550	890	900	900	950	20,900	18,400	12,900	4,920	2,440	1,720
14	1,670	1,510	890	900	900	960	25,000	16,700	12,800	4,950	2,410	1,720
15	1,640	1,460	890	905	910	980	28,000	15,400	12,600	5,000	2,370	1,760
16	1,620	1,500	890	905	910	990	33,300	13,900	12,300	5,420	2,300	1,810
17	1,580	1,470	890	905	910	1,000	36,200	12,500	11,800	6,360	2,250	1,880
18	1,510	1,460	890	910	910	995	38,200	11,400	11,200	6,840	2,160	1,990
19	1,450	1,200	905	910	880	990	40,100	10,800	10,600	6,890	2,060	2,030
20	1,410	1,000	900	910	875	985	41,700	10,600	9,970	6,660	1,970	2,080
21	1,360	1,120	900	915	875	980	43,200	10,600	9,270	6,250	1,920	2,170
22	1,320	1,350	900	910	875	985	44,500	10,500	8,640	5,870	1,840	2,280
23	1,330	1,320	900	910	880	985	45,400	10,300	8,090	5,510	1,800	2,450
24	1,240	1,200	905	910	890	985	45,800	10,200	7,640	5,140	1,780	2,570
25	1,220	1,060	910	905	895	980	46,100	9,920	7,300	4,790	1,780	2,610
26	1,200	940	925	905	895	945	44,100	9,680	7,010	4,520	1,750	2,630
27	1,200	900	935	905	895	940	43,000	9,420	6,770	4,340	1,720	2,680
28	1,300	945	905	900	880	940	42,800	9,260	6,530	4,190	1,710	2,770
29	1,470	900	940	905	-----	940	42,100	9,090	6,360	3,990	1,700	2,920
30	1,590	910	940	905	-----	940	41,100	8,920	6,320	3,800	1,720	3,190
31	1,660	-----	950	905	-----	940	-----	8,830	-----	3,680	1,720	-----
TOTAL	52,730	41,690	28,210	28,205	24,930	29,455	749,405	576,020	300,760	174,580	72,680	62,870
MEAN	1,701	1,350	910	910	890	950	24,980	18,580	10,030	5,632	2,345	2,096
MAX	2,580	1,700	950	950	910	1,000	46,100	39,700	12,900	7,000	3,520	3,190
MIN	1,200	900	890	900	875	905	940	8,830	6,320	3,680	1,700	1,710
AC-FT	104,600	82,690	55,950	55,940	49,450	58,420	1,486M	1,143M	596,500	346,300	144,200	124,700
CAL YR 1964: TOTAL	1,071,667			MEAN 2,928		MAX 17,500	MIN 362		AC-FT 2,126,000			
WAT YR 1965: TOTAL	2,141,535			MEAN 5,867		MAX 46,100	MIN 875		AC-FT 4,248,000			

M Expressed in thousands.

5-1045. Roseau River below South Fork, near Malung, Minn.

Location.--Lat 48°47'30", long 95°44'40", in SW $\frac{1}{4}$  sec. 6, T.161 N., R.39 W., on left bank a quarter of a mile downstream from South Fork and  $1\frac{1}{2}$  miles northwest of Malung.

Drainage area.--573 sq mi.

Records available.--October 1946 to September 1965.

Gage.--Water-stage recorder and concrete control. Datum of gage is 1,029.67 ft above mean sea level, adjustment of 1912.

Average discharge.--19 years, 135 cfs (97,740 acre-ft per year).

Extremes.--Maximum and minimum discharges for the water years 1961-65 are contained in the following table:

Water year	Date	Maximum		Date	Minimum	
		Discharge (cfs)	Gage height (feet)		Discharge (cfs)	Gage height (feet)
1961	Mar. 25, 1961	610	a 8.43	Many days	0	-
1962	June 12, 1962	2,500	16.98	Feb. 26-28, 1962	b 5.1	-
1963	Apr. 9, 1963	1,470	11.86	Sept. 23, 1963	1.0	4.38
1964	June 14, 1964	1,890	d 15.96	Oct. 9, 1963	1.0	4.38
1965	Apr. 13, 1965	4,660	21.90	Feb. 23 to Mar. 2	b 2.5	-

a Backwater from ice.

b Minimum daily.

c About.

d From floodmarks.

1946-65: Maximum discharge, 4,660 cfs Apr. 13, 1965 (gage height, 21.90 ft); maximum gage height, 22.51 ft Apr. 24, 1950; no flow for part of Jan. 15, 1952 (caused by construction of concrete control), and July 23 to Sept. 8, 1961.

Remarks.--Records good except those for periods of shifting-control, periods of indefinite stage-discharge relation, and those for winter periods, which are fair. Undetermined amount of natural diversion bypasses the gaging station through overflow channel 0.8 mile upstream and returns to river 0.5 mile downstream. Overflow begins at stage of about 13.0 ft, discharge 1,800 cfs.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	.80	4.4	3.4	4.6	2.3	4.4	113	174	30	.40	0	0
2	.80	4.4	3.3	4.4	2.2	4.6	115	152	.40	0	0	0
3	.80	4.4	3.2	4.4	2.2	4.6	120	134	.30	0	0	0
4	.80	4.2	3.2	4.4	2.2	4.4	95	122	.28	.30	0	0
5	.80	4.4	3.8	4.4	2.2	4.6	70	113	23	.20	0	0
6	.90	3.9	4.0	4.6	2.2	4.8	56	109	20	.20	0	0
7	.90	3.7	4.2	4.6	2.2	4.8	61	116	18	.10	0	0
8	.90	3.4	4.2	4.8	2.4	5.0	60	162	14	.10	0	0
9	1.0	3.1	4.4	4.8	2.4	5.0	58	158	11	.10	0	.50
10	1.0	2.8	4.4	4.8	2.4	5.2	58	155	10	.10	0	2.0
11	1.1	2.8	4.4	4.6	2.4	5.2	45	152	10	.10	0	5.0
12	1.3	3.0	4.4	4.6	2.4	5.2	49	144	8.5	.10	0	12
13	2.1	3.2	4.6	4.6	2.4	5.4	50	139	6.4	.10	0	40
14	2.4	3.4	4.8	4.4	2.4	5.4	54	124	5.4	.10	0	45
15	2.6	3.6	5.0	4.4	2.4	5.4	27	122	4.6	.10	0	50
16	3.0	3.7	5.0	4.4	2.4	5.4	32	113	4.8	.10	0	60
17	3.0	3.6	5.0	4.2	2.6	5.6	50	102	4.2	.10	0	75
18	3.0	3.6	5.0	4.2	2.6	5.8	66	88	3.9	.10	0	70
19	3.1	3.7	4.8	4.0	2.8	6.0	116	84	2.8	.10	0	65
20	3.2	3.9	4.8	4.0	3.0	6.2	211	82	2.1	.20	0	60
21	3.2	4.1	4.8	3.8	3.2	6.8	308	74	1.6	.10	0	65
22	3.2	3.9	4.8	3.6	3.4	100	350	66	1.2	.10	0	70
23	3.1	3.9	4.8	3.4	3.6	280	354	56	.70	0	0	85
24	3.1	3.9	4.8	3.0	3.8	400	328	51	.50	0	0	95
25	4.7	4.2	4.8	2.8	4.0	580	292	45	.40	0	0	85
26	3.2	4.4	4.8	2.6	4.2	550	258	40	.50	0	0	80
27	3.1	4.2	4.7	2.6	4.2	380	243	35	.40	0	0	75
28	3.1	4.1	4.7	2.6	4.2	232	215	36	.50	0	0	75
29	3.2	3.9	4.6	2.5	-----	265	211	34	.50	0	0	70
30	4.1	3.6	4.6	2.4	-----	211	191	33	.40	0	0	68
31	4.2	-----	4.6	2.3	-----	139	-----	30	-----	0	0	-----
TOTAL	71.70	113.4	137.9	120.8	78.7	3,246.8	4,256	3,045	282.40	3.50	0	1,252.50
MEAN	2.31	3.78	4.45	3.90	2.81	105	142	98.2	9.41	.11	0	41.8
MAX	4.7	4.9	5.0	4.8	4.2	580	354	174	.35	.40	0	95
MIN	.80	2.8	3.2	2.3	2.2	4.4	27	30	.40	0	0	0
AC-FT	142	225	274	240	156	6,440	8,440	6,040	560	6.9	0	2,480

CAL YR 1960: TOTAL 25,292.70 MEAN 69.1 MAX 960 MIN -60 AC-FT 50,170

WAT YR 1961: TOTAL 12,608.70 MEAN 34.5 MAX 580 MIN 0 AC-FT 25,010

Note.--Shifting-control method used Oct. 1 to Nov. 29. Stage-discharge relation indefinite July 25 to Sept. 30.



5-1045. Roseau River below South Fork, near Malung, Minn.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	2.1	9.6	4.0	3.0	4.3	2.5	4.2	399	80	274	14	48
2	1.9	8.5	4.0	3.2	4.3	2.5	4.2	407	69	250	25	53
3	1.6	7.8	3.5	3.5	4.3	2.5	4.4	395	61	220	133	76
4	1.5	7.1	3.5	3.5	4.3	2.5	4.5	395	53	190	166	87
5	1.3	13	3.6	3.6	4.3	2.4	5.0	439	51	160	151	81
6	1.2	13	3.6	3.6	4.2	2.4	5.5	491	49	130	124	83
7	1.2	11	3.8	3.8	4.2	2.4	6.0	527	49	100	113	83
8	1.1	10	3.8	3.8	4.0	2.4	7.0	547	51	72	94	78
9	1.1	8.8	3.6	3.8	3.8	2.4	18	549	127	67	74	76
10	2.1	8.8	3.6	4.0	3.8	2.4	120	520	626	56	59	58
11	2.3	7.3	3.4	4.2	3.6	2.4	700	479	1,010	51	52	55
12	2.3	5.8	3.2	3.8	3.6	2.4	1,100	407	1,400	53	46	59
13	1.4	5.8	3.0	3.8	3.4	2.6	1,400	344	1,600	48	41	53
14	1.2	6.0	3.0	4.0	3.4	2.6	1,500	309	1,850	42	38	50
15	1.2	6.0	3.0	4.0	3.4	2.8	1,350	271	1,750	36	36	45
16	1.2	5.6	3.0	4.0	3.4	3.0	1,230	245	1,480	30	32	42
17	1.3	5.6	3.0	4.3	3.4	3.8	1,100	227	1,250	76	30	40
18	1.6	5.5	2.8	4.3	3.2	3.6	1,020	221	1,110	87	27	42
19	2.0	5.1	2.3	4.3	3.2	3.5	868	256	1,260	51	25	38
20	2.2	5.3	2.7	4.3	3.2	3.6	732	320	1,290	50	22	37
21	2.3	4.9	2.6	4.5	3.2	3.6	616	320	1,330	36	20	36
22	3.1	5.3	2.5	4.3	3.0	3.6	547	297	1,390	32	19	37
23	3.5	4.5	2.4	4.3	3.0	3.8	552	259	1,370	49	19	39
24	6.8	4.3	2.4	4.3	2.8	3.8	522	224	1,270	45	20	49
25	13	4.0	2.6	4.3	2.8	4.5	491	201	1,110	32	20	120
26	22	4.0	2.8	4.3	2.6	4.8	418	174	926	26	20	168
27	20	4.0	2.3	4.3	2.5	3.8	356	151	750	24	20	485
28	18	2.8	2.3	4.3	2.5	3.8	324	131	600	20	22	644
29	15	4.2	2.8	4.3	2.5	3.8	328	116	456	18	37	700
30	14	4.2	2.8	4.3	-----	4.0	380	101	332	16	45	794
31	12	-----	2.8	4.3	-----	4.0	-----	90	-----	15	42	-----
TOTAL	161.5	199.0	96.2	124.3	100.2	98.2	15,712.8	9,812	24,750	2,356	1,586	4,264
MEAN	5.21	6.63	3.10	4.01	3.46	3.17	524	317	825	76.0	51.2	142
MAX	22	13	4.0	4.5	4.3	4.8	1,500	549	1,850	274	166	794
MIN	1.1	4.0	2.4	3.0	2.5	2.4	4.2	90	49	15	14	36
AC-FT	320	395	191	247	199	195	31,170	19,460	49,090	4,670	3,150	8,460

CAL YR 1963: TOTAL 38,574.3 MEAN 106 MAX 1,450 MIN 1.1 AC-FT 76,510

WAT YR 1964: TOTAL 59,260.2 MEAN 162 MAX 1,850 MIN 1.1 AC-FT 117,500

Note.--No gage-height record June 12-15.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	872	70	22	7.5	3.9	2.5	2.6	218	274	198	40	3.8
2	860	207	20	7.3	3.9	2.5	2.7	215	274	278	36	3.8
3	776	297	19	7.1	3.8	2.6	2.8	218	290	320	32	3.4
4	706	263	18	7.0	3.8	2.6	3.0	238	442	286	28	8.9
5	668	238	17	6.8	3.7	2.6	3.2	533	520	218	27	16
6	642	204	17	6.6	3.7	2.7	3.6	1,380	560	174	24	18
7	604	179	16	6.4	3.6	2.7	4.5	1,320	692	139	20	20
8	552	171	16	6.3	3.6	2.7	5.0	1,240	858	118	18	18
9	487	146	15	6.2	3.5	2.8	6.0	1,090	928	100	15	20
10	410	128	15	6.0	3.5	2.8	200	944	908	83	14	18
11	356	122	15	5.9	3.5	2.9	1,500	846	830	69	12	17
12	317	139	14	5.8	3.4	3.0	3,740	810	680	66	11	14
13	286	182	14	5.7	3.3	3.0	4,600	758	504	137	9.0	13
14	249	204	13	5.6	3.3	3.0	4,150	676	360	218	12	14
15	221	193	13	5.5	3.3	3.0	3,590	577	278	204	19	22
16	212	174	12	5.4	3.2	3.0	3,250	533	226	190	13	51
17	215	156	12	5.4	3.1	2.9	2,810	533	180	224	10	78
18	184	90	11	5.3	3.0	2.9	2,330	543	152	187	8.3	89
19	166	50	11	5.2	2.8	2.9	1,920	552	125	182	6.8	101
20	151	54	10	5.2	2.7	2.8	1,640	540	105	198	5.3	96
21	139	59	10	5.1	2.6	2.8	1,420	520	104	234	4.7	81
22	131	56	9.6	5.0	2.6	2.8	1,220	484	108	193	4.3	67
23	122	52	9.4	5.0	2.5	2.7	1,040	442	104	156	3.2	58
24	114	43	9.1	5.0	2.5	2.7	874	407	78	137	3.2	89
25	105	39	8.9	4.9	2.5	2.7	736	384	56	107	4.6	124
26	101	34	8.6	4.8	2.5	2.6	624	356	46	89	4.5	148
27	94	30	8.4	4.6	2.5	2.6	530	328	58	76	3.2	158
28	96	29	8.2	4.5	2.5	2.6	428	309	236	61	3.4	146
29	109	25	8.1	4.3	-----	2.6	324	297	290	51	3.8	154
30	92	23	7.9	4.1	-----	2.6	259	282	241	44	4.3	215
31	74	-----	7.7	4.0	-----	2.6	-----	274	-----	41	4.2	-----
TOTAL	10,111	3,657	395.9	173.5	88.8	85.2	37,218.4	17,847	10,507	4,778	403.8	1,864.9
MEAN	326	122	12.8	5.60	3.17	2.75	1,241	576	350	154	13.0	62.2
MAX	872	297	22	7.5	3.9	3.0	4,600	1,380	928	320	40	215
MIN	74	23	7.7	4.0	2.5	2.6	215	46	41	3.2	3.4	-----
AC-FT	20,050	7,250	785	344	176	169	73,820	35,400	20,840	9,480	801	3,700

CAL YR 1964: TOTAL 72,967.4 MEAN 199 MAX 1,850 MIN 2.4 AC-FT 144,700

WAT YR 1965: TOTAL 87,130.5 MEAN 239 MAX 4,600 MIN 2.5 AC-FT 172,800

## 5-1060. Sprague Creek near Sprague, Manitoba

(International gaging station)

Location.--Lat 48°59'33" long 95°39'43" in NE $\frac{1}{4}$  sec.34, T.164 N., R.39 W., on left bank half a mile south of international boundary, 3 $\frac{1}{2}$  miles south of Sprague, Manitoba, 8 miles upstream from mouth, and 14 miles northeast of Roseau, Minn.

Drainage area.--169 sq mi. Prior to October 1958, 151 sq mi; change due to construction of drainage ditch within basin.

Records available.--September 1928 to September 1965 (winter records incomplete prior to 1941).

Monthly discharge only for some periods, published in WSP 1308. Prior to September 1951, published as Mud Creek near Sprague.

Gage.--Water-stage recorder and concrete control. Datum of gage is 1,038.4 ft above mean sea level, adjustment of 1928 by Geodetic Survey of Canada. Prior to Mar. 15, 1929, staff gage at same site and datum.

Average discharge.--26 years (1928-29, 1940-65), 58.7 cfs (42,500 acre-ft per year).

Extremes.--Maximum and minimum discharges for the water years 1961-65 are contained in the following table:

Water year	Maximum			Minimum		
	Date	Discharge (cfs)	Gage height (feet)	Date	Discharge (cfs)	Gage height (feet)
1961	Mar. 24, 1961	115	a 5.71	Aug. 8 to Sept. 1	0	b 1.56
1962	May 25, 1962	862	11.42	Jan. 30 to Feb. 3	0	c 1.84
1963	Apr. 10, 1963	705	10.60	Jan. 31 to Feb. 2	d 1.0	-
1964	June 19, 1964	465	9.23	Feb. 25 to Mar. 6	d 1.0	-
1965	May 7, 1965	1,250	13.02	Feb. 2, 1965	d 1.0	-

a Backwater from ice.

b Occurred Aug. 17, 1961.

c Occurred Dec. 7, 1961.

d Minimum daily.

1928-65: Maximum discharge, 2,070 cfs Sept. 1, 1942 (gage height, 15.31 ft), from rating curve extended above 960 cfs; no flow at times in some years.

Remarks.--Records good except those for winter periods, which are poor.

Cooperation.--This station is maintained by the United States under agreement with Canada.

Revisions (water years).--WSP 1055: 1944. WSP 1308: 1931(M).

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	1.8	28	* 4.6	1.8	0.8	1.9	20	62	* 23	0.8	0.3	0
2	1.8	27	3.9	1.6	.8	1.9	17	57	26	.6	.2	.2
3	1.6	24	4.4	1.5	.8	1.9	16	54	31	.5	.1	.3
4	1.7	23	4.2	1.4	.7	1.9	17	54	28	.4	.8	.2
5	5.3	21	4.0	1.4	.7	1.9	15	54	23	.4	1.1	.1
6	2.1	21	4.0	1.5	.8	2.0	* 14	58	22	.4	.3	.5
7	1.9	21	4.0	1.5	.8	2.0	14	70	21	.3	.1	.4
8	1.8	20	4.0	1.5	.9	2.0	15	77	17	.2	0	.5
9	1.8	18	3.8	1.5	1.0	2.0	17	79	15	.1	0	.4
10	1.7	17	3.6	1.5	1.1	2.0	18	77	14	.2	0	1.2
11	1.7	14	3.2	1.4	1.2	2.1	17	75	12	.1	0	2.4
12	3.2	13	3.0	1.4	1.3	2.1	* 16	73	11	.3	0	2.1
13	3.6	13	2.8	1.4	1.4	2.1	16	70	9.6	.6	0	1.7
14	2.8	13	2.8	1.4	1.4	2.2	16	68	7.9	1.0	0	1.3
15	2.8	13	2.8	1.3	1.5	2.2	16	65	7.4	1.3	0	1.7
16	3.2	14	2.8	1.3	1.5	2.6	18	61	6.3	1.1	0	.9
17	2.8	12	2.6	1.4	1.5	3.4	20	58	5.3	.9	0	.7
18	2.5	12	2.6	1.3	1.6	2.5	34	54	4.9	2.6	0	.6
19	2.6	12	2.6	1.2	1.6	2.5	47	50	3.7	.8	0	.8
20	2.6	9.7	2.4	1.1	1.6	4.5	52	47	3.2	.5	0	1.1
21	3.0	10	2.2	1.0	1.7	15	65	46	3.1	.4	0	3.1
22	4.5	8.4	2.2	1.0	1.8	20	68	43	2.6	.5	0	3.6
23	5.7	8.4	2.0	1.0	* 1.9	* 40	61	40	3.3	* 2.7	0	2.7
24	* 6.1	8.4	2.0	.9	* 1.9	80	* 57	38	3.1	* 2.3	0	2.4
25	* 5.9	7.6	2.0	.9	* 1.9	90	* 55	34	1.8	1.3	0	1.9
26	5.3	7.4	* 2.0	.9	1.9	100	56	31	1.4	1.0	0	1.4
27	5.7	6.6	* 2.0	.8	1.9	35	61	28	1.1	.6	0	1.2
28	5.3	5.5	1.9	.8	1.9	30	68	26	* 1.0	.6	0	* .9
29	5.1	4.9	1.9	.8	-----	* 35	73	24	.9	.2	* 0	.9
30	13	4.8	1.8	.8	-----	25	68	23	.9	.1	0	.8
31	28	-----	1.8	.8	-----	25	-----	22	-----	.1	0	-----
TOTAL	136.9	417.7	89.9	38.1	37.9	540.7	1,047	1,618	310.5	22.9	2.9	36.0
MEAN	4.42	13.9	2.90	1.23	1.35	17.4	34.9	52.2	10.4	0.74	0.09	1.20
MAX	28	28	4.6	1.8	1.9	100	73	79	31	2.7	1.1	3.6
MIN	1.6	4.8	1.8	.8	.7	1.9	14	22	.9	.1	0	0
AC-FT	272	828	178	76	75	1,070	2,080	3,210	616	45	5.8	71

CALENDAR YEAR 1960: MAX 696 MIN 1.4 MEAN 41.5 AC-FT 30,150

WATER YEAR 1960-61: MAX 100 MIN 0 MEAN 11.8 AC-FT 6,530

\* Discharge measurement or observation of no flow made on this day.

Note.--Stage-discharge relation affected by ice Dec. 1 to Mar. 5, Mar. 20 to Apr. 1.

## 5-1060. Sprague Creek near Sprague, Manitoba--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	0.9	* 3.1	0.9	0.6	0	0.7	4.0	* 101	390	39	* 30	68
2	.9	3.2	1.0	.8	.7	.7	3.5	94	340	32	26	62
3	1.9	1.3	1.0	* .9	0	.7	3.5	88	294	28	26	66
4	1.1	3.4	1.0	1.0	.1	.7	3.5	84	258	27	30	63
5	1.3	3.2	1.0	1.0	.1	.7	4.0	80	227	26	71	54
6	1.2	2.8	1.0	1.0	.1	.7	5.0	73	201	24	403	46
7	1.1	2.9	1.0	.9	.2	.7	5.5	67	183	24	369	42
8	1.3	2.6	.9	.9	.1	.7	6.0	66	201	56	257	43
9	1.6	2.6	.8	.8	.2	.7	6.0	* 69	345	94	184	63
10	1.6	2.8	.8	.8	.2	.7	10	95	416	107	130	75
11	2.8	2.9	.6	.7	.2	.7	10	117	331	96	103	67
12	3.4	3.1	.5	.7	.2	.7	15	117	258	81	121	61
13	3.2	3.1	.7	.6	.3	.6	15	117	206	78	99	50
14	4.0	2.9	.8	.6	.3	.6	15	179	167	54	74	41
15	4.3	2.8	.9	.5	.4	.6	15	245	147	39	60	36
16	3.6	2.8	1.2	.5	.4	.6	20	287	201	31	50	34
17	3.6	2.5	1.5	.4	.5	.6	40	328	307	28	44	39
18	3.2	2.4	1.8	.4	.5	.6	180	332	283	25	39	35
19	3.1	2.4	1.8	.3	.5	.6	* 220	345	227	23	77	31
20	2.9	2.3	1.6	.3	.5	.5	180	442	191	23	94	26
21	2.9	2.1	1.6	.2	.6	.5	* 170	467	193	24	84	26
22	2.6	2.1	1.4	.2	.6	.5	150	444	336	28	173	25
23	2.6	2.2	1.4	.2	.6	.5	140	578	206	60	401	24
24	2.7	2.6	1.5	.2	.6	.5	136	791	172	62	428	23
25	2.7	2.5	1.5	.2	.7	.5	139	843	163	66	331	* 23
26	2.8	2.0	1.3	.1	.7	* .5	134	712	126	63	248	21
27	2.9	1.6	1.2	.1	* .7	.6	126	563	* 94	53	184	22
28	2.9	1.5	1.0	.1	.7	.8	115	* 448	72	48	147	21
29	2.9	* 1.5	.6	.1	-----	1.5	105	370	59	44	116	20
30	3.6	1.9	.5	0	-----	4.0	102	356	48	62	88	20
31	3.4	-----	* 0	-----	-----	4.0	-----	416	-----	36	73	-----
TOTAL	78.0	76.2	33.3	15.1	9.9	27.0	2,078	9,314	6,642	1,461	4,560	1,227
MEAN	2.52	2.54	1.07	.49	.35	.87	69.3	300	221	47.1	147	40.9
MAX	4.3	3.6	1.8	1.0	.7	4.0	220	843	416	107	428	77
MIN	0.9	1.0	.5	0	0	5	15	66	48	23	26	20
AC-FT	155	151	66	30	20	54	4,120	18,470	13,170	2,900	9,040	2,430

CALENDAR YEAR 1961: MAX 100 MIN 0 MEAN 10.5 AC-FT 7,620  
 WATER YEAR 1961-62: MAX 843 MIN 0 MEAN 69.9 AC-FT 50,610

\* Discharge measurement or observation of no flow made on this day.

Note.--Stage-discharge relation affected by ice Dec. 1 to Mar. 5, Mar. 20 to Apr. 1.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	20	16	35	1.2	0.1	1.2	70	124	166	77	8.2	1.5
2	19	16	32	1.2	1.2	1.2	80	128	238	65	9.1	.7
3	18	16	32	1.2	1.2	1.2	80	106	245	54	6.9	1.0
4	18	15	28	1.0	.2	1.2	* 76	97	256	46	5.0	.7
5	17	16	20	1.0	.3	1.2	100	90	264	40	4.5	.5
6	17	16	18	1.0	.3	1.4	200	87	247	34	4.0	.6
7	18	19	12	1.0	.4	1.4	300	94	210	30	3.2	.6
8	18	21	10	1.0	.4	1.4	496	121	174	25	2.6	.5
9	20	23	9.0	.8	.4	1.6	592	124	153	22	2.7	.5
10	21	23	8.0	.8	.4	1.6	690	117	153	* 17	2.8	.5
11	21	25	7.0	.8	.6	* 1.6	* 606	109	157	17	2.7	.6
12	20	25	6.0	.8	.6	1.6	462	103	146	16	2.1	.9
13	20	27	6.0	.8	.6	1.6	356	166	156	14	1.8	.6
14	23	27	5.0	.8	.6	1.8	290	249	160	12	1.6	.7
15	20	26	5.0	.8	.8	1.8	257	245	151	9.7	1.5	.9
16	20	24	5.0	.6	.8	2.0	278	232	136	18	2.1	2.2
17	19	21	4.5	.6	.8	2.0	376	222	120	40	2.5	.7
18	19	21	4.5	.6	.8	2.0	357	216	109	31	2.4	.6
19	20	20	4.0	.6	.8	3.0	340	215	105	26	2.0	.6
20	24	21	4.0	.4	1.0	4.0	316	218	97	21	1.7	.6
21	17	22	* 3.4	.4	1.0	4.0	278	218	87	22	1.7	1.2
22	16	20	3.4	.4	1.0	10	245	202	80	17	1.7	.9
23	17	17	3.2	.3	1.0	30	210	184	73	12	1.7	.5
24	15	14	3.0	.3	1.0	50	* 189	164	174	6.4	1.7	.6
25	15	13	2.5	.3	1.2	60	177	148	261	6.6	1.7	.7
26	16	13	2.2	.3	* 1.2	70	165	133	319	9.1	1.4	* .7
27	16	* 15	2.0	.2	1.2	80	154	127	255	12	* 2.0	.7
28	16	22	1.8	.2	1.2	* 60	143	123	182	12	1.3	1.2
29	16	34	1.6	.2	-----	60	141	128	12	12	1.4	1.3
30	16	35	1.4	.2	-----	60	133	101	97	* 9.4	1.2	1.2
31	* 16	-----	1.2	* .1	-----	70	-----	100	-----	* 8.8	2.2	-----
TOTAL	568	623	280.7	19.9	19.0	588.8	8,157	4,664	5,099	742.0	87.4	24.5
MEAN	18.3	20.8	9.05	0.64	0.68	19.0	272	150	170	23.9	2.82	0.82
MAX	24	35	35	1.2	1.2	80	690	249	319	77	9.1	2.2
MIN	15	13	1.2	1.1	0.1	1.2	70	87	73	6.4	1.2	.5
AC-FT	1,130	1,240	557	39	38	1,170	16,180	9,250	10,110	1,470	173	49

CALENDAR YEAR 1962: MAX 843 MIN 0 MEAN 73.4 AC-FT 53,160  
 WATER YEAR 1962-63: MAX 690 MIN 0.1 MEAN 57.2 AC-FT 41,410

\* Discharge measurement or observation of no flow made on this day.

## 5-1060. Sprague Creek near Sprague, Manitoba--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	1.0	1.1	1.2	0.4	0.3	0.1	1.5	161	28	60	22	42
2	.9	1.2	1.1	.5	.5	.1	2.0	152		49	22	57
3	.8	1.1	1.1	.5	.5	.1	2.5	143	*	24	40	63
4	.8	1.2	1.1	.5	.6	.1	3.0	179	21	33	15	51
5	.9	1.3	1.0	.4	* .7	.1	4.0	189	24	27	12	39
6		1.6	1.0	.4	.7		5.0	190	19	27	9.1	31
7	1.1	1.4	1.0	.4	.6	.2	6.0	228	18	27	7.4	27
8	1.2	1.3	1.0	.4	.6	.2	7.0	231	20	34	6.1	22
9	1.1	1.3	.9	.4	.4	.2	* 8.3	238	45	* 43	5.0	19
10	1.8	1.4	.9	.4	.3	.2	10	235	54	68	5.0	17
11	1.2	1.4	.9	.3	.3	.2	20	216	53	68	4.2	14
12	1.6	1.5	.8	.3	.3	.2	60	196	194	47	4.0	13
13	4.0	1.4	.7	.2	.3	.2	120	176	248	33	4.0	14
14	.5	1.4	.7	.2	.3	.2	135	160	220	27	3.4	10
15	.4	1.5	.7	.2	.3	.2	150	141	* 187	20	2.8	7.4
16	.7	1.5	.7	.2	.2	.3	* 140	124	162	16	2.7	7.9
17	.9	1.5	.7	.2	.2	.4	120	104	115	70	2.4	8.8
18	1.0	1.7	.6	.2	.2	.6	90	130	155	112	2.9	10
19	1.0	1.5	.6	.2	.2	.6	80	159	380	72	2.4	7.7
20	1.0	1.5	* .6	.2	.2	.7	77	148	445	120	1.9	8.5
21	1.1	1.5	.6	.2	.2	.7	78	139	389	133	1.9	8.2
22	.9	1.4	.6	.2	.2	.7	76	115	351	140	2.2	8.2
23	1.2	1.3	.6	.2	.2	.8	* 69	95	324	136	4.0	39
24	2.2	1.3	.6	* .2	.2	.9	66	81	294	96	5.8	90
25	1.6	1.3	.6	.2	.1	1.0	65	71	252	72	6.1	83
26	1.4	1.3	.5	.2	.1	1.1	61	61	215	55	* 6.2	138
27	1.5	* 1.3	.5	* .2	.1	1.2	59	52	178	44	6.6	323
28	1.1	1.3	.5	.2	.1	1.2	83	47	133	38	6.9	364
29	.8	1.3	.5	.2	.1	1.2	161	40	100	36	8.8	335
30	1.1	1.3	.5	.2		* 1.2	* 162	36	76	* 30	17	* 304
31	* 1.1	-----	.5	.3	-----	1.3	-----	32	-----	25	33	-----
TOTAL	36.8	41.1	23.3	8.8	8.9	16.3	1,921.3	4,274	4,730	1,798	251.8	2,161.7
MEAN	1.19	1.37	.75	.28	.31	.53	64.0	138	158	58.0	8.12	72.1
MAX	4.0	4.1	1.2	.5	.7	1.3	162	238	445	140	33	364
MIN	1.1	1.1	.4	.2	.1	1.5	32	18	16	1.9	1.4	1.4
AC-FT	73	82	46	17	18	32	3,810	8,480	9,380	3,570	499	4,290

CALENDAR YEAR 1963: MAX 690 MIN 0.1 MEAN 53.4 AC-FT 38,680

WATER YEAR 1963-64: MAX 445 MIN 0.1 MEAN 41.7 AC-FT 30,300

\* Discharge measurement or observation of no flow made on this day.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	278	39	4.1	1.8	1.1	1.4	3.1	184	153	162	52	14
2	297	41	4.0	1.8	1.0	1.4	4.0	192	158	424	49	12
3	287	41	3.6	1.8	1.1	1.4	5.0	204	281	594	44	97
4	266	43	3.3	1.8	1.1	1.4	10	187	283	610	37	31
5	247	39	3.1	1.9	1.1	1.4	15	320	241	598	30	111
6	220	36	2.9	1.0	1.1	1.5	20	903	299	458	28	101
7	202	37	2.8	1.9	1.2	1.5	30	1,100	444	330	26	97
8	189	33	2.8	1.9	1.2	1.6	50	1,060	406	254	22	81
9	169	33	2.8	1.9	1.2	1.7	80	839	344	192	18	72
10	153	35	2.8	1.8	1.2	1.7	150	768	288	149	15	66
11	141	38	2.8	1.8	1.2	1.8	250	688	245	118	13	59
12	131	44	2.7	1.7	1.3	1.8	450	581	203	134	12	54
13	120	47	2.6	1.7	1.3	1.8	* 830	490	171	187	12	49
14	109	45	2.5	1.6	1.3	1.8	1,090	414	145	162	11	51
15	98	45	2.5	1.6	1.3	1.8	1,200	353	123	132	9.4	83
16	90	45	2.4	1.6	1.3	1.8	1,060	306	104	114	8.2	87
17	83	37	2.3	1.5	1.3	1.8	* 912	276	91	153	11	109
18	74	32	2.2	1.5	1.3	1.8	771	269	78	250	8.8	120
19	67	25	2.1	1.5	1.4	1.8	626	258	68	221	7.7	105
20	64	15	2.0	1.4	1.5	1.8	519	236	66	172	6.2	89
21	61	10	2.0	1.4	1.5	1.8	477	234	66	* 145	4.8	76
22	56	7.0	1.9	1.4	1.4	1.8	428	234	73	128	4.5	73
23	53	5.0	1.8	1.4	1.4	1.8	371	214	70	111	4.0	120
24	50	* 3.7	1.8	1.4	* 1.2	1.9	339	213	63	91	3.9	148
25	48	5.0	1.8	* 1.4	1.1	1.9	309	* 232	55	77	4.6	148
26	46	4.4	1.8	1.3	1.1	2.0	283	218	50	62	* 4.8	141
27	45	4.1	1.8	1.3	1.2	2.0	256	204	87	53	6.9	120
28	* 46	4.2	1.8	1.2	1.4	2.1	238	199	262	44	12	111
29	42	4.2	* 1.8	1.1	-----	2.2	* 216	190	* 182	39	10	* 110
30	39	4.3	1.8	1.1	-----	2.4	198	182	153	43	12	198
31	38	-----	1.8	1.1	-----	2.7	-----	168	-----	50	13	-----
TOTAL	3,809	801.9	76.4	48.5	34.8	55.6	11,191.1	11,916	5,252	6,247	500.8	2,646
MEAN	123	26.7	2.46	1.56	1.24	1.79	373	384	175	202	16.2	88.2
MAX	297	47	4.1	1.9	1.5	2.7	1,200	1,100	444	610	52	198
MIN	38	3.7	1.8	1.1	1.0	1.4	3.1	168	50	39	3.9	10
AC-FT	7,560	1,590	152	96	69	110	22,200	23,640	10,420	12,390	993	5,250

CALENDAR YEAR 1964: MAX 445 MIN 0.1 MEAN 54.3 AC-FT 39,400

WATER YEAR 1964-65: MAX 1,200 MIN 1.0 MEAN 117 AC-FT 84,470

\* Discharge measurement or observation of no flow made on this day.

5-1065. Roseau River at Roseau Lake, Minn.

Location.--Lat 48°54'22", long 95°49'55", in SW $\frac{1}{4}$ SW $\frac{1}{4}$  sec.28, T.163 N., R.40 W., on upstream bridge piling on left bank at Roseau Lake  $3\frac{1}{2}$  miles upstream from Pine Creek,  $3\frac{3}{4}$  miles downstream from Sprague Creek, and 7 miles northwest of Roseau.

Records available.--November 1939 to September 1965 (incomplete).

Gage.--Staff gage read once daily. Datum of gage is 1,018.59 ft above mean sea level, adjustment of 1928 by Geodetic Survey of Canada. Gage readings have been reduced to elevations above mean sea level.

Extremes.--Maximum and minimum elevations, in feet, for the water years 1961-65 are contained in the following table:

Water year	Maximum		Minimum observed	
	Date	Elevation	Date	Elevation
1961	Mar. 25, 1961.....	1,028.43	Aug. 30, 1961.....	1,019.97
1962	June 17, 1962.....	1,032.92	Oct. 30, 1961.....	1,021.29
1963	Apr. 12, 13, 1963.....	1,030.99	Sept. 21, 1963.....	1,020.28
1964	June 24, 25, 1964.....	1,031.78	Oct. 1, 2, 1963.....	1,020.64
1965	Apr. 20, 21, 1965.....	1,035.88	Aug. 23, 1965.....	1,020.95

1939-65: Maximum elevation observed, 1,036.86 ft May 13, 1950; minimum observed, 1,019.75 ft Aug. 16, 1941.

Flood in July 1919 reached an elevation of about 1,034 ft.

ELEVATION, IN FEET, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	20.69					-	25.38	24.16	21.49	20.31	20.51	19.99
2	20.73					-	25.25	23.87	21.69	20.29	20.47	20.05
3	20.75					-	25.03	23.62	21.61	20.23	20.45	20.19
4	20.77					-	24.48	23.43	21.57	20.37	20.43	20.29
5	20.77					-	23.62	23.24	21.52	20.43	20.41	20.45
6	20.81					-	23.18	23.17	21.33	20.41	20.39	20.59
7	20.85					-	22.92	23.27	21.23	20.35	20.37	20.69
8	20.83					-	22.93	23.58	21.09	20.33	20.37	20.81
9	20.81					-	22.60	23.89	21.01	20.27	20.35	20.83
10	20.85					-	22.49	23.89	20.89	20.25	20.33	20.89
11	20.85					-	22.21	23.81	20.79	20.19	20.31	20.93
12	20.87					-	22.13	23.74	20.75	20.21	20.27	20.95
13	20.99					-	22.06	23.65	20.71	20.27	20.23	21.17
14	21.09					-	22.03	23.57	20.63	20.27	20.19	21.63
15	21.15					-	22.10	23.46	20.59	20.29	20.17	21.91
16	21.07					-	22.20	23.32	20.57	20.39	20.13	21.97
17	21.07					-	22.09	23.11	20.53	20.37	20.11	22.01
18	21.05					-	22.19	22.92	20.55	20.37	20.09	22.35
19	21.01					-	22.93	22.74	20.57	20.41	20.01	22.37
20	20.99					-	23.93	22.60	20.57	20.45	20.05	22.27
21	20.99					-	24.81	22.49	20.55	20.45	20.03	22.17
22	21.07					-	25.41	22.39	20.55	20.45	20.03	22.11
23	21.19					24.21	25.58	22.29	20.53	20.47	20.01	22.25
24	21.21					27.28	25.47	22.18	20.53	20.57	19.99	22.73
25	21.17					28.40	25.14	22.09	20.53	20.65	19.99	23.05
26	21.13					28.37	24.92	21.94	20.51	20.67	19.99	22.97
27	21.07					27.99	24.68	21.78	20.45	20.75	19.99	22.82
28	21.01					27.54	24.52	21.69	20.41	20.67	19.99	22.63
29	20.95					26.72	24.44	21.61	20.37	20.65	19.99	22.43
30	20.99					26.33	24.37	21.55	20.31	20.63	19.97	22.35
31	21.39	-----				25.91	-----	21.49	-----	20.57	19.99	-----
MAX	21.39	-	-	-	-	-	25.58	24.16	21.69	20.75	20.51	23.05
MIN	20.69	-	-	-	-	-	22.03	21.49	20.31	20.19	19.97	19.99

Note.--Add 1,000 ft to obtain elevation above mean sea level.

## 5-1065. Roseau River at Roseau Lake, Minn.--Continued

ELEVATION, IN FEET, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962											
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	SEPT.
1	22.21	21.29					22.76	30.44	32.18	29.84	22.00
2	22.17						22.76	30.19	32.16	29.50	24.66
3	22.09						22.78	29.94	32.12	29.12	22.76
4	21.99						22.78	29.66	32.04	28.72	22.88
5	21.91						22.78	29.32	31.92	28.26	23.18
6	21.85						22.74	29.04	31.74	27.76	30.04
7	21.77						22.74	28.66	31.56	27.26	30.76
8	21.69						23.06	28.44	31.40	27.02	31.04
9	21.65						23.96	27.96	31.38	26.68	31.16
10	21.61						25.42	27.82	31.56	26.18	31.16
11	21.61						25.96	27.74	32.10	25.66	31.14
12	21.75						26.36	27.66	32.44	25.18	31.14
13	21.81						26.84	27.56	32.74	24.76	31.10
14	21.95						26.86	27.60	32.84	24.38	30.84
15	22.23						26.86	27.86	32.80	23.86	30.64
16	22.37						27.32	28.38	32.84	23.44	30.36
17	22.35						27.86	28.74	32.92	22.98	30.06
18	22.29						29.26	29.00	32.88	22.62	29.76
19	22.27						30.84	29.30	32.80	22.10	29.44
20	22.23						31.56	29.76	32.70	21.90	29.14
21	22.21						31.06	30.06	32.54	21.76	28.76
22	22.02						31.26	30.30	32.36	21.62	28.50
23	21.99						31.36	30.66	32.20	21.76	28.46
24	21.85						31.45	31.14	32.00	22.16	28.38
25	21.69						31.44	31.50	31.76	22.56	28.22
26	21.59						31.38	31.84	31.52	23.20	27.92
27	21.47						31.28	32.04	31.26	22.62	27.54
28	21.37						31.14	32.16	30.90	22.54	27.14
29	21.35				-----		30.90	32.18	30.66	22.38	26.60
30	21.29				-----		30.66	32.16	30.22	22.26	25.96
31	21.29	-----			-----		-----	32.18	-----	22.16	25.50
MAX	22.37	-	-	-	-	-	31.45	32.18	32.92	29.84	31.16
MIN	21.29	-	-	-	-	-	22.74	27.56	30.22	21.62	21.90

Note.--Add 1,000 ft to obtain elevation above mean sea level.

ELEVATION, IN FEET, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963											
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	SEPT.
1	21.74					-	25.46	26.87	25.22	27.31	22.01
2	21.72					-	25.09	26.47	25.93	26.90	22.13
3	21.70					-	25.01	26.13	26.74	26.36	22.13
4	21.66					-	25.12	25.75	26.98	25.80	22.00
5	21.64					-	26.38	25.40	26.94	25.28	21.83
6	21.62					-	28.72	25.06	26.74	24.76	21.63
7	21.56					-	29.62	24.86	26.43	24.26	21.50
8	21.52					-	29.90	24.81	26.20	23.87	21.32
9	21.54					-	30.00	24.76	26.03	23.51	21.17
10	21.56					-	30.62	24.68	26.26	23.17	21.07
11	21.62					-	30.89	24.55	26.40	22.84	20.97
12	21.64					-	30.97	24.43	26.48	22.56	20.92
13	21.60					-	30.95	24.61	26.50	22.27	20.86
14	21.60					-	30.82	25.26	26.51	22.15	20.82
15	21.62					-	30.67	25.72	26.44	21.94	20.79
16	21.66					-	30.53	25.83	26.26	21.82	20.78
17	21.68					-	30.51	25.91	26.00	21.85	20.74
18	21.76					-	30.42	26.03	25.72	21.93	20.80
19	21.66					-	30.31	26.33	25.53	21.98	20.80
20	21.56					-	30.20	26.63	25.47	21.90	20.80
21	21.58					-	30.03	26.89	25.39	21.99	20.78
22	21.60					-	29.81	27.01	25.22	21.97	20.74
23	21.62					-	29.60	26.99	25.11	21.87	20.72
24	21.66					-	24.08	29.29	26.74	25.88	21.78
25	21.66					-	25.64	29.00	26.53	27.31	21.73
26	21.64					-	27.63	28.60	26.32	28.10	21.71
27	21.62					-	27.51	28.31	26.10	28.23	21.81
28	21.65					-	27.22	27.92	25.84	28.05	21.83
29	21.65					-----	27.07	27.61	25.59	27.80	21.82
30	21.61					-----	26.41	27.26	25.31	27.57	21.80
31	21.60	-----				-----	25.75	-----	25.07	-----	21.81
MAX	21.74	-	-	-	-	-	30.97	27.01	28.23	27.31	22.13
MIN	21.52	-	-	-	-	-	25.01	24.43	25.11	21.71	20.44

Note.--Add 1,000 ft to obtain elevation above mean sea level.

## 5-1065. Roseau River at Roseau Lake, Minn.--Continued

ELEVATION, IN FEET, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	20.64						-	27.95	22.52	30.32	21.48	21.94
2	20.64						-	27.87	22.31	29.92	21.52	22.14
3	20.66						-	27.78	22.14	29.48	21.92	22.26
4	20.68						-	27.75	22.04	29.02	22.84	22.46
5	20.66						21.74	27.80	21.95	28.42	23.06	22.40
6	20.66						21.74	27.92	21.76	27.76	22.92	22.30
7	20.66						21.76	28.08	21.74	27.08	22.58	22.14
8	20.66						21.85	28.12	21.82	26.48	22.33	22.10
9	20.68						21.98	28.28	22.74	25.92	22.14	22.02
10	20.68						22.60	28.30	24.88	25.48	22.02	21.94
11	20.68						25.64	28.22	27.60	25.02	21.76	21.88
12	20.68						28.42	28.12	28.94	24.62	21.60	21.74
13	20.72						28.72	27.98	29.96	24.02	21.40	21.72
14	20.78						28.92	27.73	30.20	23.68	21.34	21.68
15	20.82						29.12	27.46	30.42	23.26	21.34	21.66
16	20.84						30.30	27.06	30.46	23.00	21.38	21.60
17	20.84						30.00	26.74	30.49	23.52	21.28	21.54
18	20.86						29.71	26.62	30.52	24.43	21.18	21.50
19	20.86						29.68	26.66	30.92	24.33	21.14	21.40
20	20.88						29.60	26.72	31.24	23.96	21.08	21.50
21	20.92						29.44	26.66	31.46	23.72	21.04	21.50
22	21.10						29.28	26.48	31.59	23.68	21.04	21.52
23	21.22						29.18	26.16	31.73	24.06	21.04	21.64
24	21.28						28.99	25.82	31.77	23.92	21.10	22.14
25	21.32						28.82	25.42	31.76	23.22	21.16	22.86
26	21.36						28.59	25.02	31.66	22.62	21.12	23.86
27	21.38						28.30	24.62	31.50	22.19	21.08	26.40
28	21.42						28.03	24.24	31.28	22.04	21.10	28.10
29	21.42						28.04	23.88	30.96	21.68	21.08	28.30
30	21.36				-----		28.02	23.44	30.66	21.74	21.54	28.29
31	21.28	-----			-----		-----	22.92	-----	21.58	21.74	-----
MAX	21.42	-	-	-	-	-	-	28.30	31.77	30.32	23.06	28.30
MIN	20.64	-	-	-	-	-	-	22.92	21.74	21.58	21.04	21.40

Note.--Add 1,000 ft to obtain elevation above mean sea level.

ELEVATION, IN FEET, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	28.30						23.03	33.95	29.45	25.93	22.21	21.47
2	28.64						23.03	33.75	29.19	26.87	22.13	21.47
3	28.68						23.05	33.55	29.13	27.65	22.03	21.41
4	28.62						23.05	33.35	29.09	27.79	21.85	21.53
5	28.62						23.09	33.15	29.09	27.71	21.75	22.63
6	28.60						23.15	33.21	29.11	27.53	22.35	23.05
7	28.58						23.19	33.35	29.49	27.33	22.17	23.03
8	28.50						23.25	33.51	29.77	26.95	21.89	22.85
9	28.40						23.43	33.55	29.93	26.45	21.65	22.63
10	28.22						24.53	33.59	29.99	25.85	21.55	22.55
11	28.00						30.09	33.55	29.99	25.29	21.31	22.41
12	27.78						31.67	33.53	29.93	24.85	21.23	22.29
13	27.52						32.47	33.43	29.75	25.05	21.15	22.27
14	27.16						33.17	33.37	29.53	25.55	21.11	22.25
15	26.80						34.05	33.27	29.23	25.69	21.07	22.63
16	26.44						34.65	33.07	28.93	25.41	21.15	23.25
17	26.12						35.05	32.87	28.53	25.19	21.29	23.73
18	25.84						35.43	32.69	28.09	25.67	21.27	24.27
19	25.44						35.77	32.51	27.57	25.93	21.19	24.41
20	25.12						35.83	32.33	26.97	25.73	21.09	24.23
21	24.82						35.83	32.15	26.35	25.85	21.03	23.97
22	24.56						35.67	31.95	25.77	25.85	21.03	23.71
23	24.34						35.55	31.71	25.33	25.63	20.95	23.91
24	24.16						35.45	31.42	24.81	25.01	21.09	24.33
25	23.94						35.35	31.25	24.35	24.33	21.19	24.71
26	23.64						35.15	31.01	23.87	23.65	21.25	25.01
27	23.34						35.01	30.79	23.77	23.09	21.33	25.05
28	23.02						34.65	30.51	24.69	22.65	21.39	24.96
29	23.02						34.35	30.23	26.37	22.35	21.41	24.85
30	23.00				-----		34.15	29.99	26.31	22.17	21.45	25.75
31	22.82	-----			-----		-----	29.73	-----	22.17	21.47	-----
MAX	28.68	-	-	-	-	-	35.83	33.95	29.99	27.79	22.35	25.75
MIN	22.82	-	-	-	-	-	23.03	29.73	23.77	22.17	20.95	21.41

Note.--Add 1,000 ft to obtain elevation above mean sea level.

5-1075. Roseau River at Ross, Minn.

Location.--Lat 48°54'37", long 95°55'18", in SE $\frac{1}{4}$  sec.27, T.163 N., R.41 W., on left bank 300 ft downstream from highway bridge, a quarter of a mile north of Ross, and 2.3 miles downstream from Pine Creek.

Drainage area.--1,220 sq mi, approximately.

Records available.--July 1928 to September 1965.

Gage.--Water-stage recorder. Datum of gage is 1,018.44 ft above mean sea level, adjustment of 1928 by Geodetic Survey of Canada. Prior to Mar. 13, 1929, staff gage at same site and datum.

Average discharge.--37 years, 238 cfs (172,300 acre-ft per year).

Extremes.--Maximum and minimum discharges for the water years 1961-65 are contained in the following table:

Water year	Maximum			Minimum		
	Date	Discharge (cfs)	Gage height (feet)	Date	Discharge (cfs)	Gage height (feet)
1961	Mar. 25, 1961	570	a 8.91	Aug. 29, 30, 1961	0	-
1962	June 17, 1962	2,120	13.86	Feb. 26 to Mar. 3	b 5.4	-
1963	Apr. 13, 1963	1,550	11.51	Sept. 27, 1963	2.0	0.33
1964	June 25, 1964	1,770	12.37	Oct. 17, 18, 1963	b 2.2	-
1965	Apr. 20, 1965	3,780	16.50	Mar. 20-22, 1965	b 7.5	-

a Backwater from ice.

b Minimum daily.

1928-65: Maximum discharge, 6,560 cfs May 12, 1950 (gage height, 18.25 ft); no flow Aug. 29, 30, 1961.

Maximum stage known, about 19 ft in 1896. Other outstanding floods reached the following stages (from information by local residents): flood in July 1919, 17.5 ft; flood in 1927, about 16 ft.

Remarks.--Records good except those for winter periods, which are fair. High flow regulated by natural storage in Roseau Lake. Records of chemical analyses for the water years 1962-63 are published in reports of the Geological Survey.

Revisions (water years).--WSP 1055: 1945. WSP 1175: Drainage area. WSP 1308: 1936(M). WSP 1508: 1948-49(P).

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	1.0	37	15	9.4	5.2	8.4	340	300	75	.90	3.0	.40
2	1.1	39	14	9.4	5.0	8.6	320	272	81	.50	2.2	1.3
3	1.4	38	13	9.4	5.0	8.6	310	242	81	.40	1.8	1.4
4	2.0	36	12	9.2	4.8	8.6	280	221	83	.40	2.0	1.6
5	2.4	34	12	9.2	4.8	8.8	240	205	76	1.4	1.3	2.7
6	2.7	34	12	9.2	4.8	9.0	204	197	65	1.4	1.3	4.4
7	3.3	35	12	9.2	4.8	9.2	178	206	60	.70	1.4	4.4
8	3.4	38	12	9.0	4.8	9.5	180	231	52	.40	1.3	4.2
9	2.7	36	13	9.0	4.8	9.5	152	270	45	.30	1.4	6.6
10	2.8	36	13	9.0	5.0	10	142	271	40	.30	1.4	7.1
11	2.7	36	13	9.0	5.0	11	118	262	33	.30	1.3	8.9
12	2.8	34	12	9.0	5.0	12	111	256	31	.60	.60	10
13	2.8	32	12	9.0	5.4	12	107	248	30	.40	.40	19
14	4.4	32	12	9.0	5.6	12	105	234	27	.20	.90	46
15	6.7	32	13	9.0	6.0	12	92	219	23	.30	.70	67
16	7.1	32	13	9.2	6.0	12	100	210	19	.40	.60	73
17	6.4	30	12	9.2	6.2	13	108	194	16	.30	.70	79
18	6.0	28	12	9.2	6.2	13	114	173	14	.50	.70	93
19	5.5	28	12	9.2	6.4	14	171	155	11	.60	.70	97
20	5.0	26	12	9.0	6.6	15	263	144	8.9	.90	.50	92
21	4.9	26	12	9.0	7.0	18	369	136	7.2	1.3	.50	89
22	5.8	24	12	8.8	7.2	26	446	130	8.2	1.4	.30	87
23	8.4	24	11	8.6	7.6	120	473	123	7.2	1.6	.20	93
24	12	24	11	8.0	7.8	410	459	112	7.1	2.3	.10	117
25	13	24	11	7.0	7.8	540	427	103	6.0	2.7	.10	136
26	16	22	11	6.5	7.8	560	392	96	5.2	4.4	.10	135
27	17	20	10	6.2	8.0	520	367	89	3.8	5.8	.10	124
28	18	16	9.7	6.0	8.0	460	349	83	2.6	5.2	.10	110
29	18	12	9.4	5.6	-----	405	340	79	1.9	3.6	0	98
30	21	14	9.4	5.5	-----	390	344	74	1.1	3.0	0	92
31	28	-----	9.4	5.4	-----	370	-----	71	-----	2.7	.30	-----
TOTAL	234.3	879	366.9	259.4	168.6	4,035.2	7,601	5,606	921.2	45.20	26.00	1,700.00
MEAN	7.56	29.3	11.8	8.37	6.02	130	253	181	30.7	1.46	.84	56.7
MAX	28	39	15	9.4	8.0	560	473	300	83	5.8	3.0	136
MIN	1.0	12	9.4	5.4	4.8	8.4	92	71	1.1	.20	0	.40
AC-FT	465	1,740	728	515	334	8,000	15,080	11,120	1,830	90	52	3,370

CAL YR 1960: TOTAL 59,054.8 MEAN 161 MAX 1,560 MIN 1.0 AC-FT 117,100

MAT YR 1961: TOTAL 21,842.80 MEAN 59.8 MAX 560 MIN 0 AC-FT 43,320

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963												
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	74	63	120	16	4.0	4.0	360	700	431	734	86	7.0
2	64	130	16	16	4.0	4.0	350	520	526	667	90	7.8
3	70	64	130	16	4.0	4.0	360	574	648	587	91	8.0
4	66	64	125	15	4.0	4.0	440	522	690	504	87	7.2
5	67	62	130	15	4.0	4.0	580	468	690	430	76	6.9
6	63	62	125	15	4.0	4.0	937	424	664	363	65	6.7
7	59	68	110	14	4.0	4.0	1,130	390	622	308	61	5.8
8	56	69	90	14	4.0	4.0	1,220	379	579	257	46	5.2
9	56	72	85	14	4.0	4.0	1,280	376	568	218	40	4.9
10	60	77	75	14	4.0	4.2	1,370	367	589	183	34	4.4
11	62	82	60	12	4.0	4.4	1,460	347	616	153	29	4.4
12	62	84	45	10	4.0	4.6	1,520	330	624	136	26	4.4
13	61	89	35	9.0	4.0	5.0	1,550	348	630	110	24	4.4
14	60	92	30	8.0	4.0	5.2	1,540	437	635	96	22	4.5
15	61	92	28	7.0	4.0	5.4	1,500	502	629	89	20	4.7
16	64	92	26	6.0	4.0	5.6	1,470	523	600	80	20	4.2
17	64	90	26	5.5	4.0	5.6	1,450	530	562	84	19	4.4
18	67	85	26	5.5	4.0	5.6	1,440	547	510	88	19	4.5
19	66	85	28	5.5	4.0	5.8	1,410	589	473	86	20	4.4
20	62	85	28	5.0	4.0	6.0	1,370	632	455	87	20	4.4
21	62	90	26	5.0	4.0	6.5	1,340	674	464	91	19	3.8
22	60	85	24	5.0	4.0	8.0	1,300	692	445	89	18	3.4
23	65	85	24	4.5	4.0	1.5	1,240	683	403	86	17	2.8
24	80	80	24	4.5	4.0	100	1,180	659	530	81	14	2.5
25	64	80	22	4.5	4.0	200	1,120	632	743	75	13	3.0
26	63	80	20	4.5	4.0	300	1,050	602	836	76	13	2.7
27	62	75	22	4.5	4.0	350	971	565	871	81	14	2.2
28	62	85	20	4.0	4.0	380	999	525	848	80	10	2.0
29	64	95	20	4.0	4.0	400	840	485	808	80	8.4	2.8
30	64	110	18	4.0	4.0	380	772	448	778	76	7.8	2.2
31	64	-----	18	4.0	4.0	370	-----	420	-----	74	8.2	-----
TOTAL	1,968	2,406	1,690	270.5	112.0	2,602.9	33,449	16,000	18,487	6,149	1,037.4	138.4
MEAN	63.5	80.2	54.5	8.73	4.00	84.0	1,115	516	616	198	33.5	4.61
MAX	74	110	130	16	4.0	400	1,550	700	871	734	91	8.0
MIN	56	62	18	5.0	4.0	4.0	350	330	403	74	7.8	2.2
AC-FT	3,900	4,770	3,350	437	222	5,160	66,350	31,740	36,670	12,200	2,060	275
CAL YR 1962	TOTAL 166,839.4			MEAN 457	TOTAL 2,110		MIN 5.4					
WAT YR 1963:	TOTAL 84,310.2			MEAN 231	MAX 1,550		MIN 2.2	AC-FT 330,900		AC-FT 167,200		

## 5-1075. Roseau River at Ross, Minn.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	3.8	17	7.8	5.6	6.4	4.4	5.4	883	145	1,430	64	96
2	3.5	15	7.8	5.9	6.4	4.4	5.6	871	127	1,330	70	110
3	3.0	13	7.6	5.6	6.2	4.6	5.8	857	112	1,230	103	127
4	2.8	12	7.6	5.8	6.2	4.6	6.0	848	102	1,110	182	139
5	2.7	11	7.4	5.8	6.2	4.6	6.2	854	90	987	202	137
6	2.4	11	7.2	6.0	6.2	4.6	6.5	867	84	846	187	127
7	2.3	13	7.2	6.0	6.2	4.6	7.0	881	84	709	159	119
8	2.4	16	7.0	6.0	6.2	4.6	8.0	917	82	600	141	110
9	2.4	17	7.0	6.0	6.0	4.6	15	927	141	520	121	104
10	2.6	16	6.8	6.2	6.0	4.6	30	935	390	461	99	96
11	3.2	14	6.6	6.2	5.8	4.8	200	929	776	404	86	90
12	3.5	13	6.4	6.4	5.8	4.8	450	917	1,020	345	78	86
13	4.0	11	6.2	6.4	5.8	4.8	500	883	1,150	290	70	86
14	5.0	10	6.0	6.4	5.6	5.0	510	836	1,190	249	63	86
15	6.0	9.5	6.0	6.4	5.4	5.0	540	789	1,250	214	56	81
16	4.0	9.3	5.8	6.4	5.2	5.0	750	728	1,320	182	54	75
17	2.2	9.3	5.8	6.4	5.0	5.0	850	669	1,380	235	49	72
18	2.2	8.9	5.6	6.4	5.0	5.0	900	630	1,440	345	44	69
19	2.4	8.6	5.6	6.4	4.8	5.0	1,100	645	1,500	321	40	68
20	2.6	8.6	5.6	6.4	4.6	5.0	1,200	655	1,580	257	36	68
21	2.8	8.2	5.6	6.4	4.4	5.0	1,210	647	1,650	258	32	66
22	3.0	8.0	5.4	6.6	4.2	5.0	1,170	621	1,700	258	31	64
23	3.5	8.0	5.4	6.6	4.2	5.0	1,140	578	1,730	299	32	72
24	4.0	8.0	5.4	6.6	4.2	5.0	1,100	522	1,760	281	34	111
25	5.0	8.0	5.4	6.6	4.2	5.0	1,060	470	1,760	218	38	158
26	8.0	7.8	5.4	6.6	4.2	5.0	1,010	418	1,750	164	40	230
27	20	7.8	5.4	6.6	4.2	5.0	965	368	1,720	125	39	579
28	26	7.8	5.4	6.6	4.2	5.0	907	317	1,660	108	40	861
29	25	7.8	5.4	6.6	4.2	5.1	901	278	1,590	94	41	499
30	22	7.8	5.4	6.4	-----	5.1	897	230	1,520	85	64	913
31	19	-----	5.6	6.4	-----	5.2	-----	179	-----	73	87	-----
TOTAL	201.3	322.4	192.8	194.4	153.0	150.4	17,455.5	21,149	30,403	14,028	2,382	5,899
MEAN	6.49	10.7	6.22	6.27	5.28	4.85	582	682	1,027	453	76.8	197
MAX	26	17	7.8	6.6	6.4	5.2	1,210	935	1,760	1,430	202	913
MIN	2.2	7.8	5.4	5.6	4.2	4.4	5.4	179	82	73	31	64
AC-FT	399	639	382	386	303	298	34,620	41,950	61,100	27,820	4,720	11,700
CAL YR 1963: TOTAL 78,962.7				MEAN 216	MAX 1,550	MIN 2.2	AC-FT 156,600					
WAT YR 1964: TOTAL 92,930.8				MEAN 254	MAX 1,760	MIN 2.2	AC-FT 184,300					

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	931	160	47	21	15	9.5	14	2,530	1,220	608	117	28
2	967	173	45	21	14	9.5	15	2,450	1,170	749	103	28
3	979	284	41	21	14	9.0	16	2,370	1,140	852	93	28
4	977	362	37	21	14	9.0	16	2,280	1,120	867	83	38
5	981	358	34	21	13	9.0	17	2,250	1,110	852	79	68
6	987	333	32	20	13	9.0	18	2,210	1,120	823	116	84
7	989	300	31	20	13	9.0	19	2,260	1,170	783	105	100
8	977	270	31	20	13	9.0	21	2,340	1,210	719	87	114
9	959	246	31	20	13	9.0	35	2,400	1,250	629	69	116
10	929	217	31	20	13	9.0	75	2,400	1,280	534	58	116
11	891	202	32	19	12	9.0	350	2,370	1,290	454	48	114
12	850	217	33	19	12	9.0	800	2,370	1,290	406	42	110
13	800	248	33	19	12	9.5	1,150	2,340	1,260	431	38	110
14	741	284	32	18	12	9.5	1,500	2,320	1,220	488	33	128
15	674	291	30	18	12	9.5	2,150	2,280	1,160	498	30	160
16	619	280	29	18	12	9.2	2,820	2,210	1,100	455	34	194
17	573	256	28	18	12	8.8	3,210	2,150	1,030	444	42	250
18	523	200	26	18	12	8.4	3,530	2,060	951	508	42	311
19	468	175	25	18	11	8.0	3,620	2,030	861	533	36	315
20	423	165	25	17	11	7.5	3,740	1,940	758	503	30	299
21	388	150	24	17	11	7.5	3,730	1,880	659	534	26	268
22	358	120	24	17	11	7.5	3,700	1,830	568	538	22	240
23	332	95	23	17	10	8.0	3,540	1,780	500	484	18	256
24	305	78	23	16	10	8.0	3,380	1,720	432	399	16	311
25	279	65	23	16	10	8.2	3,230	1,630	369	311	16	355
26	243	58	22	16	9.5	8.8	3,070	1,580	310	238	17	386
27	214	56	22	16	9.5	9.5	2,920	1,520	304	186	19	393
28	195	53	22	16	9.5	10	2,790	1,470	438	149	22	382
29	186	52	22	15	-----	12	2,690	1,400	624	121	25	367
30	184	51	22	15	-----	13	2,620	1,340	618	106	26	512
31	172	-----	22	15	-----	14	-----	1,280	-----	108	27	-----
TOTAL	19,094	5,799	902	563	333.5	285.9	54,786	62,900	27,532	15,310	1,519	6,179
MEAN	616	193	29.1	18.2	11.9	9.22	1,826	2,032	918	494	49.0	206
MAX	989	362	47	21	15	14	3,740	2,530	1,290	867	117	512
MIN	172	51	22	15	9.5	7.5	1,280	1,280	304	106	16	26
AC-FT	37,870	11,500	1,790	1,120	661	567	108,700	124,900	54,610	30,370	3,010	12,260
CAL YR 1964: TOTAL 118,009.3				MEAN 322	MAX 1,760	MIN 4.2	AC-FT 234,100					
WAT YR 1965: TOTAL 195,293.4				MEAN 535	MAX 3,740	MIN 7.5	AC-FT 387,400					

5-1080. Roseau River near Badger, Minn.

Location.--Lat 48°54'42", long 96°00'24", in SW $\frac{1}{4}$  sec.30, T.163 N., R.41 W., on right bank 100 ft upstream from highway bridge and 9 miles north of Badger.

Records available.--August 1928 to September 1965 (incomplete).

Gage.--Water-stage recorder. Datum of gage is 1,016.90 ft above mean sea level, adjustment of 1928 by Geodetic Survey of Canada. Gage readings have been reduced to elevations above mean sea level.

Extremes.--Maximum and minimum elevations, in feet, for the water years 1961-65 are contained in the following table:

Water year	Maximum		Minimum recorded	
	Date	Elevation	Date	Elevation
1961	Mar. 26, 1961.....	1,026.00	Aug. 30, 1961.....	1,017.42
1962	June 17, 1962.....	1,029.89	Nov. 2, 1961.....	1,018.76
1963	Apr. 13, 1963.....	1,027.80	Sept. 27, 1963.....	1,017.56
1964	June 25, 1964.....	1,028.52	Oct. 4, 1963.....	1,017.57
1965	Apr. 22, 1965.....	1,031.73	Aug. 25, 1965.....	1,018.06

1928-65: Maximum elevation, 1,032.65 ft May 13, 1950; minimum recorded, 1,017.42 ft Aug. 30, 1961.

Maximum elevation known, about 1,034 ft in 1896.

MEAN ELEVATION, IN FEET, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	17.83					-	-	22.13	19.30	17.94	17.98	17.48
2	17.77					-	23.63	21.90	19.45	17.92	17.96	17.50
3	17.68					-	23.44	21.66	19.45	17.89	17.92	17.51
4	17.66					-	22.65	21.45	19.50	17.87	17.92	17.49
5	17.66					-	21.91	21.27	19.42	17.89	17.87	17.53
6	17.63					-	21.31	21.17	19.22	17.93	17.83	17.63
7	17.63					-	20.95	21.24	19.12	17.91	17.80	17.72
8	17.63					-	20.95	21.47	18.98	17.88	17.77	17.84
9	17.63					-	20.68	21.83	18.80	17.84	17.76	17.90
10	17.62					-	20.50	21.87	18.68	17.82	17.76	17.89
11	17.61					-	20.13	21.80	18.58	17.82	17.75	17.92
12	17.59					-	19.98	21.76	18.48	17.86	17.71	17.93
13	17.60					-	19.94	21.70	18.38	17.86	17.69	18.09
14	17.62					-	19.87	21.58	18.28	17.82	17.66	18.73
15	17.74					-	19.82	21.45	18.18	17.79	17.64	19.28
16	17.86					-	19.85	21.35	18.13	17.77	17.62	19.49
17	17.86					-	19.98	21.18	18.10	17.75	17.60	19.59
18	17.87					-	19.98	20.98	18.07	17.75	17.58	19.84
19	17.83					-	20.67	20.77	18.04	17.75	17.56	19.99
20	17.78					-	21.64	20.62	18.02	17.75	17.55	19.93
21	17.77					-	22.46	20.51	17.98	17.77	17.53	19.79
22	17.78					19.23	23.10	20.40	17.96	17.82	17.52	19.69
23	17.83					20.90	23.33	20.31	17.96	17.87	17.50	19.71
24	17.93					24.24	23.28	20.16	17.96	17.88	17.49	20.16
25	-					25.60	23.07	20.00	17.96	17.89	17.49	20.61
26	-					25.95	22.82	19.85	17.97	17.93	17.47	20.68
27	-					25.76	22.63	19.70	17.97	18.02	17.46	20.56
28	-					-	22.48	19.54	17.96	18.11	17.45	20.37
29	-					24.83	22.40	19.43	17.95	18.11	17.44	20.15
30	-					24.55	22.33	19.34	17.94	18.05	17.44	20.00
31	-	-----				24.35	-----	19.26	-----	18.00	17.47	-----
MAX	-	-	-	-	-	-	23.63	22.13	19.50	18.11	17.98	20.68
MIN	-	-	-	-	-	-	19.82	19.26	17.94	17.75	17.44	17.48

Note.--Add 1,000 ft to obtain elevation above mean sea level.

## 5-1080. Roseau River near Badger, Minn.--Continued

MEAN ELEVATION, IN FEET, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962											
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	SEPT.
1	19.87	18.80					-	27.59	29.09	27.33	23.43
2	19.78	18.78					-	27.36	29.05	27.02	23.05
3	19.70	18.85					-	27.13	29.01	26.73	22.76
4	19.60	-					-	26.89	29.98	26.41	22.53
5	19.51	-					20.32	26.60	28.91	26.05	22.36
6	19.42	-					20.44	26.33	28.80	25.69	22.25
7	19.35	-					20.76	26.08	28.65	25.41	22.09
8	19.25	-					21.33	25.80	28.56	25.24	21.96
9	19.19	-					22.22	25.52	28.48	24.91	22.07
10	19.13	-					23.43	25.36	28.79	24.47	22.33
11	19.17	-					24.20	25.25	29.14	24.29	22.81
12	19.19	-					-	25.17	29.28	23.68	23.12
13	19.24	-					24.60	25.11	29.40	23.30	23.26
14	19.33	-					-	25.15	29.47	22.89	23.27
15	19.63	-					-	25.28	29.56	22.44	23.06
16	19.86	-					-	25.56	29.76	21.88	22.77
17	19.91	-					-	25.76	29.87	21.39	22.45
18	19.88	-					-	25.98	29.92	21.47	22.14
19	19.82	-					-	26.32	29.74	20.46	21.78
20	19.79	-					-	26.65	29.66	20.14	21.47
21	19.77	-					-	26.83	29.55	19.97	21.16
22	19.68	-					-	27.11	29.35	19.92	20.92
23	19.57	-					-	27.64	29.24	19.86	20.74
24	19.44	-					28.23	27.93	29.09	20.35	20.61
25	19.29	-					28.36	28.18	28.91	20.72	20.45
26	19.16	-					28.34	28.44	28.69	20.69	20.32
27	19.04	-					28.29	28.29	28.44	20.89	20.22
28	18.96	-					28.19	28.84	28.16	20.82	20.14
29	18.90	-			-----		28.02	28.98	28.11	20.70	19.98
30	18.86	-			-----		27.79	29.08	27.63	20.60	19.81
31	18.84	-----			-----		-----	29.12	-----	20.49	-----
MAX	19.91	-	-	-	-	-	-	29.12	29.87	27.33	23.45
MIN	18.84	-	-	-	-	-	-	25.11	27.63	19.92	19.81

Note.--Add 1,000 ft to obtain elevation above mean sea level.

MEAN ELEVATION, IN FEET, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963											
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	SEPT.
1	19.73					-	23.40	24.64	22.96	24.94	17.92
2	19.68					-	23.02	24.31	23.46	24.65	17.90
3	19.65					-	23.15	24.01	24.12	24.23	17.87
4	19.60					-	23.56	23.70	24.40	23.75	17.86
5	19.58					-	24.19	23.38	24.42	23.27	17.82
6	19.53					-	25.54	23.06	24.33	22.80	17.80
7	19.48					-	26.51	22.83	24.14	22.37	17.77
8	19.44					-	27.01	22.70	23.95	21.97	17.72
9	19.42					-	27.12	22.68	23.87	21.81	17.70
10	19.44					-	27.29	22.61	23.97	21.25	17.68
11	19.51					-	27.52	22.48	24.11	20.93	17.66
12	19.52					-	27.71	22.35	24.18	20.70	17.65
13	19.48					-	27.79	22.42	24.21	20.35	17.63
14	19.45					-	27.77	22.93	24.24	20.07	17.63
15	19.45					-	27.65	23.37	24.21	19.87	17.64
16	19.49					-	27.59	23.52	24.06	19.69	17.62
17	19.48					-	27.53	23.58	23.85	19.68	17.61
18	19.52					-	27.44	23.67	23.58	19.81	17.62
19	19.56					-	27.36	23.86	23.34	19.64	17.63
20	19.46					-	27.24	24.08	23.20	19.69	17.63
21	19.46					-	27.13	24.30	23.24	19.75	17.61
22	19.43					-	27.00	24.40	23.13	19.74	17.59
23	19.43					-	26.81	24.39	22.89	19.67	17.58
24	19.45					-	26.60	24.26	23.74	19.58	17.57
25	19.41					-	26.37	24.14	24.93	19.47	17.58
26	19.38					-	26.12	23.98	25.49	19.48	17.58
27	19.38					-	25.83	23.80	25.60	19.55	17.56
28	19.36					25.25	25.53	23.59	25.50	19.57	17.56
29	19.38				-----	25.25	25.27	23.36	25.30	19.54	17.61
30	19.39				-----	24.90	24.97	23.13	25.13	19.49	17.60
31	-	-----			-----	24.20	-----	22.94	-----	19.47	-----
MAX	19.73	-	-	-	-	-	27.79	24.64	25.60	24.94	17.92
MIN	19.36	-	-	-	-	-	23.02	22.35	22.89	19.47	17.56

Note.--Add 1,000 ft to obtain elevation above mean sea level.

## 5-1080. Roseau River near Badger, Minn.--Continued

MEAN ELEVATION, IN FEET, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	17.62						-	25.39	-	27.53	19.18	19.67
2	17.64						-	25.74	20.18	27.21	19.16	19.88
3	17.58						-	25.25	20.04	26.66	19.57	20.13
4	17.57						-	25.23	19.87	26.50	20.57	20.34
5	17.58						-	25.22	19.68	26.06	21.00	20.33
6	17.58						-	25.28	19.53	25.56	20.90	20.22
7	17.59						-	25.35	19.52	25.06	20.63	20.85
8	17.60						-	25.50	19.49	24.60	20.37	19.98
9	17.62						-	25.54	20.22	24.15	20.12	19.88
10	17.62						20.04	25.58	22.35	23.79	19.84	19.78
11	17.61						22.86	25.59	24.62	23.38	19.64	19.68
12	17.59						25.66	25.53	25.88	22.91	19.48	19.56
13	17.58						26.07	25.40	26.42	22.36	19.35	19.54
14	17.61						26.11	25.22	26.56	21.89	19.22	19.50
15	17.68						26.17	25.01	26.74	21.56	19.12	19.45
16	17.69						26.82	-	26.99	21.07	19.09	19.35
17	17.65						26.64	-	27.21	21.55	18.98	19.23
18	17.61						26.57	-	27.42	22.25	18.87	19.18
19	17.61						26.65	-	27.73	22.25	18.77	19.13
20	17.59						26.69	-	27.94	21.79	18.66	19.09
21	17.59						26.65	-	28.13	21.72	18.56	19.08
22	17.62						26.52	-	28.27	21.69	18.52	19.03
23	17.76						26.39	-	28.38	21.94	18.53	19.15
24	17.91						26.24	-	28.46	21.81	18.57	19.66
25	17.86						26.09	-	28.48	21.37	18.64	20.51
26	17.89						25.92	-	28.48	20.77	18.69	21.36
27	18.26						25.70	-	28.43	20.23	18.68	23.51
28	18.44						25.50	-	28.24	19.91	18.66	25.14
29	18.39						25.44	-	28.04	19.69	18.68	25.44
30	18.35						25.41	-	27.80	19.52	18.98	25.52
31	-	-----					-----	-	-	19.33	19.43	-----
MAX	18.44	-	-	-	-	-	-	-	28.48	27.53	21.00	25.52
MIN	17.57	-	-	-	-	-	-	-	19.49	19.33	18.52	19.03

Note.--Add 1,000 ft to obtain elevation above mean sea level.

MEAN ELEVATION, IN FEET, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	25.60	20.76					-	30.60	26.78	24.03	20.10	18.39
2	25.73	20.83					-	30.41	26.60	24.68	20.05	18.39
3	25.81	21.77					-	30.22	26.50	25.16	19.91	18.37
4	25.81	-					-	30.02	26.43	25.28	19.75	18.68
5	25.82	-					-	29.98	26.38	25.23	19.65	20.21
6	25.83	-					-	29.95	26.41	25.12	20.18	20.96
7	25.84	-					-	29.90	26.57	25.00	20.25	20.93
8	25.81	-					-	30.00	26.67	24.74	19.90	20.78
9	25.74	-					-	30.12	26.81	24.34	19.54	20.54
10	25.63	-					-	30.15	26.89	23.88	19.28	20.42
11	-	-					-	30.05	26.93	23.40	19.07	20.28
12	-	-					28.01	30.07	26.94	23.01	18.92	20.12
13	-	-					28.69	29.99	26.85	23.06	18.77	20.06
14	-	-					29.32	29.95	26.74	23.39	18.67	20.01
15	-	-					30.11	29.88	26.55	23.51	18.56	20.55
16	-	-					-	30.64	29.74	26.33	23.30	21.08
17	-	-					-	31.07	29.59	26.06	23.16	21.54
18	-	-					-	31.36	29.39	25.71	23.43	22.05
19	-	-					-	31.51	29.29	25.33	23.66	22.15
20	-	-					-	31.64	29.10	24.90	23.55	22.03
21	-	-					-	31.69	28.94	24.42	23.63	21.94
22	-	-					-	31.72	28.78	23.92	23.73	21.56
23	-	-					-	31.67	28.60	23.47	23.50	21.60
24	-	-					-	31.59	28.41	22.98	22.99	22.06
25	-	-					-	31.49	28.10	22.49	22.37	22.40
26	-	-					-	31.36	27.94	22.01	21.86	22.63
27	-	-					-	31.21	27.77	21.95	21.15	22.70
28	21.16	-					-	31.04	27.57	22.76	20.70	22.64
29	21.03	-					-	30.89	27.36	23.88	20.35	22.55
30	21.00	-					-	30.75	27.17	24.01	20.10	23.25
31	20.98	-----					-----	26.96	-----	20.08	18.36	-----
MAX	-	-	-	-	-	-	-	30.60	26.94	25.28	20.25	23.25
MIN	-	-	-	-	-	-	-	26.96	21.95	20.08	18.08	18.37

Note.--Add 1,000 ft to obtain elevation above mean sea level.

5-1095. Roseau River near Haug, Minn.

Location--Lat 48°55'28", long 96°12'26", in SE $\frac{1}{4}$  sec.21, T.163 N., R.43 W., on left bank 250 ft down-stream from abandoned highway bridge, 5 miles south of international boundary, and  $8\frac{1}{4}$  miles north-west of Haug.

Records available--April 1932 to September 1965 (incomplete).

Gage--Water-stage recorder. Datum of gage is 1,014.02 ft above mean sea level, adjustment of 1928. By Geodetic Survey of Canada. Gage readings have been reduced to elevations above mean sea level.

Extremes--Maximum and minimum elevations, in feet, for the water years 1961-65 are contained in the following table:

Water year	Maximum		Minimum recorded	
	Date	Elevation	Date	Elevation
1961	Mar. 27 to Apr. 23, 1961.....	a 1,022.78	Sept. 4, 1961.....	1,014.75
1962	June 21, 1962b.....	1,023.54	Nov. 2, 1961.....	1,015.86
1963	Apr. 21, 22, 1963.....	1,022.87	Sept. 27, 1963.....	1,014.92
1964	June 29, 1964.....	1,023.00	Oct. 8, 13, 22, 1963.....	1,014.85
1965	May 2, 1965b.....	a 1,023.96	Aug. 26, 1965.....	1,015.35

a From floodmarks.

b About.

1932-65: Maximum elevation, 1,024.64 ft May 15, 1950; minimum recorded, 1,014.74 ft Aug. 8, 1933.

Flood in July 1919 reached an elevation of about 1,024 ft.

MEAN ELEVATION, IN FEET, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	15.62					-	-	18.60	16.18	15.15	15.40	14.91
2	15.59					-	-	18.45	16.24	15.09	15.37	14.91
3	15.56					-	-	18.21	16.26	15.10	15.35	14.82
4	15.54					-	-	18.00	16.34	15.09	15.38	14.85
5	15.50					-	-	17.83	16.37	15.08	15.35	14.84
6	15.47					-	-	17.73	16.26	15.11	15.30	14.84
7	15.44					-	-	17.70	16.12	15.14	15.24	14.81
8	15.40					-	-	17.84	16.09	15.16	15.21	14.89
9	15.36					-	-	18.31	15.92	15.17	15.21	14.93
10	15.33					-	-	18.51	15.84	15.17	15.20	15.07
11	15.32					-	-	18.44	15.74	15.18	15.18	15.17
12	15.31					-	-	18.39	15.65	15.33	15.17	15.11
13	15.31					-	-	18.35	15.54	15.35	15.17	15.11
14	15.31					-	-	18.27	15.46	15.36	15.14	15.19
15	15.31					-	-	18.18	15.38	15.34	15.12	15.73
16	15.30					-	-	18.08	15.31	15.31	15.11	16.23
17	15.30					-	-	17.99	15.28	15.26	15.09	16.42
18	15.29					-	-	17.86	15.29	15.22	15.10	16.53
19	15.29					-	-	17.68	15.20	15.22	15.08	16.75
20	15.28					-	-	17.49	15.15	15.20	15.04	16.85
21	15.27					-	-	17.24	15.10	15.20	15.03	16.77
22	15.28					16.69	-	17.13	15.10	15.25	15.02	16.66
23	15.29					17.09	-	17.04	15.04	15.30	15.01	16.58
24	15.29					18.41	19.44	16.95	15.00	15.30	15.01	16.69
25	-					20.29	19.36	16.77	14.98	15.28	14.99	17.06
26	-					21.16	19.18	16.65	14.97	15.27	14.95	17.31
27	-					-	-	19.05	16.53	14.99	14.94	17.36
28	-					-	-	18.87	16.43	15.00	14.92	17.27
29	-					-	-	18.76	16.30	15.01	15.45	14.90
30	-					-----	-	18.71	16.22	15.06	15.45	14.91
31	-	-----				-----	-	16.19	-----	15.45	14.93	-----
MAX	-	-	-	-	-	-	-	18.60	16.37	15.45	15.40	17.36
MIN	-	-	-	-	-	-	-	16.19	14.97	15.08	14.90	14.81

Note--Add 1,000 ft to obtain elevation above mean sea level.

## 5-1095. Roseau River near Haug, Minn.--Continued

MEAN ELEVATION, IN FEET, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	16.84	15.93					-	22.81	23.27	23.13	17.51	20.89
2	16.75	15.90					-	22.79	23.32	23.07	17.41	20.34
3	16.69	15.99					-	22.75	-	23.00	17.46	19.86
4	16.62	-					-	22.70	-	22.91	17.52	19.48
5	16.59	-					17.67	22.60	-	22.83	18.56	19.20
6	16.49	-					17.76	22.55	-	22.73	20.27	19.00
7	16.47	-					17.85	22.51	-	22.65	21.53	18.83
8	16.43	-					18.06	22.43	-	22.64	21.90	18.78
9	16.35	-					18.25	22.35	-	22.51	22.11	18.97
10	16.30	-					-	22.26	-	22.33	22.27	18.99
11	16.33	-					-	22.16	-	22.13	22.43	19.14
12	16.34	-					-	22.05	-	21.88	22.56	19.39
13	16.33	-					-	22.02	-	21.55	22.63	19.57
14	16.34	-					20.89	22.02	-	21.13	22.68	19.63
15	16.48	-					20.94	21.99	-	20.53	22.75	19.58
16	16.71	-					21.03	21.99	-	19.86	22.74	19.37
17	16.65	-					21.31	22.03	-	19.23	22.74	19.11
18	16.86	-					21.63	22.07	-	18.71	22.74	18.77
19	16.83	-					21.91	22.17	-	18.23	22.71	18.45
20	16.78	-					22.21	22.27	-	17.85	22.67	18.15
21	16.75	-					22.34	22.35	-	17.62	22.62	17.85
22	16.71	-					22.46	22.46	-	17.52	22.55	17.60
23	16.62	-					22.55	22.63	-	17.52	22.50	17.42
24	16.54	-					22.62	22.74	-	17.63	22.44	17.28
25	16.42	-					22.71	22.85	-	17.82	22.37	17.13
26	16.30	-					22.77	22.93	-	17.95	22.30	17.03
27	16.20	-					22.82	23.01	-	18.00	22.21	16.90
28	16.11	-					22.85	23.08	23.31	17.98	22.06	16.80
29	16.04	-			-----		22.85	23.13	23.28	17.84	21.91	16.72
30	15.97	-			-----		22.82	23.18	23.21	17.74	21.70	16.58
31	15.95	-----			-----		-----	23.22	-----	17.64	21.36	-----
MAX	16.86	-	-	-	-	-	-	23.22	-	23.13	22.74	20.89
MIN	15.95	-	-	-	-	-	-	21.99	-	17.52	17.41	16.58

Note.--Add 1,000 ft to obtain elevation above mean sea level.

MEAN ELEVATION, IN FEET, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	16.47					-	20.24	21.81	-	21.39	16.42	15.20
2	16.42					-	19.62	21.59	-	21.25	16.63	15.19
3	16.39					-	19.21	21.37	-	20.99	16.80	15.16
4	16.36					-	-	21.05	-	20.62	16.81	15.14
5	16.33					-	19.71	20.61	-	20.18	16.71	15.12
6	16.32					-	20.67	20.16	-	19.80	16.53	15.10
7	16.28					-	21.58	19.81	-	19.36	16.34	15.09
8	16.26					-	22.13	19.54	-	18.90	16.17	15.06
9	16.23					-	22.34	19.40	-	18.49	16.01	15.03
10	16.22					-	22.43	19.28	-	18.05	15.89	15.01
11	16.27					-	22.50	19.18	-	17.74	15.79	15.02
12	16.31					-	22.56	19.06	21.29	17.51	15.72	15.05
13	16.28					-	22.63	19.03	21.33	17.26	15.66	15.01
14	16.24					-	22.67	-	21.27	16.97	15.59	14.98
15	16.22					-	22.70	-	21.21	16.76	15.54	14.99
16	16.27					-	22.74	-	21.12	16.65	15.59	14.99
17	16.29					-	22.79	-	20.98	16.55	15.55	14.98
18	16.34					-	22.83	-	20.79	16.64	15.52	14.99
19	16.37					-	22.85	-	20.59	16.72	15.51	14.99
20	16.21					-	22.85	-	20.38	16.69	15.51	14.98
21	16.28					-	22.87	-	20.27	16.65	15.51	14.98
22	16.27					-	22.87	-	20.18	16.64	15.49	14.97
23	16.23					-	22.85	-	20.04	16.59	15.46	14.94
24	16.25					-	22.81	-	20.04	16.51	15.42	14.94
25	16.39					-	22.75	-	20.77	16.43	15.36	14.94
26	16.41					-	22.68	-	21.29	16.36	15.32	14.93
27	16.40					-	21.54	-	21.54	16.42	15.32	14.92
28	16.38					21.44	22.41	-	21.61	16.52	15.32	14.96
29	16.35				-----	21.46	22.19	-	21.58	16.47	15.34	14.95
30	16.37				-----	21.29	21.96	-	21.50	16.42	15.32	14.94
31	-	-----			-----	20.75	-----	-	-----	16.40	15.24	-----
MAX	16.47	-	-	-	-	-	22.87	-	-	21.39	16.81	15.20
MIN	16.21	-	-	-	-	-	19.21	-	-	16.36	15.24	14.92

Note.--Add 1,000 ft to obtain elevation above mean sea level.

## 5-1095. Roseau River near Haug, Minn.--Continued

MEAN ELEVATION, IN FEET, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	14.93						-	21.72	17.59	22.97	16.27	16.50
2	14.95						-	21.71	17.08	22.92	16.16	16.61
3	14.97						-	21.66	16.88	22.87	16.35	16.78
4	14.92						-	21.84	16.74	22.79	16.75	16.95
5	14.90						-	21.60	16.58	22.71	17.35	16.99
6	14.90						-	21.61	16.49	22.58	17.46	16.94
7	14.89						-	21.61	16.40	22.42	17.32	16.84
8	14.89						-	21.66	16.39	22.24	17.08	16.74
9	14.89						-	21.70	16.87	22.11	16.88	16.67
10	14.91						16.94	21.73	16.19	21.92	16.70	16.60
11	14.90						17.25	21.75	19.53	21.56	16.55	16.54
12	14.88						-	21.76	20.83	21.03	16.41	16.44
13	14.87						-	21.73	21.49	20.32	16.30	16.40
14	14.88						-	21.86	21.74	19.58	16.21	16.39
15	14.88						21.67	21.55	21.88	18.92	16.14	16.35
16	14.91						21.81	21.35	21.99	18.39	16.08	16.21
17	14.92						21.93	21.10	22.12	18.78	16.04	16.05
18	14.92						22.02	20.63	22.24	19.03	16.00	15.97
19	14.91						22.06	20.63	22.55	18.17	15.94	15.93
20	14.91						22.10	20.54	22.47	18.90	15.86	15.91
21	14.88						22.14	20.47	22.57	18.57	15.83	15.90
22	14.88						22.15	20.42	22.66	18.50	15.79	15.99
23	14.89						22.14	20.26	22.74	18.56	15.79	15.99
24	14.99						22.11	20.05	22.82	18.59	15.80	16.13
25	15.10						22.10	19.76	22.89	18.32	15.84	16.74
26	15.08						22.07	19.47	22.93	17.86	15.88	17.47
27	15.13						22.01	19.18	22.98	17.34	15.90	18.41
28	15.41						21.88	18.85	22.99	16.96	15.89	20.23
29	15.47						21.81	18.52	22.99	16.72	15.90	20.86
30	-				-----		21.75	18.19	22.99	16.53	16.00	21.04
31	-	-----			-----		-----	17.79	-----	16.39	16.26	-----
MAX	-	-	-	-	-	-	-	21.76	22.99	22.97	17.46	21.04
MIN	-	-	-	-	-	-	-	17.79	16.39	16.39	15.79	15.90

Note.--Add 1,000 ft to obtain elevation above mean sea level.

MEAN ELEVATION, IN FEET, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	21.12						-	-	23.06	20.91	17.65	15.58
2	21.22						-	-	23.02	21.34	17.57	15.57
3	21.32						-	-	22.98	21.57	17.44	15.56
4	21.39						-	-	22.91	21.69	17.30	15.80
5	21.41						-	-	22.84	21.75	17.20	16.62
6	21.44						-	-	22.82	21.76	17.13	17.40
7	21.46						-	23.83	22.78	21.76	17.17	17.52
8	21.47						-	23.81	22.76	21.69	16.92	17.44
9	21.47						-	23.81	22.75	21.58	16.80	17.28
10	21.45						-	23.83	22.75	21.56	16.33	17.11
11	21.40						-	23.81	22.75	21.01	16.16	16.97
12	21.32						22.10	23.82	22.74	20.69	16.03	16.82
13	21.20						22.53	23.80	22.73	20.45	15.95	16.73
14	21.04						22.97	23.77	22.72	20.38	15.92	16.75
15	20.84						23.17	23.74	22.68	20.42	-	16.95
16	20.58						23.31	23.71	22.63	20.42	-	17.42
17	20.37						23.42	23.70	22.57	20.27	-	-
18	20.13						23.50	23.67	22.47	20.22	-	-
19	19.87						23.59	23.85	22.36	20.56	-	-
20	19.57						-	23.61	22.22	20.43	-	-
21	19.29						-	23.57	22.02	20.41	-	-
22	19.07						-	23.54	21.75	20.48	-	-
23	18.86						-	23.51	21.39	20.45	-	-
24	18.69						-	23.48	20.91	20.20	-	-
25	18.50						-	23.43	20.31	19.77	-	-
26	18.31						-	23.39	19.69	19.22	15.35	-
27	18.05						-	23.34	18.70	18.39	15.39	-
28	17.86						-	23.30	20.03	18.27	15.39	18.95
29	17.69				-----		-	23.24	20.39	17.95	15.45	-
30	17.64				-----		-	23.19	20.70	17.76	15.55	-
31	-	-----			-----		-----	23.15	-----	17.69	15.58	-----
MAX	21.47	-	-	-	-	-	-	-	23.06	21.76	-	-
MIN	17.64	-	-	-	-	-	-	-	19.69	17.69	-	-

Note.--Add 1,000 ft to obtain elevation above mean sea level.

5-1120. Roseau River below State ditch 51, near Caribou, Minn.

(International gaging station)

Location.--Lat 48°58'54", long 96°27'46", in SE $\frac{1}{4}$ SW $\frac{1}{4}$  sec.34, T.164 N., R.45 W., on left bank 400 ft downstream from State ditch 51 (known locally as Caribou cutoff ditch) and 0.6 mile west of Caribou.

Drainage area.--1,570 sq mi, approximately.

Records available.--April to October 1917, April 1920 to September 1965 (some winter records incomplete). Published as "at Caribou" prior to April 1929 and as "below Cutoff ditch, near Caribou" April 1929 to September 1936. Records published for both sites April 1929 to September 1930. Monthly discharge only for some periods, published in WSP 1308 and 1728.

Gage.--Water-stage recorder. Datum of gage is 1,002.14 ft above mean sea level, adjustment of 1928 by Geodetic Survey of Canada. Prior to Apr. 1, 1929, chain gage at site at Caribou 0.6 mile upstream at datum 0.95 ft lower.

Average discharge.--15 years (1920-30, 1932-33, 1936-37, 1940-43), 298 cfs (215,700 acre-ft per year).

Extremes.--Maximum and minimum discharges for the water years 1961-65 are contained in the following table:

Water year	Date	Maximum		Date	Minimum	
		Discharge (cfs)	Gage height (feet)		Discharge (cfs)	Gage height (feet)
1961	Mar. 29, 1961	611	a 5.96	Aug. 17, 1961	b 1.7	c 1.44
1962	June 11, 1962	2,070	8.63	Nov. 3, 1961	d 20	-
1963	Apr. 25, 1963	1,510	e 7.46	Sept. 14-18, 24-29	d 11	f 1.80
1964	July 2, 1964	1,430	g 7.21	Apr. 1, 1964	d 10	h 2.22
1965	May 6, 1965	2,690	9.64	Mar. 25-29, 1965	d 11	-

a From floodmarks, backwater from ice.

b Minimum recorded.

c Occurred Sept. 6-8, 1961.

d Minimum daily recorded.

e Maximum gage height for year, 7.63 ft Mar. 31, 1963, backwater from ice.

f Minimum recorded, occurred Sept. 6-7, 1963.

g Maximum gage height for year, 7.61 ft Apr. 17, 1964, backwater from ice.

h Minimum recorded, occurred Aug. 25-28, 1964.

1917, 1920-65: Maximum discharge, 4,080 cfs May 19, 1950 (gage height, 11.81 ft); no flow Aug. 18, 1936.

Flood in 1916 is reported to have reached a stage of about 15.5 ft at former site.

Remarks.--Records good except those for periods of ice effect, shifting control, and no gage-height record, which are fair. Occasionally, at high stages, there is some natural diversion of flow above station to headwaters of Two Rivers. Station not operated during winter period.

Cooperation.--This station is maintained by the United States under agreement with Canada.

Revisions (water years).--WSP 1308: 1938(M). WSP 1508: 1917(M), 1920, 1932(M), 1934-35(M).

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

OAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	7.3					-	540	398	83	7.3	5.8	2.4
2	7.3					-	500	370	78	6.8	5.6	2.7
3	6.6					-	440	336	80	6.0	5.8	2.7
4	6.2					-	480	303	77	5.8	6.0	2.4
5	6.4					-	460	281	83	5.8	5.4	2.1
6	6.4					-	400	267	78	5.8	5.2	2.0
7	5.6					-	320	255	62	5.2	4.8	1.9
8	5.0					-	200	261	57	5.2	4.0	2.5
9	4.4					-	190	316	49	5.6	3.4	3.4
10	4.4					-	160	365	40	6.0	3.0	4.0
11	4.6					-	140	363	37	6.2	2.9	5.2
12	5.8					-	130	352	33	6.4	2.8	6.4
13	6.4					-	125	340	29	8.2	2.4	8.2
14	6.8					-	125	331	25	8.8	2.2	9.4
15	6.8					-	101	314	23	8.5	2.2	9.7
16	6.6					-	89	299	22	7.9	2.0	29
17	6.6					-	137	289	19	6.4	2.1	46
18	6.8					-	135	273	19	5.6	2.4	48
19	7.0					-	146	251	18	5.0	2.5	54
20	7.9					-	219	231	14	4.8	2.4	69
21	8.2					-	312	201	12	5.6	2.3	71
22	8.8					14	409	178	12	5.8	2.2	68
23	9.1					20	492	171	11	6.6	2.1	64
24	7.9					40	529	162	9.4	6.2	2.0	62
25	-					150	529	146	8.5	5.2	2.2	80
26	-					350	492	127	7.0	4.6	2.5	108
27	-					500	472	116	6.6	4.2	2.7	116
28	-					560	442	106	6.6	5.0	2.6	113
29	-					590	423	96	6.6	6.6	2.3	105
30	-					600	411	86	6.6	6.4	2.2	86
31	-					580	-----	80	-----	6.4	2.3	-----
TOTAL	-					-	9,568	7,662	1,012.3	189.9	98.3	1,184.0
MEAN	-					-	319	247	33.7	6.13	3.17	39.5
MAX	-					-	540	398	83	8.8	6.0	116
MIN	-					-	89	80	6.6	4.2	2.0	1.9
AC-FT	-					-	18,980	15,200	2,010	377	195	2,350

Note.--Shifting-control method used May 22 to Sept. 30. No gage-height record Mar. 29, Apr. 1-6.

5-1120. Roseau River below State ditch 51, near Caribou, Minn.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962												
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	78	26				-	35	1,230	1,580	1,780	206	872
2	70	27				-	50	1,260	1,610	1,750	190	757
3	66	20				-	70	1,260	1,640	1,710	202	643
4	62	-				-	80	1,260	1,660	1,680	239	559
5	56	-				-	100	1,240	1,680	1,630	328	494
6	53	-				-	120	1,230	1,700	1,590	528	443
7	50	-				-	140	1,230	1,720	1,570	807	416
8	50	-				-	170	1,230	1,750	1,590	904	401
9	46	-				-	200	1,210	1,770	1,520	957	443
10	42	-				-	220	1,210	1,920	1,450	994	446
11	52	-				-	240	1,180	2,060	1,360	1,030	453
12	46	-				-	260	1,160	2,020	1,270	1,060	489
13	44	-				-	300	1,120	1,960	1,200	1,070	520
14	44	-				-	340	1,160	1,950	1,080	1,090	531
15	45	-				-	380	1,140	2,010	942	1,120	531
16	56	-				-	420	1,120	2,030	785	1,150	502
17	68	-				-	460	1,120	2,020	643	1,180	453
18	72	-				-	520	1,100	2,020	518	1,210	403
19	72	-				-	600	1,120	2,010	418	1,230	344
20	70	-				-	900	1,140	2,010	351	1,230	295
21	68	-				-	800	1,140	2,000	308	1,240	252
22	68	-				-	800	1,140	2,000	277	1,250	212
23	63	-				-	900	1,330	1,990	271	1,250	188
24	57	-				-	1,050	1,510	1,970	273	1,220	171
25	54	-				-	1,080	1,450	1,960	288	1,200	152
26	46	-				-	1,100	1,410	1,930	295	1,170	140
27	41	-				22	1,130	1,400	1,890	293	1,140	125
28	38	-				24	1,160	1,420	1,880	286	1,110	115
29	34	-				30	1,180	1,440	1,860	267	1,080	122
30	30	-				35	1,210	1,520	1,830	246	1,050	97
31	27	-----				35		1,560	-----	227	963	-----
TOTAL	1,668	-				-	16,015	39,040	56,440	27,868	29,378	11,574
MEAN	53.8	-				-	534	1,259	1,881	899	948	386
MAX	78	-				-	1,210	1,560	2,060	1,780	1,250	872
MIN	27	-				-	1,100	1,410	1,580	227	97	
AC-FT	3,310	-				-	31,770	77,430	111,900	55,280	58,270	22,960

Note.--Shifting-control method used Oct. 1 to Nov. 2, July 18 to Sept. 30.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963												
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	89					-	600	1,310	686	933	104	20
2	82					-	550	1,240	670	912	110	19
3	79					-	500	1,170	768	872	131	18
4	79					-	550	1,080	807	807	138	16
5	76					-	594	976	819	721	134	14
6	78					-	760	855	816	637	116	12
7	73					-	1,010	751	813	559	97	12
8	72					-	1,270	662	821	460	79	12
9	70					-	1,250	602	841	389	70	12
10	68					-	1,250	567	889	319	59	12
11	70					-	1,260	541	924	269	51	12
12	73					-	1,270	528	957	231	46	12
13	75					-	1,290	528	979	200	42	12
14	72					-	1,320	525	969	165	38	11
15	70					-	1,350	549	954	138	36	11
16	70					-	1,390	602	930	129	36	11
17	72					-	1,420	640	902	115	38	11
18	78					-	1,430	662	858	113	36	11
19	79					-	1,450	678	816	132	35	12
20	79					-	1,470	707	771	132	34	12
21	73					-	1,480	737	723	122	33	12
22	75					-	1,500	763	710	116	34	12
23	72					-	1,500	779	686	113	32	12
24	73					-	1,500	777	656	108	30	11
25	79					-	1,510	751	749	99	26	11
26	86					-	1,500	721	863	107	25	11
27	88					-	1,480	691	939	110	24	11
28	86					250	1,450	656	960	116	24	11
29	85					300	1,420	618	963	115	23	11
30	80					500	1,370	578	960	104	23	12
31	-					600		589		105	22	
TOTAL	-						36,694	22,833	25,199	9,448	1,726	376
MEAN	-						1,223	737	840	305	55.7	12.5
MAX	-						1,510	1,310	979	933	138	20
MIN	-						500	525	656	99	22	11
AC-FT	-						72,780	45,290	49,980	18,740	3,420	746

5-1120. Roseau River below State ditch 51, near Caribou, Minn.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	12						10	1,050	214	1,430	118	89
2	13						12	1,040	177	1,430	105	108
3	13						14	1,040	149	1,430	99	123
4	15						16	1,050	131	1,430	99	129
5	18						18	1,020	116	1,420	140	145
6	16						20	1,060	108	1,410	196	152
7	17						25	1,020	102	1,390	210	150
8	18						30	1,010	96	1,370	196	141
9	18						35	1,000	104	1,340	173	131
10	18						45	997	206	1,310	154	122
11	19						80	997	387	1,240	138	113
12	20						120	990	754	1,120	120	108
13	20						320	987	925	941	108	99
14	19						380	983	990	739	100	94
15	22						550	973	1,000	580	88	92
16	25						860	947	1,050	480	82	91
17	30						1,050	883	1,070	533	78	82
18	32						1,080	827	1,110	554	72	68
19	32						1,080	760	1,190	567	71	63
20	32						1,090	730	1,200	544	66	62
21	33						1,090	708	1,210	473	62	57
22	32						1,100	699	1,240	433	61	56
23	29						1,110	672	1,290	436	59	59
24	29						1,110	626	1,310	433	58	64
25	29						1,110	575	1,320	406	57	76
26	34						1,110	515	1,340	337	57	127
27	34						1,100	484	1,350	264	57	239
28	36						1,100	433	1,380	208	57	497
29	45						1,080	375	1,400	173	58	705
30	55						1,060	315	1,410	145	62	790
31	70							267		127	68	
TOTAL	835						17,805	25,033	24,329	24,693	3,069	4,832
MEAN	26.9						594	808	811	797	99.0	161
MAX	70						1,110	1,360	1,410	1,430	210	790
MIN	12						10	267	96	127	57	56
AC-FT	1,660						35,320	49,650	48,260	48,980	6,090	9,580

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	830					-	12	2,520	1,880	970	333	90
2	840					-	12	2,530	1,860	1,130	315	86
3	868					-	13	2,490	1,860	1,130	293	110
4	886					-	15	2,450	1,830	1,120	267	150
5	896					-	16	2,530	1,780	1,110	246	230
6	902					-	17	2,680	1,750	1,100	244	260
7	912					-	18	2,660	1,740	1,120	241	250
8	915					-	20	2,590	1,720	1,100	222	240
9	918					-	21	2,530	1,660	1,080	179	210
10	915					-	45	2,510	1,620	1,050	140	200
11	915					-	140	2,450	1,580	980	118	190
12	902					-	500	2,410	1,550	918	104	180
13	883					-	1,120	2,390	1,520	861	91	180
14	855					-	1,370	2,360	1,500	818	80	180
15	815					-	1,470	2,340	1,470	809	73	240
16	754					-	1,480	2,310	1,450	812	70	280
17	705					-	1,560	2,290	1,420	784	64	330
18	656					-	1,660	2,290	1,380	757	68	360
19	613					-	1,760	2,260	1,350	766	72	370
20	557					-	1,860	2,240	1,320	793	73	360
21	512					-	1,990	2,220	1,270	793	72	340
22	486					-	2,120	2,190	1,220	799	66	320
23	456					-	2,240	2,170	1,130	806	59	330
24	418					-	2,350	2,160	1,020	769	56	370
25	394					11	2,420	2,160	877	705	54	400
26	360					11	2,470	2,130	736	616	52	410
27	321					11	2,500	2,100	824	531	56	420
28	280					11	2,510	2,050	840	453	60	430
29	250					11	2,520	2,010	830	394	70	446
30	225					12	2,530	1,970	871	363	90	453
31	210					12		1,920		340	90	
TOTAL	20,449					-	36,759	71,910	41,858	25,777	4,018	8,415
MEAN	660					-	1,225	2,320	1,395	832	130	281
MAX	918					-	2,530	2,680	1,880	1,130	333	453
MIN	210					-	12	1,920	736	340	52	86
AC-FT	40,560					-	72,910	142,600	83,020	51,130	7,970	16,690

Note.--No gage-height record Aug. 26 to Sept. 27.

5-1125. Roseau River at international boundary, near Caribou, Minn.

Location.--Lat 48°59'57", long 96°30'20", near center of sec.29, T.164 N., R.45 W., on left bank 400 ft upstream from international boundary crossing and 3 miles northwest of Caribou.

Drainage area.--1,590 sq mi, approximately.

Records available.--May 1933 to September 1965 (incomplete).

Gage.--Water-stage recorder. Datum of gage is 1,002.59 ft above mean sea level, adjustment of 1928 by Geodetic Survey of Canada. Gage readings have been reduced to elevations above mean sea level.

Extremes.--Maximum and minimum elevations, in feet, for the water years 1961-65 are contained in the following table:

Water year	Maximum		Minimum recorded	
	Date	Elevation	Date	Elevation
1961	Mar. 28 to Apr. 6, 1961.....	a 1,005.24	Aug. 28, 1961.....	1,002.44
1962	June 15, 1962.....	1,006.91	Apr. 5, 1962.....	1,002.68
1963	Apr. 1, 1963.....	1,006.69	Sept. 27, 1963.....	1,002.37
1964	Apr. 17, 1964.....	1,007.22	Oct. 17, 1963.....	1,002.83
1965	May 6, 1965.....	1,007.09	Apr. 9, 1965.....	1,002.44

a From floodmarks.

1933-65: Maximum elevation recorded, 1,007.43 ft Apr. 14, 1960; minimum recorded, 1,001.97 ft Aug. 14, 1933.

MEAN ELEVATION, IN FEET, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	2.94					-	-	4.12	3.38	2.80	2.68	-
2	2.94					-	-	4.07	3.57	2.80	2.68	-
3	2.93					-	-	3.99	3.53	2.80	2.67	-
4	2.92					-	4.28	3.91	3.37	2.79	2.68	-
5	2.91					-	-	3.86	3.40	2.77	2.68	-
6	2.91					-	-	3.82	3.38	2.76	2.67	-
7	2.90					-	4.11	3.81	3.32	2.76	2.68	-
8	2.90					-	3.88	3.81	3.29	2.75	2.67	-
9	2.89					-	3.79	3.92	3.26	2.75	2.66	-
10	2.89					-	3.72	4.04	3.21	2.73	2.66	-
11	2.88					-	3.66	4.06	3.16	2.74	2.66	-
12	2.87					-	3.54	4.02	3.13	2.73	2.65	-
13	2.86					-	3.52	4.01	3.08	2.73	2.64	-
14	2.85					-	3.53	4.00	3.03	2.73	2.63	-
15	2.84					-	3.38	3.97	2.99	2.73	2.62	-
16	2.83					-	3.27	3.95	2.94	2.73	2.61	2.84
17	2.82					-	3.41	3.91	2.92	2.72	2.62	3.19
18	2.81					-	3.46	3.88	2.91	2.71	2.62	3.25
19	2.81					-	3.51	3.83	2.91	2.71	-	3.30
20	2.80					-	3.70	3.78	2.86	2.71	-	3.37
21	2.79					-	3.94	3.73	2.84	2.71	-	3.37
22	2.79					-	4.16	3.67	2.82	2.71	-	3.35
23	2.78					-	4.31	3.65	2.82	2.70	-	3.32
24	2.78					-	4.41	3.63	2.83	2.69	-	3.30
25	-					-	4.42	3.59	2.83	2.69	-	3.36
26	-					3.00	4.35	3.53	2.82	2.69	-	3.49
27	-					3.74	4.30	3.50	2.82	2.68	-	3.54
28	-					-	4.23	3.47	2.82	2.68	2.44	3.53
29	-					-	4.18	3.43	2.81	2.68	-	3.49
30	-					4.13	4.16	3.39	2.80	2.67	-	3.44
31	-	-----				-	-----	3.37	-----	2.68	-	-----
MAX	-	-	-	-	-	-	-	4.12	3.40	2.80	-	-
MIN	-	-	-	-	-	-	-	3.37	2.80	2.67	-	-

Note.--Add 1,000 ft to obtain elevation above mean sea level.

## 5-1125. Roseau River at international boundary, near Caribou, Minn.--Continued

## MEAN ELEVATION, IN FEET, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	3.41	3.09					-	6.16	6.61	6.77	3.91	5.74
2	3.39	3.09					-	6.19	6.63	6.74	3.86	5.41
3	3.37	3.17					-	6.23	6.66	6.72	3.88	5.11
4	3.33	-					-	6.23	6.69	6.70	3.99	4.68
5	3.30	-					2.69	6.21	6.69	6.67	4.21	4.68
6	3.27	-					2.71	6.19	6.70	6.62	4.65	4.58
7	3.24	-					2.72	6.19	6.72	6.60	5.41	4.49
8	3.25	-					2.72	6.19	6.74	6.61	5.75	4.47
9	3.23	-					2.72	6.16	6.76	6.58	5.88	4.56
10	3.20	-					2.73	6.17	6.79	6.50	5.95	4.58
11	3.25	-					2.73	6.11	6.86	6.42	6.02	4.58
12	3.23	-					2.71	6.05	6.89	6.31	6.09	4.66
13	3.21	-					2.82	5.99	6.90	6.19	6.12	4.70
14	3.20	-					2.87	6.06	6.89	5.98	6.17	4.75
15	3.22	-					-	6.02	6.88	5.89	6.20	4.75
16	3.28	-					-	5.98	-	5.27	6.25	4.67
17	3.36	-					-	5.96	-	4.88	6.29	4.55
18	3.38	-					3.54	5.93	-	4.59	6.32	4.44
19	3.39	-					4.22	5.96	-	4.36	6.36	4.30
20	3.38	-					6.11	6.01	-	4.21	6.37	4.17
21	3.37	-					5.72	6.01	-	4.09	6.38	4.06
22	3.37	-					5.69	6.01	-	4.02	6.39	3.96
23	3.33	-					5.73	6.32	-	4.00	6.39	4.89
24	3.31	-					5.78	6.56	-	4.03	6.36	3.83
25	3.30	-					5.83	6.47	-	4.06	6.32	3.77
26	3.27	-					5.91	6.42	-	4.08	6.29	3.74
27	3.22	-					5.96	6.40	-	4.10	6.25	3.69
28	3.19	-					6.01	6.42	6.81	4.08	6.19	3.66
29	3.16	-					6.07	6.45	6.80	4.03	6.14	3.62
30	3.11	-			-----		6.12	6.50	6.79	3.99	6.06	3.59
31	3.09	-----			-----		-----	6.58	-----	3.95	5.93	-----
MAX	3.41	-	-	-	-	-	-	6.56	-	6.77	6.39	5.74
MIN	3.09	-	-	-	-	-	-	5.93	-	3.95	3.86	3.59

Note.--Add 1,000 ft to obtain elevation above mean sea level.

## MEAN ELEVATION, IN FEET, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	3.53					-	6.56	6.20	4.94	5.63	3.58	3.07
2	3.50					-	6.12	6.16	4.90	-	3.61	3.04
3	3.49					-	5.56	6.00	5.14	-	3.67	3.04
4	3.49					-	5.27	5.85	5.24	-	3.70	3.02
5	3.49					-	5.19	5.60	5.29	-	3.69	2.99
6	3.49					-	5.13	5.29	5.27	-	3.64	2.97
7	3.48					-	5.33	5.02	5.25	-	3.58	2.94
8	3.45					-	5.80	4.80	5.30	-	3.52	2.95
9	3.43					-	6.00	4.66	5.34	-	3.45	2.94
10	3.41					-	6.05	4.59	5.46	-	3.39	2.94
11	3.42					-	6.07	4.52	5.54	-	3.35	2.94
12	3.47					-	6.08	4.44	5.53	-	3.32	2.96
13	3.47					-	6.09	4.43	5.71	-	3.28	2.96
14	3.43					-	6.12	4.44	5.66	-	3.25	2.95
15	3.42					-	6.17	4.54	5.64	-	3.24	2.95
16	3.41					-	6.30	4.67	5.57	-	3.24	2.95
17	3.45					-	6.38	4.75	5.49	-	3.24	2.94
18	3.45					-	6.30	4.81	5.39	-	3.24	2.95
19	3.44					-	6.30	4.88	5.27	-	3.23	2.95
20	3.46					-	6.28	4.95	5.16	-	3.21	2.95
21	3.43					-	6.27	5.00	5.07	-	3.22	2.95
22	3.43					-	6.27	5.08	5.01	-	3.21	2.95
23	3.41					-	6.28	5.12	4.97	-	3.21	2.95
24	3.41					-	6.30	5.11	4.90	-	3.19	2.96
25	3.43					-	6.31	5.07	5.11	3.60	3.16	2.94
26	3.48					-	6.33	4.99	5.43	3.63	3.13	2.91
27	3.49					-	6.32	4.92	5.60	3.62	3.12	2.88
28	3.48					5.61	6.31	4.84	5.68	3.64	3.11	2.95
29	3.48				-----	5.68	6.30	4.74	5.69	3.63	3.12	2.96
30	3.47				-----	6.09	6.24	4.84	5.67	3.61	3.13	2.96
31	-	-----			-----	6.48	-----	4.67	-----	3.61	3.13	-----
MAX	3.53	-	-	-	-	-	6.56	6.20	5.71	-	3.70	3.07
MIN	3.41	-	-	-	-	-	5.13	4.43	4.90	-	3.11	2.88

Note.--Add 1,000 ft to obtain elevation above mean sea level.

5-1125. Roseau River at international boundary, near Caribou, Minn.--Continued

## MEAN ELEVATION, IN FEET, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	2.92						-	5.72	3.80	6.41	3.59	3.59
2	2.90						-	5.70	3.70	6.44	3.51	3.63
3	2.90						-	5.72	3.65	6.44	3.49	3.65
4	2.94						-	5.74	3.64	6.44	3.55	3.70
5	2.95						-	5.70	3.64	6.42	3.79	3.74
6	2.91						-	5.78	3.64	6.41	3.89	3.73
7	2.89						-	5.71	3.64	6.37	3.87	3.71
8	2.89						-	5.65	3.64	6.35	3.80	3.65
9	2.87						-	5.64	3.65	6.32	3.72	3.64
10	2.87						3.02	5.62	3.95	6.28	3.68	3.61
11	2.88						3.05	5.62	4.37	6.16	3.63	3.60
12	2.88						3.10	5.62	5.12	5.95	3.54	3.55
13	2.87						3.18	5.61	5.51	5.60	3.53	3.53
14	2.86						3.22	5.60	5.64	5.11	3.49	3.53
15	2.85						3.26	5.58	5.69	4.70	3.46	3.53
16	2.85						4.76	5.51	5.76	4.42	3.44	3.51
17	2.85						6.56	5.37	5.82	4.53	3.43	3.42
18	2.86						5.80	5.23	-	4.63	3.39	3.40
19	2.86						5.78	5.07	6.08	4.67	3.36	3.38
20	2.85						5.79	5.00	-	4.62	3.36	3.36
21	2.86						5.81	4.94	6.14	4.41	3.34	3.34
22	2.87						5.83	4.91	-	4.36	3.35	3.34
23	2.87						5.83	4.85	6.24	4.35	3.32	3.38
24	2.86						5.83	4.74	6.26	4.34	3.32	3.42
25	2.87						5.83	4.63	6.27	4.27	3.32	3.53
26	2.92						5.82	4.47	6.30	4.14	3.34	3.63
27	2.91						5.80	4.39	6.33	4.02	3.37	3.14
28	2.98						5.78	4.26	6.35	3.80	3.35	4.59
29	3.10						5.75	4.14	6.38	3.72	3.36	5.05
30	-				-----		5.73	4.03	6.40	3.65	3.42	5.29
31	-	-----			-----		-----	3.92	-----	3.60	3.48	-----
MAX	-	-	-	-	-	-	-	5.78	-	6.44	3.89	5.29
MIN	-	-	-	-	-	-	-	3.92	-	3.60	3.32	3.14

Note.--Add 1,000 ft to obtain elevation above mean sea level.

## MEAN ELEVATION, IN FEET, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	5.41						-	7.04	6.94	5.60	4.13	3.45
2	5.42						2.46	7.04	6.84	5.94	4.08	3.44
3	5.46						2.46	7.04	6.84	5.94	4.02	3.43
4	5.51						2.46	7.04	6.79	5.92	3.95	3.51
5	5.52						2.47	7.04	6.79	5.89	3.93	3.68
6	5.53						2.47	7.09	6.79	5.89	3.94	3.92
7	5.56						2.47	7.08	6.79	5.90	3.94	4.03
8	5.56						2.46	7.06	6.74	5.89	3.89	3.99
9	5.56						2.45	7.05	6.71	5.84	3.78	3.94
10	5.55						2.51	7.04	6.65	5.78	3.69	3.89
11	5.53						2.96	7.04	6.62	5.64	3.63	3.84
12	5.51						5.68	7.04	6.59	5.49	3.58	3.82
13	5.44						6.67	7.04	6.54	5.35	3.53	3.75
14	5.35						6.82	7.04	6.51	5.25	3.49	3.75
15	5.29						6.59	7.03	6.46	5.23	3.45	3.79
16	5.14						6.53	7.02	6.45	5.24	3.44	3.92
17	5.00						6.59	7.02	6.42	5.19	3.44	4.06
18	4.90						6.68	7.01	6.37	5.12	3.47	4.17
19	4.77						6.76	6.99	6.34	5.14	3.46	4.27
20	4.61						6.83	6.99	6.27	5.20	3.47	4.30
21	4.50						6.87	6.97	6.20	5.21	3.44	4.29
22	4.41						6.94	6.96	6.12	5.22	3.41	4.24
23	4.32						6.97	6.95	5.99	5.23	3.39	4.16
24	4.27						7.01	6.95	5.78	5.17	3.36	4.19
25	4.19						7.03	6.94	5.43	5.02	3.36	4.29
26	4.12						7.04	6.94	5.09	4.79	3.35	4.36
27	4.06						7.04	6.94	5.28	4.55	3.36	4.44
28	3.96						7.04	6.94	5.33	4.39	3.36	4.46
29	-				-----		7.06	6.94	5.27	4.24	3.41	4.47
30	-				-----		7.04	6.94	5.36	4.19	3.44	4.49
31	-	-----			-----		-----	6.94	-----	4.14	3.45	-----
MAX	5.56	-	-	-	-	-	7.06	7.09	6.94	5.94	4.13	4.49
MIN	3.96	-	-	-	-	-	2.45	6.94	5.09	4.14	3.35	3.43

Note.--Add 1,000 ft to obtain elevation above mean sea level.

5-1133.6. Long Creek at western crossing of international boundary

(International gaging station)

Location.--Lat 49°00'01", long 103°21'08", in SE $\frac{1}{4}$  sec.1, T.1, R.11 W., 2d meridian, on right bank 10 miles south of Outram, Saskatchewan.

Drainage area.--2,020 sq mi, of which about 1,270 sq mi is probably noncontributing.

Records available.--March 1959 to September 1965.

Gage.--Water-stage recorder and artificial control. Datum of gage is 1,894.00 ft above mean sea level, international boundary survey.

Average discharge.--6 years, 20.9 cfs (15,130 acre-ft per year).

Extremes.--Maximum and minimum discharges for the water years 1961-65 are contained in the following table:

Water year	Maximum			Minimum		
	Date	Discharge (cfs)	Gage height (feet)	Date	Discharge (cfs)	Gage height (feet)
1961	Mar. 17, 1961	10.3	1.46	Several months	0	-
1962	Apr. 4, 1962	144	2.34	do.	0	-
1963	June 8, 1963	703	5.66	do.	0	-
1964	Apr. 4, 1964	a 476	do.	do.	0	-
1965	Apr. 18, 1965	814	5.71	do.	0	-

a Maximum daily.

1959-65: Maximum daily discharge, 1,330 cfs Mar. 27, 1960 (gage height, 8.61 ft, backwater from ice); no flow for several months in each year.

Remarks.--Records good. Discharge affected by storage in upstream reservoirs.

Cooperation.--This station is one of the international gaging stations maintained by Canada under agreement with the United States.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	N11	N11	N11	N11	N11	N11	0.0	N11	N11	N11	N11	N11
2	"	"	"	"	"	"	0.0	"	"	"	"	"
3	"	"	"	"	"	"	0.0	"	"	"	"	"
4	"	"	"	"	"	"	0.0	"	"	"	"	"
5	"	"	"	"	"	"	0.0	"	"	"	"	"
6	"	"	"	"	"	"	0.0	"	"	"	"	"
7	"	"	"	"	"	"	N11	"	"	"	"	"
8	"	"	"	"	"	"	"	"	"	"	"	"
9	"	"	"	"	"	"	"	"	"	"	"	"
10	"	"	"	"	"	"	"	"	"	"	"	"
11	"	"	"	"	"	"	"	"	"	"	"	"
12	"	"	"	"	"	"	"	"	"	"	"	"
13	"	"	"	"	"	"	"	"	"	"	"	"
14	"	"	"	"	"	"	"	"	"	"	"	"
15	"	"	"	"	"	"	"	"	"	"	"	"
16	"	"	"	"	"	5	"	"	"	"	"	"
17	"	"	"	"	"	9.8	"	"	"	"	"	"
18	"	"	"	"	"	8.3	"	"	"	"	"	"
19	"	"	"	"	"	6.5	"	"	"	"	"	"
20	"	"	"	"	"	5.0	"	"	"	"	"	"
21	"	"	"	"	"	3.4	"	"	"	"	"	"
22	"	"	"	"	"	2.3	"	"	"	"	"	"
23	"	"	"	"	"	1.3	"	"	"	"	"	"
24	"	"	"	"	"	0.8	"	"	"	"	"	"
25	"	"	"	"	"	0.6	"	"	"	"	"	"
26	"	"	"	"	"	0.4	"	"	"	"	"	"
27	"	"	"	"	"	0.3	"	"	"	"	"	"
28	"	"	"	"	N11	0.2	"	"	"	"	"	"
29	"	"	"	"	-----	0.1	"	"	"	"	"	"
30	"	N11	"	"	-----	0.1	N11	"	N11	"	"	N11
31	N11	-----	N11	N11	-----	0.1	-----	N11	-----	N11	N11	-----
TOTAL	N11	N11	N11	N11	N11	44.3	0.0	N11	N11	N11	N11	N11
MEAN	N11	N11	N11	N11	N11	1.43	0.0	N11	N11	N11	N11	N11
MAX	N11	N11	N11	N11	N11	9.8	0.0	N11	N11	N11	N11	N11
MIN	N11	N11	N11	N11	N11	N11	N11	N11	N11	N11	N11	N11
AC-FT	N11	N11	N11	N11	N11	87.9	0.0	N11	N11	N11	N11	N11

CALENDAR YEAR 1960: MAX 1,330 MIN N11 MEAN 35.3 AC-FT 25,640

WATER YEAR 1960-61: MAX 9.8 MIN N11 MEAN 0.1 AC-FT 87.9

Note.--The expression "n11" and "0.0" represent "no flow" and less than 0.05 cfs, respectively.

## 5-1133.6. Long Creek at western crossing of international boundary--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962												
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	N11	N11	N11	N11	N11	N11	22.0	0.5	0.2	N11	N11	N11
2	"	"	"	"	"	"	14.0	* .4	.1	"	"	"
3	"	"	"	"	"	"	93.0	.4	.1	"	"	"
4	"	"	"	"	"	"	* 137	.3	0.0	"	"	"
5	"	"	"	"	"	"	140	.2	0.0	"	"	"
6	"	"	"	"	"	"	* 126	.2	0.0	"	"	"
7	"	"	"	"	"	"	120	.2	.1	"	"	"
8	"	"	"	"	"	"	98.5	.2	0.0	"	"	"
9	"	"	"	"	"	"	56.0	.2	0.0	"	"	"
10	"	"	"	"	"	"	47.6	.2	0.0	"	"	"
11	"	"	"	"	"	"	39.0	.2	* 0.0	"	"	"
12	"	"	"	"	"	"	31.2	.2	0.0	"	"	"
13	"	"	"	"	"	"	* 26.5	.2	0.0	"	"	"
14	"	"	"	"	"	"	23.8	.2	.1	"	"	"
15	"	"	"	"	"	"	19.6	.2	.3	"	"	"
16	"	"	"	"	"	"	17.5	.2	.2	"	"	"
17	"	"	"	"	"	"	16.5	.2	.2	"	"	"
18	"	"	"	"	"	"	14.0	.2	.2	"	"	"
19	"	"	"	"	"	"	13.0	.1	.2	"	"	"
20	"	"	"	"	"	"	11.0	.1	.1	"	"	"
21	"	"	"	"	"	"	8.6	.1	.1	"	"	"
22	"	"	"	"	"	"	7.4	.1	.1	"	"	"
23	"	"	"	"	"	"	6.6	.1	.1	"	"	"
24	"	"	"	"	"	"	6.6	.1	.1	"	"	"
25	"	"	"	"	"	"	5.0	0.0	0.0	"	"	"
26	"	"	"	"	"	N11	3.8	0.0	0.0	"	"	"
27	"	"	"	"	"	* 25.0	2.3	0.0	0.0	"	"	"
28	"	"	"	"	"	93.0	1.7	0.0	* 0.0	"	"	"
29	"	"	"	"	N11	110	1.2	.1	0.0	"	"	"
30	"	"	"	"	"	* 52.2	.8	* .2	0.0	"	"	"
31	N11	-----	N11	N11	-----	37	-----	.2	-----	N11	N11	-----
TOTAL	N11	N11	N11	N11	N11	317.5	1,110.2	5.5	2.2	N11	N11	N11
MEAN	N11	N11	N11	N11	N11	10.2	37.0	0.2	0.1	N11	N11	N11
MAX	N11	N11	N11	N11	N11	110	140	0.5	.3	N11	N11	N11
MIN	N11	N11	N11	N11	N11	N11	1.8	0.0	0.0	N11	N11	N11
AC-FT	N11	N11	N11	N11	N11	630	2,200	10.9	4.4	N11	N11	N11

CALENDAR YEAR 1961: MAX 9.8 MIN N11 MEAN 0.1 AC-FT 87.9  
 WATER YEAR 1961-62: MAX 140 MIN N11 MEAN 4.0 AC-FT 2,850

\* Discharge measurement or observation of no flow made on this day.

Note.--The expression "n11" and "0.0" represent "no flow" and "less than 0.05 cfs", respectively.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963													
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	
1	N11	N11	N11	N11	N11	N11	6.4	0.4	0.0	8.2	0.4	22.2	
2	"	"	"	"	"	"	5.6	0.3	0.0	7.2	0.4	14.5	
3	"	"	"	"	"	"	5.6	0.2	0.2	6.2	0.3	10.6	
4	"	"	"	"	"	"	5.4	0.2	0.4	5.6	0.2	6.8	
5	"	* "	"	"	"	"	4.0	0.2	71.1	4.8	0.2	* 5.0	
6	"	"	"	"	"	"	2.2	0.2	255	4.2	0.2	3.5	
7	"	"	"	"	"	"	1.6	0.2	403	3.8	0.1	2.0	
8	"	"	"	"	"	"	8.5	0.2	680	2.8	0.1	1.2	
9	"	"	"	"	"	"	13.3	0.1	418	2.0	0.1	1.0	
10	"	"	"	"	"	"	* 12.7	0.1	162	* 2.4	0.0	0.8	
11	"	"	"	"	"	"	10.2	0.1	124	* 2.4	0.0	0.8	
12	"	"	"	"	"	"	9.2	0.2	* 129	14.8	0.0	0.5	
13	"	"	"	"	"	"	8.5	0.2	189	24.4	0.0	0.4	
14	"	"	"	"	"	"	8.0	0.2	194	11.3	0.0	0.4	
15	"	"	"	"	"	"	7.2	0.2	170	6.8	0.0	0.4	
16	"	"	"	"	"	"	7.2	0.1	137	4.8	0.0	0.4	
17	"	"	"	"	"	"	7.0	0.1	* 117	3.8	0.0	0.5	
18	"	"	"	"	"	"	6.8	0.1	100	4.0	0.0	0.5	
19	"	"	"	"	"	*	6.2	0.1	66.4	3.6	0.0	12.3	
20	"	"	"	"	"	"	5.6	0.1	51.2	2.8	0.0	58.4	
21	"	"	"	"	"	"	5.6	0.0	39.8	2.2	0.0	50.4	
22	"	"	"	"	"	"	N11	5.8	0.0	36.4	1.2	0.0	33.4
23	*	"	"	"	"	"	60.2	5.2	* 0.0	29.5	0.6	0.0	* 22.8
24	"	"	"	"	"	"	84.8	4.8	0.0	26.5	0.4	0.4	16.2
25	"	"	"	"	"	"	87.0	3.8	0.0	21.6	0.2	3.2	11.8
26	"	"	"	"	"	*	74.4	2.6	0.0	18.0	5.2	298	* 8.6
27	"	"	"	"	"	"	36.8	1.7	0.0	14.1	4.6	256	6.8
28	"	"	"	"	"	*	23.4	* 1.2	0.0	10.8	3.4	203	4.2
29	"	"	"	"	"	N11	15.8	0.8	0.0	9.5	2.2	146	3.2
30	"	N11	"	"	-----	10.8	0.5	0.0	9.5	* 1.2	80.0	2.2	
31	N11	-----	N11	N11	-----	8.0	-----	0.0	-----	0.8	45.4	-----	
TOTAL	N11	N11	N11	N11	N11	N11	401.2	173.2	3.5	3,483.0	149.9	1,034.0	301.8
MEAN	N11	N11	N11	N11	N11	N11	12.9	5.77	0.11	116	4.84	33.4	10.1
MAX	N11	N11	N11	N11	N11	N11	87.0	13.3	0.4	680	24.4	298	58.4
MIN	N11	N11	N11	N11	N11	N11	N11	0.5	0.0	0.0	0.4	0.0	0.4
AC-FT	N11	N11	N11	N11	N11	N11	796	344	6.9	6,910	297	2,050	599
CALENDAR YEAR 1962: MAX 140 MIN N11 MEAN 3.93 AC-FT 2,850													
WATER YEAR 1962-63: MAX 680 MIN N11 MEAN 15.2 AC-FT 11,000													

CALENDAR YEAR 1962: MAX 140 MIN N11 MEAN 3.93 AC-FT 2,850  
 WATER YEAR 1962-63: MAX 680 MIN N11 MEAN 15.2 AC-FT 11,000

\* Discharge measurement or observation of no flow made on this day.

Note.--The expression "n11" and "0.0" represent "no flow" and "less than 0.05 cfs", respectively.

5-1133.6. Long Creek at western crossing of international boundary--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964												
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	1.6	0.4	0.1	0.0	N11	N11	* 20	14.0	0.2	7.6	0.0	N11
2	1.1	0.3	0.1	0.0	"	"	124	13.6	0.2	5.8	0.0	"
3	0.8	0.3	0.1	0.0	"	"	* 167	14.4	0.1	5.0	0.0	"
4	0.9	0.2	0.1	0.0	"	"	476	18.5	0.1	4.8	0.0	"
5	0.4	0.2	0.1	0.0	"	"	428	* 20.2	0.1	3.8	0.0	"
6	0.4	* 0.2	0.1	0.0	"	"	* 228	18.5	0.0	3.0	0.0	"
7	0.4	0.2	0.1	0.0	"	"	143	18.5	0.0	2.9	0.0	"
8	0.3	0.2	0.1	0.0	"	"	140	18.0	0.1	4.2	0.0	"
9	0.3	0.2	0.1	0.0	"	"	122	17.6	* 0.1	5.2	0.0	* "
10	0.3	0.2	0.1	0.0	"	* "	200	15.8	0.1	5.0	0.0	"
11	0.2	0.2	0.1	0.0	"	"	309	14.4	0.1	3.8	N11	"
12	0.2	0.2	0.1	0.0	"	"	260	13.2	0.2	2.6	"	"
13	0.2	0.2	0.1	0.0	"	"	206	12.0	0.2	* 3.0	"	"
14	0.2	0.2	0.0	0.0	"	"	166	11.2	0.2	2.4	"	"
15	0.2	0.2	0.0	0.0	"	"	* 140	10.0	0.2	1.6	"	"
16	0.3	0.2	0.0	N11	"	* "	125	9.3	5.0	0.8	"	"
17	0.4	0.2	0.0	"	"	"	113	8.2	6.5	0.4	"	"
18	0.6	0.1	0.0	"	"	"	90.1	* 7.2	6.0	0.3	"	"
19	1.0	0.1	0.0	"	"	"	69.0	6.2	6.0	0.3	"	"
20	0.6	0.1	0.0	"	"	"	58.2	5.5	6.8	0.2	"	"
21	0.5	0.1	0.0	"	"	"	* 62.6	4.8	9.6	0.2	"	* "
22	0.6	0.1	0.0	"	"	"	57.4	4.0	12.4	0.1	"	"
23	0.8	0.1	0.0	"	"	"	40.5	3.2	35.0	0.1	"	"
24	1.6	0.1	0.0	"	"	"	33.1	2.8	36.4	0.0	"	"
25	1.8	0.1	0.0	"	"	"	29.2	2.0	28.6	0.0	"	"
26	1.6	0.1	0.0	"	"	"	25.5	1.4	29.2	0.0	"	"
27	1.0	0.1	0.0	"	"	"	23.6	1.0	24.2	0.0	"	"
28	0.5	0.1	0.0	"	"	"	22.5	0.5	18.0	* 0.0	"	"
29	0.5	0.1	0.0	"	N11	"	18.5	0.4	12.0	0.0	"	"
30	0.4	0.1	0.0	"	-----	"	16.2	0.4	9.3	0.0	"	N11
31	0.4	-----	0.0	N11	-----	N11	-----	0.3	-----	0.0	N11	-----
TOTAL	19.7	5.1	1.3	0	N11	N11	3,913.4	287.1	246.9	63.0	0	N11
MEAN	0.64	0.17	0.04	0	N11	N11	130	9.26	8.23	2.03	0	N11
MAX	1.8	0.4	0.1	0	N11	N11	476	20.2	36.4	7.6	0	N11
MIN	0.2	0.1	0.0	0	N11	N11	16.2	0.3	0.0	0.0	0	N11
AC-PT	39	10	2.6	0	N11	N11	7,760	569	490	125	0	N11

CALENDAR YEAR 1963: MAX 680 MIN N11 MEAN 15.3 AC-PT 11,060

WATER YEAR 1963-64: MAX 476 MIN N11 MEAN 12.4 AC-PT 9,000

\* Discharge measurement or observation of no flow made on this day.  
 Note.--No gage-height record Nov. 7 to Dec. 13. Stage-discharge relation affected by ice Apr. 1-9. The expression "n11" and "0.0" represent "no flow" and "less than 0.05 cfs", respectively.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965												
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	N11	N11	N11	N11	N11	N11	N11	47.5	466	100	15.1	0.1
2	"	"	"	"	"	"	"	44.0	432	95.0	12.8	0.1
3	"	"	"	"	"	"	"	* 39.5	423	109	10.6	0.0
4	"	"	"	"	"	"	"	35.0	391	117	8.4	0.4
5	"	"	"	"	"	"	"	37.5	346	101	6.6	0.5
6	"	"	"	"	"	"	"	70.8	287	79.7	6.6	0.4
7	"	"	"	"	"	"	"	357	239	66.9	6.6	0.4
8	"	"	"	"	"	"	"	673	188	59.6	6.6	20.6
9	"	"	"	"	"	"	"	* 0.5	651	148	51.2	* 30.2
10	"	"	"	"	"	"	"	26.4	565	122	* 51.2	23.1
11	"	"	"	"	"	"	"	64.4	* 645	107	38.5	34.0
12	"	"	"	"	"	"	"	702	85.1	36.5	24.5	13.3
13	"	"	"	"	"	"	"	315	581	65.5	33.1	17.4
14	"	"	"	"	"	"	"	358	377	59.6	29.3	13.3
15	"	"	"	"	"	"	"	269	255	69.0	26.4	12.4
16	"	"	"	"	"	"	"	302	170	72.2	24.1	11.0
17	"	"	"	"	"	"	"	629	129	70.6	22.1	7.4
18	"	"	"	"	"	"	"	798	106	56.6	19.8	6.1
19	"	"	"	"	"	"	"	741	* 86.0	45.5	16.5	3.4
20	"	"	"	"	"	"	"	539	60.8	38.0	* 17.9	2.3
21	"	"	"	"	"	"	"	* 348	50.6	58.4	18.4	1.8
22	"	"	"	"	"	"	"	253	41.5	* 105	28.3	1.1
23	"	"	"	"	"	"	"	190	39.5	110	70.6	0.6
24	"	"	"	"	"	"	"	150	40.5	97.0	99.0	0.4
25	"	"	"	"	"	"	"	125	72.2	76.2	102	0.4
26	"	"	"	"	"	"	"	109	393	69.0	60.8	0.5
27	"	"	"	"	"	"	"	* 88.7	702	81.5	42.0	0.7
28	"	"	"	"	N11	"	"	73.8	549	136	33.1	0.4
29	"	"	"	"	-----	"	"	72.2	420	141	27.4	0.4
30	"	N11	"	"	-----	* "	"	52.6	402	116	19.3	0.3
31	N11	-----	N11	N11	-----	N11	-----	426	-----	17.9	0.2	-----
TOTAL	N11	N11	N11	N11	N11	N11	5,738.6	8,768.4	4,701.2	1,603.4	279.5	217.2
MEAN	N11	N11	N11	N11	N11	N11	191	283	157	51.7	9.02	7.24
MAX	N11	N11	N11	N11	N11	N11	798	702	466	117	51.2	30.2
MIN	N11	N11	N11	N11	N11	N11	N11	35.0	38.0	16.5	0.2	0.0
AC-PT	N11	N11	N11	N11	N11	N11	11,380	17,390	9,320	3,180	554	431

CALENDAR YEAR 1964: MAX 476 MIN N11 MEAN 12.3 AC-PT 8,940

WATER YEAR 1964-65: MAX 798 MIN N11 MEAN 58.4 AC-PT 42,260

\* Discharge measurement or observation of no flow made on this day.  
 Note.--Stage-discharge relation affected by ice Apr. 1-14. The expression "n11" and "0.0" represent "no flow" and "less than 0.05 cfs", respectively.

5-1135. Long Creek near Crosby, N. Dak.

Location.--Lat 48°58'30", long 103°16'04", in NW¼ sec.3, T.163 N., R.97 W., on right bank at downstream side of county highway bridge, 1 mile downstream from small tributary and 5 miles north-east of Crosby.

Drainage area.--2,080 sq mi, approximately, of which about 1,300 sq mi is probably noncontributing. Records available.--March to April 1943, April 1944 to September 1965 (discontinued).

Gage.--Water-stage recorder. Altitude of gage is 1,870 ft (from topographic map). Prior to June 21, 1952, wire-weight gage at same site and datum.

Average discharge.--21 years (1944-65), 25.8 cfs (18,680 acre-ft per year); median of yearly mean discharges, 17 cfs (12,300 acre-ft per year).

Extremes.--Maximums and minimums (discharge in cubic feet per second, gage height in feet).

Annual maximum discharge (\*) and peak discharges above base (200 cfs), water years 1961-65

Date	Time	Discharge	Gage height	Date	Time	Discharge	Gage height	Date	Time	Discharge	Gage height
1961	-	* 0	-	June 14, 1963	1000	481	8.77	Apr. 18, 1965	2230	797	9.34
Mar. 31, 1962	0800	-	a 6.25	Aug. 26, 1963	2300	481	8.77	May 9, 1965	0500	800	9.00
Apr. 4, 1962	2300	* 167	6.02	Apr. 5, 1964	0600	* 680	a 9.12	May 27, 1965	1700	* 812	9.04
June 8, 1963	2400	* 890	9.40	Apr. 11, 1964	0900	309	6.67				

a Backwater from ice.

No flow for part of each year.

1943-65: Maximum discharge, 6,240 cfs Apr. 23, 1948 (gage height, 16.10 ft); maximum gage height, 16.10 ft Apr. 22, 23, 1948 (backwater from ice Apr. 22); no flow during part or all of each year.

Maximum stage known, 16.10 ft Apr. 22, 23, 1948 (backwater from ice Apr. 22). Flood in 1904 reached about the same stage from information by local residents.

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

Revisions (water years).--WSP 1308: 1946. WSP 1728: Drainage area.

Discharge, in cubic feet per second, water years October 1960 to September 1962

Mar. 25, 1962....	1.0	Apr. 7, 1962....	136	Apr. 18, 1962....	13	Apr. 29, 1962....	1.5
28.....	20	8.....	111	19.....	11	30.....	1.2
29.....	120	9.....	68	20.....	9.6	May 1.....	.70
30.....	55	10.....	50	21.....	7.7	2.....	.50
31.....	60	11.....	39	22.....	6.1	3.....	.30
Apr. 1.....	25	12.....	32	23.....	4.5	4.....	.10
2.....	20	13.....	28	24.....	4.5	14.....	.20
3.....	82	14.....	24	25.....	4.5	15.....	.20
4.....	156	15.....	20	26.....	3.8	16.....	.20
5.....	160	16.....	18	27.....	2.6	17.....	.20
6.....	148	17.....	14	28.....	2.0	18.....	.10
						19.....	.10

Month	Cfs-days	Maximum	Minimum	Mean	Runoff in acre-feet
Calendar year 1960.....	14,497.60	1,400	1.2	39.6	28,760
March 1962.....	256.0	120	0	8.26	508
April.....	1,203.0	160	1.2	40.1	2,390
May.....	260	.70	0	.084	9.3
Water year 1961-62.....	1,461.60	160	0	4.00	2,900

Note.--Flow occurred only on days listed above.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	0	0	0	0	0	0	6.8	0	1.2	14	1.3	30
2	0	0	0	0	0	0	8.0	0	2.6	12	.80	19
3	0	0	0	0	0	0	6.3	0	3.4	10	.60	13
4	0	0	0	0	0	0	4.0	0	8.3	8.6	.40	9.3
5	0	0	0	0	0	0	3.3	0	16	7.1	.30	7.1
6	0	0	0	0	0	0	2.8	0	211	5.6	.20	5.0
7	0	0	0	0	0	0	2.0	0	404	4.5	.10	3.0
8	0	0	0	0	0	0	2.5	0	717	3.6	.10	1.9
9	0	0	0	0	0	0	11	0	619	2.8	0	1.2
10	0	0	0	0	0	0	17	0	246	2.8	0	.90
11	0	0	0	0	0	0	13	0	152	3.8	0	1.0
12	0	0	0	0	0	0	11	0	146	2.7	0	.80
13	0	0	0	0	0	0	10	0	204	22	0	.70
14	0	0	0	0	0	0	8.9	0	234	18	0	1.0
15	0	0	0	0	0	0	8.6	0	210	11	0	1.0
16	0	0	0	0	0	0	9.3	0	166	7.1	0	1.3
17	0	0	0	0	0	0	8.3	0	143	4.8	0	1.4
18	0	0	0	0	0	0	6.1	0	126	3.6	0	1.8
19	0	0	0	0	0	0	5.6	0	97	3.2	0	1.8
20	0	0	0	0	0	0	4.5	0	75	2.4	0	.29
21	0	0	0	0	0	0	3.8	0	64	1.9	0	.60
22	0	0	0	0	0	0	3.3	0	58	1.4	0	.44
23	0	0	0	0	0	0	3.3	0	50	1.0	3.2	.30
24	0	0	0	0	0	20	2.9	0	256	.80	3.9	.19
25	0	0	0	0	0	120	2.4	0	38	11	11	.12
26	0	0	0	0	0	90	1.5	0	32	27	200	8.6
27	0	0	0	0	0	40	.60	0	28	30	344	6.4
28	0	0	0	0	0	28	.20	0	22	13	232	4.4
29	0	0	0	0	-----	19	.10	0	19	6.9	172	2.8
30	0	0	0	0	-----	12	0	16	0	3.6	101	1.9
31	0	-----	-----	0	-----	6.9	-----	3.1	-----	2.1	57	-----
TOTAL	0	0	0	0	0	335.9	167.10	3.1	4,156.5	248.30	1,127.90	319.30
MEAN	0	0	0	0	0	10.8	5.57	.10	139	8.1	36.4	10.6
MAX	0	0	0	0	0	120	17	3.1	717	30	344	60
MIN	0	0	0	0	0	0	0	0	1.2	.80	0	.70
AC-FT	0	0	0	0	0	666	331	6.2	8,240	493	2,240	633
CAL YR 1962: TOTAL	1,461.60					MEAN 4.00	MAX 160	MIN 0	AC-FT 2,900			
WAT YR 1963: TOTAL	6,358.10					MEAN 17.4	MAX 717	MIN 0	AC-FT 12,610			

## 5-1135. Long Creek near Crosby, N. Dak.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	1.3	0	0	0	0	0	30	24	0	10	0	0
2	1.0	0	0	0	0	0	160	23	0	8.6	0	0
3	.80	0	0	0	0	0	320	27	0	6.9	0	0
4	.70	0	0	0	0	0	510	30	0	6.5	0	0
5	.60	0	0	0	0	0	490	32	0	7.1	0	0
6	.40	0	0	0	0	0	290	31	0	5.4	0	0
7	.20	0	0	0	0	0	170	30	0	4.2	0	0
8	.10	0	0	0	0	0	144	30	.10	3.6	0	0
9	.10	0	0	0	0	0	125	30	.10	4.2	0	0
10	0	0	0	0	0	0	169	28	.10	5.1	0	0
11	0	0	0	0	0	0	299	23	.10	5.4	0	0
12	0	0	0	0	0	0	266	22	.10	5.1	0	0
13	0	0	0	0	0	0	217	22	.10	5.1	0	0
14	0	0	0	0	0	0	171	20	.10	5.6	0	0
15	0	0	0	0	0	0	141	18	.20	5.1	0	0
16	0	0	0	0	0	0	123	14	.30	4.2	0	0
17	0	0	0	0	0	0	107	14	2.3	2.9	0	0
18	0	0	0	0	0	0	89	14	4.8	1.8	0	0
19	0	0	0	0	0	0	76	8.7	5.4	1.0	0	0
20	0	0	0	0	0	0	61	5.2	5.8	.40	0	0
21	0	0	0	0	0	0	64	6.0	6.7	.30	0	0
22	0	0	0	0	0	0	61	5.1	11	.30	0	0
23	0	0	0	0	0	0	50	3.8	21	.20	0	0
24	0	0	0	0	0	0	43	2.4	35	.20	0	0
25	0	0	0	0	0	0	38	2.2	32	.10	0	0
26	0	0	0	0	0	0	36	2.0	28	.10	0	0
27	0	0	0	0	0	0	34	1.8	29	0	0	0
28	0	0	0	0	0	0	36	1.5	25	0	0	0
29	0	0	0	0	0	0	28	1.0	20	0	0	0
30	0	0	0	0	0	0	26	.50	12	0	0	0
31	0	-----	0	0	-----	0	-----	0	-----	0	0	-----
TOTAL	5.20	0	0	0	0	0	4,374	470.20	239.20	99.40	0	0
MEAN	.17	0	0	0	0	0	146	15.2	7.97	3.21	0	0
MAX	1.3	0	0	0	0	0	510	32	35	10	0	0
MIN	0	0	0	0	0	0	26	0	0	0	0	0
AC-FT	10	0	0	0	0	0	8,680	933	474	197	0	0

CAL YR 1963: TOTAL 6,363.30

MEAN 17.4

MAX 717

MIN 0

AC-FT 12,620

WAT YR 1964: TOTAL 5,188.00

MEAN 14.2

MAX 510

MIN 0

AC-FT 10,290

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	0	0	0	0	0	0	0	50	511	117	11	.80
2	0	0	0	0	0	0	0	45	600	104	8.2	.60
3	0	0	0	0	0	0	0	46	500	116	5.4	.70
4	0	0	0	0	0	0	0	45	400	131	3.9	1.3
5	0	0	0	0	0	0	0	53	350	121	3.2	1.4
6	0	0	0	0	0	0	0	90	300	95	2.7	1.1
7	0	0	0	0	0	0	0	307	250	75	2.4	.90
8	0	0	0	0	0	0	0	713	200	66	3.4	1.0
9	0	0	0	0	0	0	1.0	734	170	56	4.1	21
10	0	0	0	0	0	0	10	612	150	41	43	23
11	0	0	0	0	0	0	70	665	120	38	39	16
12	0	0	0	0	0	0	240	749	100	35	25	11
13	0	0	0	0	0	0	300	642	80	32	16	8.2
14	0	0	0	0	0	0	350	431	70	27	8.6	5.8
15	0	0	0	0	0	0	250	272	90	25	5.8	3.9
16	0	0	0	0	0	0	225	175	110	23	6.5	3.1
17	0	0	0	0	0	0	535	126	100	21	3.3	1.8
18	0	0	0	0	0	0	743	105	70	18	3.0	1.1
19	0	0	0	0	0	0	734	88	55	16	1.6	1.0
20	0	0	0	0	0	0	553	65	40	18	1.1	.80
21	0	0	0	0	0	0	371	50	70	20	1.2	1.0
22	0	0	0	0	0	0	255	40	130	22	1.4	2.7
23	0	0	0	0	0	0	192	39	120	67	.80	2.5
24	0	0	0	0	0	0	156	40	100	122	1.0	2.0
25	0	0	0	0	0	0	134	75	90	150	1.1	3.0
26	0	0	0	0	0	0	122	377	80	93	1.4	5.8
27	0	0	0	0	0	0	104	776	100	52	1.8	13
28	0	0	0	0	0	0	90	645	130	34	1.4	12
29	0	0	0	0	-----	0	65	483	164	28	1.2	12
30	0	0	0	0	-----	0	55	451	136	20	1.0	11
31	0	-----	0	0	-----	0	-----	469	-----	15	1.0	-----
TOTAL	0	0	0	0	0	0	5,555.0	9,458	5,386	1,798	210.50	169.50
MEAN	0	0	0	0	0	0	185	305	180	58.0	6.79	5.65
MAX	0	0	0	0	0	0	743	776	600	150	43	23
MIN	0	0	0	0	0	0	0	39	40	15	.80	.60
AC-FT	0	0	0	0	0	0	11,020	18,760	10,680	3,570	418	336

CAL YR 1964: TOTAL 5,182.80

MEAN 14.2

MAX 510

MIN 0

AC-FT 10,280

WAT YR 1965: TOTAL 22,577.00

MEAN 61.9

MAX 776

MIN 0

AC-FT 44,780

5-1136. Long Creek near Noonan, N. Dak.

(International gaging station)

Location.--Lat 48°58'52", long 103°04'34", near north line of NE¼ sec.1, T.163 N., R.96 W., on right bank 150 ft upstream from county highway bridge, 1.5 miles upstream from international boundary, and 7 miles northwest of Noonan.

Drainage area.--2,500 sq mi, approximately, of which about 1,620 sq mi is probably noncontributing.

Records available.--October 1959 to September 1965.

Gage.--Water-stage recorder. Altitude of gage is 1,840 ft (from topographic map). Prior to Aug. 18, 1960, wire-weight gage at same site.

Average discharge.--6 years, 25.9 cfs (18,750 acre-ft per year).

Extremes.--Maximums and minimums (discharge in cubic feet per second, gage height in feet).

Annual maximum discharge (\*) and peak discharges above base (200 cfs), water years 1961-65

Date	Time	Discharge	Gage height	Date	Time	Discharge	Gage height	Date	Time	Discharge	Gage height
Mar. 20, 1961	1900	* 23	4.12	June 14, 1963	1800	230	5.81	Apr. 19, 1965	0700	* 771	8.28
Mar. 30, 1962	0700	* 154	5.33	Aug. 27, 1963	1230	477	7.63	May 9, 1965	1030	* 781	8.32
June 9, 1963	0700	* 809	8.42	Apr. 5, 1964	0900	* 784	a 9.43	May 28, 1965	0200	* 762	8.25
				Apr. 11, 1964	1400	471	7.00				

a Backwater from ice.

No flow for some months in each year.

1959-65: Maximum discharge, 3,200 cfs Mar. 27, 1960 (gage height, 14.4 ft, from high watermark, backwater from ice); no flow for some months in each year.

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

Cooperation.--This station is one of the international gaging stations maintained by the United States under agreement with Canada.

Revisions.--WSP 1728: Drainage area.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	0	0	0	0	0	0	1.9	.40	0	0	0	0
2	0	0	0	0	0	0	3.2	.40	0	0	0	0
3	0	0	0	0	0	0	2.2	.30	0	0	0	0
4	0	0	0	0	0	0	3.5	.30	0	0	0	0
5	0	0	0	0	0	0	2.8	.30	0	0	0	0
6	0	0	0	0	0	0	2.4	.20	0	0	0	0
7	0	0	0	0	0	0	2.0	.20	0	0	0	0
8	0	0	0	0	0	0	1.7	.20	0	0	0	0
9	0	0	0	0	0	0	1.6	.20	0	0	0	0
10	0	0	0	0	0	0	1.4	.10	0	0	0	0
11	0	0	0	0	0	0	1.0	.20	0	0	0	0
12	0	0	0	0	0	0	.90	.20	0	0	0	0
13	0	0	0	0	0	0	.80	.10	0	0	0	0
14	0	0	0	0	0	0	.70	.10	0	0	0	0
15	0	0	0	0	0	1.0	.40	0	0	0	0	0
16	0	0	0	0	0	3.0	.40	.10	0	0	0	0
17	0	0	0	0	0	5.0	1.0	.20	0	0	0	0
18	0	0	0	0	0	10	.80	.20	0	0	0	0
19	0	0	0	0	0	18	.70	.20	0	0	0	0
20	0	0	0	0	0	18	.70	.20	0	0	0	0
21	0	0	0	0	0	16	.60	.10	0	0	0	0
22	0	0	0	0	0	10	.50	0	0	0	0	0
23	0	0	0	0	0	7.1	.50	0	0	0	0	0
24	0	0	0	0	0	7.1	.60	0	0	0	0	0
25	0	0	0	0	0	5.1	.60	0	0	0	0	0
26	0	0	0	0	0	3.6	.50	0	0	0	0	0
27	0	0	0	0	0	3.0	.50	0	0	0	0	0
28	0	0	0	0	0	2.4	.50	0	0	0	0	0
29	0	0	0	0	0	2.2	.40	0	0	0	0	0
30	0	0	0	0	0	2.1	.40	0	0	0	0	0
31	0	0	0	0	0	2.0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	115.6	35.20	4.20	0	0	0	0
MEAN	0	0	0	0	0	3.73	1.17	.14	0	0	0	0
MAX	0	0	0	0	0	18	3.5	.40	0	0	0	0
MIN	0	0	0	0	0	0	.40	0	0	0	0	0
AC-FT	0	0	0	0	0	229	70	8.3	0	0	0	0

CAL YR 1960: TOTAL 17,492.30 MEAN 47.8 MAX 2,000 MIN 0 AC-FT 34,700  
 NAT YR 1961: TOTAL 155.00 MEAN .42 MAX 18 MIN 0 AC-FT 307

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963												
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	0	0	0	0	0	0	7.8	2.0	.20		21	65
2	0	0	0	0	0	0	7.5	1.8	.20	12	14	45
3	0	0	0	0	0	0	7.1	1.5	.30	10	8.9	35
4	0	0	0	0	0	0	6.2	1.2	.50	8.8	6.2	27
5	0	0	0	0	0	0	4.9	.70	6.8	8.3	4.3	21
6	0	0	0	0	0	0	3.6	.50	171	6.4	3.1	17
7	0	0	0	0	0	0	3.2	.50	364	4.5	2.2	13
8	0	0	0	0	0	0	3.1	.40	623	3.5	1.5	10
9	0	0	0	0	0	0	3.1	.20	739	2.8	1.1	7.5
10	0	0	0	0	0	.10	12	.20	356	2.8	.80	6.2
11	0	0	0	0	0	.10	22	.40	177	5.9	.70	5.5
12	0	0	0	0	0	0	19	1.3	146	4.1	.70	4.5
13	0	0	0	0	0	0	15	1.9	174	2.5	.40	3.6
14	0	0	0	0	0	0	12	1.9	223	15	.30	3.1
15	0	0	0	0	0	0	8.8	2.0	214	19	.20	2.4
16	0	0	0	0	0	0	8.0	1.7	181	12	.20	1.7
17	0	0	0	0	0	0	7.3	1.1	146	6.6	.10	1.2
18	0	0	0	0	0	0	6.6	1.7	127	4.1	.20	2.2
19	0	0	0	0	0	0	6.8	1.6	103	3.1	.10	2.4
20	0	0	0	0	0	0	8.6	1.6	77	2.4	.10	3.4
21	0	0	0	0	0	0	7.5	1.5	64	1.9	0	25
22	0	0	0	0	0	0	7.5	1.2	60	1.2	0	47
23	0	0	0	0	0	0	6.8	.90	49	.90	.70	36
24	0	0	0	0	0	0	6.6	.70	46	.50	1.1	27
25	0	0	0	0	0	30	6.2	.60	42	18	12	20
26	0	0	0	0	0	112	5.5	.50	32	28	71	14
27	0	0	0	0	0	84	4.5	.40	27	62	362	11
28	0	0	0	0	40	40	4.1	.40	23	116	254	9.4
29	0	0	0	0	20	20	3.6	.40	23	84	190	7.3
30	0	0	0	0	112	8.0	2.5	.30	19	52	140	5.7
31	0	---	---	---	---	---	---	.30	---	32	100	---
TOTAL	0	0	0	0	0	304.20	227.7	31.40	4,214.00	544.30	1,196.90	479.9
MEAN	0	0	0	0	0	9.81	7.59	1.01	140	17.6	38.6	16.0
MAX	0	0	0	0	0	112	22	2.0	739	116	362	65
MIN	0	0	0	0	0	0	2.5	.20	20	.50	0	1.2
AC-FT	0	0	0	0	0	603	452	62	8,360	1,080	2,370	952
CAL YR 1962-1963	TOTAL	1,750.90		MEAN	4.80	MAX 138	MIN 0	AC-FT	3,470			
	TOTAL	6,998.40		MEAN	19.2	MAX 739	MIN 0	AC-FT	13,880			

5-1136. Long Creek near Noonan, N. Dak.--Continued

DISCHARGE, IN CUBIC FEET PER SECONDO, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	4.3	0	.20	.20	0	.20	20	32	.30	13	0	0
2	3.4	.10	.20	.40	0	.50	200	30	.40	11	0	0
3	2.4	.10	.30	.30	0	.20	500	30	.30	9.4	0	0
4	2.0	.10	.20	.20	0	.10	550	36	.30	9.7	0	0
5	1.6	.10	.10	.20	0	0	650	38	.40	25	0	0
6	1.4	.10	.10	.10	0	0	430	42	.40	15	0	0
7	1.1	.10	.10	.10	0	0	300	39	.40	8.0	0	0
8	.90	.10	.10	.10	0	0	290	36	.80	5.1	0	0
9	.80	.10	.10	0	0	0	280	35	.70	4.1	0	0
10	.70	.10	.10	0	0	0	274	32	.30	3.0	0	0
11	.60	.10	.10	0	0	0	429	28	.20	2.5	0	0
12	.50	.10	.10	0	.50	.50	393	24	.40	2.2	0	0
13	.50	.10	.10	0	1.0	.20	320	23	.30	2.2	0	0
14	.50	.10	.10	0	.50	.10	235	23	.30	2.7	0	0
15	.40	.10	.20	0	.20	.40	186	21	.60	2.2	0	0
16	.40	.10	.20	0	.20	.30	156	16	.70	3.1	0	0
17	.40	.10	.20	0	.20	.20	138	14	.60	.90	0	0
18	.50	.10	.10	0	.10	.20	123	14	.60	.90	0	0
19	.40	.20	.10	0	.10	.10	104	12	5.3	1.0	0	0
20	.20	.10	.10	0	.10	0	86	9.4	10	.70	0	0
21	.20	.10	.10	0	.10	0	78	8.3	11	.90	0	0
22	.20	.20	.10	0	.10	0	78	7.3	10	.90	0	0
23	.50	.20	.10	0	.10	0	72	6.4	13	.40	0	0
24	.30	.20	.10	0	.10	0	56	5.7	25	.30	0	0
25	.10	.20	.10	0	.10	0	48	4.9	35	.30	0	0
26	.10	.20	.10	0	.10	0	42	4.3	29	.20	0	0
27	0	.20	0	0	0	0	39	2.5	27	.20	0	0
28	0	.20	0	0	0	0	37	1.7	25	.30	0	0
29	0	.20	0	0	0	0	36	1.0	21	.10	0	0
30	0	.20	0	0	0	0	33	.50	17	0	0	0
31	0	-----	0	0	-----	.50	-----	.30	-----	0	0	-----
TOTAL	24.40	3.90	3.50	1.60	3.50	3.50	6,183	577.30	236.50	125.30	0	0
MEAN	.79	.13	.11	.052	.12	.11	206	18.6	7.88	4.04	0	0
MAX	4.3	.20	.30	.40	1.0	.50	650	42	35	25	0	0
MIN	0	0	0	0	0	0	20	.30	.20	0	0	0
AC-FT	48	7.7	6.9	3.2	6.9	6.9	12,260	1,150	469	249	0	0
CAL YR 1963:	TOTAL 7,030.20			MEAN 19.3		MAX 739	MIN 0	AC-FT 13,940				
WAT YR 1964:	TOTAL 7,162.50			MEAN 19.6		MAX 650	MIN 0	AC-FT 14,210				

DISCHARGE, IN CUBIC FEET PER SECONDO, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	0	0	0	0	0	0	0	66	511	131	16	.80
2	0	0	0	0	0	0	0	57	519	112	12	.50
3	0	0	0	0	0	0	.20	49	486	105	9.1	.30
4	0	0	0	0	0	0	.50	42	460	115	6.8	.80
5	0	0	0	0	0	0	.50	47	418	120	4.8	1.7
6	0	0	0	0	0	0	.70	78	362	107	4.0	1.1
7	0	0	0	0	0	0	1.0	213	295	86	3.0	1.1
8	0	0	0	0	0	0	1.6	623	246	72	2.6	.90
9	0	0	0	0	0	0	1.2	760	205	61	2.2	.90
10	0	0	0	0	0	0	7.0	657	167	51	1.8	11
11	0	0	0	0	0	0	35	628	145	44	28	2.3
12	0	0	0	0	0	0	55	694	126	39	33	18
13	0	0	0	0	0	0	230	674	100	35	23	12
14	0	.10	0	0	0	0	350	507	82	32	15	9.5
15	0	.20	0	0	0	0	400	345	79	28	9.1	7.1
16	0	.10	0	0	0	0	278	238	90	25	9.5	6.3
17	0	0	0	0	0	0	448	182	92	22	6.3	5.3
18	0	0	0	0	0	0	684	141	90	20	6.0	3.5
19	0	0	0	0	0	0	757	120	72	18	4.4	2.0
20	0	0	0	0	0	0	635	95	54	16	3.4	1.3
21	0	0	0	0	0	0	465	73	43	22	2.6	1.1
22	0	0	0	0	0	0	328	56	70	22	1.8	1.6
23	0	0	0	0	0	0	230	49	123	23	1.2	3.6
24	0	0	0	0	0	0	181	51	121	62	1.1	2.8
25	0	0	0	0	0	0	149	77	107	66	.90	2.0
26	0	0	0	0	0	0	131	208	90	116	1.7	1.7
27	0	0	0	0	0	0	115	640	85	73	2.9	1.6
28	0	0	0	0	0	0	97	715	97	47	2.2	3.4
29	0	0	0	0	0	0	86	549	149	35	1.6	10
30	0	0	0	0	0	0	80	473	146	28	1.2	9.8
31	0	-----	0	0	-----	0	-----	490	-----	22	1.0	-----
TOTAL	0	0.40	0	0	0	0	5,746.70	9,597	5,630	1,755	218.20	144.90
MEAN	0	.013	0	0	0	0	192	310	188	56.6	7.04	4.83
MAX	0	.20	0	0	0	0	757	760	519	131	33	23
MIN	0	0	0	0	0	0	0	42	43	16	.90	.30
AC-FT	0	.8	0	0	0	0	11,400	19,040	11,170	3,480	433	287
CAL YR 1964:	TOTAL 7,131.10			MEAN 19.5		MAX 650	MIN 0	AC-FT 14,140				
WAT YR 1965:	TOTAL 23,092.20			MEAN 63.3		MAX 760	MIN 0	AC-FT 45,800				

5-1137.5. East Branch Short Creek Reservoir near Columbus, N. Dak.

Location.--Lat 48°59'26", long 102°47'07", in SW 1/4 sec.32, T.164 N., R.93 W., on left bank of reservoir, 0.5 mile south of international boundary and 6.0 miles north of Columbus.

Drainage area.--280 sq mi of which 175 sq mi is noncontributing.

Records available.--April 1963 to September 1965.

Gage.--Water-stage recorder. Datum of gage is 1,860.00 ft above mean sea level, datum of 1929.

Extremes.--Maximums and minimums (contents in acre-feet, gage height in feet) for April 1963 to September 1965 are contained in the following table:

Water year	Maximum			Minimum		
	Date	Contents	Gage height	Date	Contents	Gage height
1963	Sept. 5, 1963	765	22.50	-	-	-
1964	Apr. 12, 13, 1964	1,336	28.13	Sept. 22, 23, 1964	1,068	25.78
1965	Apr. 14, 15, 1965	1,356	28.30	Dec. 20-24, 1964	1,028	25.38

Remarks.--Reservoir is formed by earthen dam; storage began in April 1963. Outlet of lake is a fixed crest-concrete dam, average crest elevation, 1,886.90 ft above mean sea level. Reservoir capacity at crest elevation, 1,200 acre-ft. The reservoir is operated for water supply and recreation.

MONTH-END ELEVATIONS AND CONTENTS, APRIL 1963 TO SEPTEMBER 1965

Date	Elevation (feet)†	Contents (acre-feet)	Change in contents (acre-feet)	Date	Elevation (feet)†	Contents (acre-feet)	Change in contents (acre-feet)
Oct. 31, 1962.....				Oct. 31, 1964.....	25.56	1,046	-26
Nov. 30.....				Nov. 30.....	25.39	1,029	-17
Dec. 31.....				Dec. 31.....	25.39	1,029	0
Calendar year 1962				Calendar year 1964	-	-	+323
Jan. 31, 1963.....				Jan. 31, 1965.....	25.40	1,030	+1.0
Feb. 28.....				Feb. 28.....	25.42	1,032	+2.0
Mar. 31.....				Mar. 31.....	25.46	1,036	+4.0
Apr. 30.....	8.01	60	-	Apr. 30.....	27.98	1,306	+70
May 31.....	a 12.3	170	+110	May 31.....	27.70	1,284	-22
June 30.....	a 20.1	558	+388	June 30.....	27.35	1,242	-42
July 31.....	21.70	693	+135	July 31.....	26.92	1,191	-51
Aug. 31.....	22.40	756	+63	Aug. 31.....	26.47	1,142	-49
Sept. 30.....	22.26	743	-13	Sept. 30.....	26.59	1,155	+13
Water year 1963...	-	-	-	Water year 1965...	-	-	+83
Oct. 31.....	21.90	711	-32	† Elevation at 2400 hours. a Estimated.			
Nov. 30.....	21.80	702	-9.0				
Dec. 31.....	21.84	706	+4.0				
Calendar year 1963	-	-	-				
Jan. 31, 1964.....	-	-	-				
Feb. 29.....	21.81	703	0				
Mar. 31.....	22.21	739	+36				
Apr. 30.....	27.65	1,278	+539				
May 31.....	27.17	1,220	-58				
June 30.....	27.14	1,217	-3.0				
July 31.....	26.61	1,157	-60				
Aug. 31.....	26.12	1,103	-54				
Sept. 30.....	25.82	1,072	-31				
Water year 1964...	-	-	+329				

5-1138. Short Creek below international boundary, near Roche Percee, Saskatchewan

(International gaging station)

Location.--Lat 49°01'42", long 102°51'00", in NW $\frac{1}{4}$  sec.11, T.1, R.7 W., 2d meridian, 4 miles south-west of Roche Percee and 5 miles upstream from mouth.

Drainage area.--480 sq mi.

Records available.--March 1960 to September 1965.

Gage.--Water-stage recorder.

Average discharge.--5 years, 4.10 cfs (2,970 acre-ft per year).

Extremes.--Maximum and minimum discharges for the water years 1961-65 are contained in the following table:

Water year	Maximum			Minimum		
	Date	Discharge (cfs)	Gage height (feet)	Date	Discharge (cfs)	Gage height (feet)
1961	Mar. 17, 1961	55	a 6.18	Many days	0	-
1962	Mar. 26, 1962	123	6.43	do.	0	-
1963	June 7, 1963	173	6.66	do.	0	-
1964	Apr. 4, 1964	b 347	-	do.	0	-
1965	May 8, 1965	119	c 5.91	do.	0	-

a Backwater from ice.

b Maximum daily.

c Maximum gage height for the year, 5.99 ft Apr. 9, 1965, backwater from ice.

1960-65: Maximum discharge, 1,360 cfs Mar. 28, 1960 (gage height, 14.39 ft); no flow for many days in each year.

Remarks.--Records fair. Discharge affected by upstream regulation.

Cooperation.--This station is one of the international gaging stations maintained by Canada under agreement with the United States.

Revisions.--WSP 1728: Drainage area.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	0.1	0.0	0.0	0.0	0.1	0.1	a 1.0	0.1	0.1	N11	N11	N11
2	0.1	0.0	0.0	0.0	0.1	0.2	a 1.0	0.1	0.1	"	"	"
3	0.1	0.0	0.0	0.0	0.1	0.2	1.0	0.0	0.1	"	"	"
4	0.1	0.0	0.0	0.0	0.1	0.5	a 1.0	0.0	0.0	"	"	"
5	0.1	0.0	0.0	0.0	0.1	0.5	1.0	0.1	0.0	"	"	"
6	0.1	0.0	0.0	0.0	0.1	0.5	a 1.0	0.2	0.0	"	"	"
7	0.1	0.0	0.0	0.0	0.1	1.0	a 1.0	0.3	0.0	"	"	"
8	0.0	0.0	0.0	0.0	0.1	2.0	a 1.0	0.4	N11	"	"	"
9	0.0	0.0	0.0	0.0	0.1	4.0	a .9	0.5	"	"	"	"
10	0.0	0.0	0.0	0.0	0.1	5.0	a .9	0.5	"	"	"	"
11	0.0	0.1	0.0	0.1	0.1	9.8	a .9	0.6	"	"	"	"
12	0.0	0.1	0.0	0.1	0.1	9.8	.9	0.6	"	"	"	"
13	0.0	0.1	0.0	0.1	0.1	10.0	.8	0.7	"	"	"	"
14	0.0	0.1	0.0	0.1	0.1	15.7	.8	0.8	"	"	"	"
15	0.0	0.1	0.0	0.1	0.1	20.4	.5	0.8	"	"	"	"
16	0.0	0.1	0.0	0.1	0.1	52	.3	0.8	"	"	"	"
17	0.0	0.1	0.0	0.1	0.1	53	.3	0.6	"	"	"	"
18	0.0	0.1	0.0	0.1	0.1	29.6	.2	0.6	"	"	"	"
19	0.0	0.1	0.0	0.1	0.1	17.4	.2	0.4	"	"	"	"
20	0.0	0.1	0.0	0.1	0.1	12.6	.2	0.4	"	"	"	"
21	0.0	0.1	0.0	0.1	0.1	9.8	.2	0.3	"	"	"	"
22	0.0	0.1	0.0	0.1	0.1	7.7	.1	0.3	"	"	"	"
23	0.0	0.1	0.0	0.1	0.1	7.4	.1	0.2	"	"	"	"
24	0.0	0.1	0.0	0.1	0.1	0.9	.1	0.2	"	"	"	"
25	0.0	0.1	0.0	0.1	0.1	4.0	.2	0.2	"	"	"	"
26	0.0	0.0	0.0	0.1	0.1	3.4	.1	0.2	"	"	"	"
27	0.0	0.0	0.0	0.1	0.1	1.7	.1	0.2	"	"	"	"
28	0.0	0.0	0.0	0.1	0.1	1.5	.1	0.1	"	"	"	"
29	0.0	0.0	0.0	0.1	0.1	1.3	.1	0.1	"	"	"	"
30	0.0	0.0	0.0	0.1	0.1	1.2	.1	0.1	N11	"	"	N11
31	0.0	-----	0.0	0.1	0.1	1.1	-----	0.1	-----	N11	N11	-----
TOTAL	0.7	1.5	0.0	2.1	2.8	284.3	16.1	10.5	0.3	N11	N11	N11
MEAN	0.02	0.05	0.0	0.07	0.10	9.17	0.54	0.34	0.01	N11	N11	N11
MAX	0.1	0.1	0.0	0.1	0.1	53	1.0	0.8	0.1	N11	N11	N11
MIN	0.0	0.0	0.0	0.0	0.1	0.1	.1	0.0	N11	N11	N11	N11
AC-FT	1.4	3.0	0.0	4.2	5.6	564	32	21	0.6	N11	N11	N11

CALENDAR YEAR 1960: MAX - MIN - MEAN - AC-FT -  
WATER YEAR 1960-61: MAX 53 MIN N11 MEAN 0.87 AC-FT 632

a No gage-height record.

Note.--Stage-discharge relation affected by ice Nov. 9 to Apr. 1. Wire-weight gage readings used Nov. 17 to Apr. 5. The expressions "nil" and "0.0" represent "no flow" and "less than 0.05 cfs", respectively.

5-1138. Short Creek below international boundary, near Roche Percee, Saskatchewan--Continued

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	N11	* N11	N11	N11	N11	N11	14.0	* N11	63.4	0.9	N11	N11
2	"	"	"	"	"	"	12.8	* N11	36.5	.7	"	"
3	"	"	"	"	"	"	* 9.5	0.0	16.7	.6	"	"
4	"	"	"	"	"	"	7.5	N11	10.0	.4	"	"
5	"	"	"	"	"	"	6.1	"	10.4	.4	"	"
6	"	"	"	"	"	"	3.8	"	7.5	.4	"	"
7	"	"	"	"	"	"	2.7	"	6.0	.2	"	"
8	"	"	"	"	"	"	2.0	"	4.8	0.0	"	"
9	"	"	"	"	"	"	1.4	"	3.5	.1	"	"
10	"	"	"	"	"	"	1.2	"	2.0	0.0	"	"
11	"	"	"	"	"	"	1.2	"	1.8	0.0	"	"
12	"	"	"	"	"	"	* 1.0	"	11.0	0.0	"	"
13	"	"	"	"	"	"	.9	N11	* 8.5	N11	"	"
14	"	"	"	"	"	"	.8	0.0	19.0	"	"	"
15	"	"	"	"	"	"	.8	N11	48.0	"	"	"
16	"	"	"	"	"	"	.8	"	46.5	"	"	"
17	"	"	"	"	"	"	.6	"	40.5	"	"	"
18	"	"	"	"	"	"	.4	"	43.0	"	"	"
19	"	"	"	"	"	"	.3	N11	46.0	"	"	"
20	"	"	"	"	"	"	.4	0.0	29.0	"	"	"
21	"	"	"	"	"	* N11	.1	.8	19.0	"	"	"
22	"	"	"	"	"	0.0	0.0	1.0	13.7	"	*	"
23	"	"	"	"	"	8.8	0.0	.8	9.8	"	"	"
24	"	"	"	"	"	45.5	.7	.7	7.5	"	"	"
25	"	"	"	"	"	99	.1	.6	5.3	*	"	"
26	"	"	"	"	"	* 102	N11	.6	3.8	"	"	"
27	"	"	"	"	"	96.8	"	.4	2.6	"	"	*
28	"	"	"	"	N11	71.2	"	.5	* 2.4	"	"	"
29	"	"	"	"	-----	* 38.0	"	1.4	1.7	"	"	"
30	"	N11	-----	-----	-----	29.0	N11	* 1.8	1.0	"	"	N11
31	N11	-----	N11	N11	-----	16.7	-----	41.0	-----	N11	N11	-----
TOTAL	N11	N11	N11	N11	N11	507.0	69.1	49.6	520.9	3.7	N11	N11
MEAN	N11	N11	N11	N11	N11	16.4	2.3	1.6	17.4	0.1	N11	N11
MAX	N11	N11	N11	N11	N11	102	14.0	41.0	63.4	0.9	N11	N11
MIN	N11	N11	N11	N11	N11	N11	N11	N11	1.0	N11	N11	N11
AC-FT	N11	N11	N11	N11	N11	1,010	137	98	1,030	7.3	N11	N11

CALENDAR YEAR 1961: MAX 53.0 MIN N11 MEAN 0.9 AC-FT 627  
 WATER YEAR 1961-62: MAX 102 MIN N11 MEAN 3.2 AC-FT 2,280

\* Discharge measurement or observation of no flow made on this day.  
 Note.--Stage-discharge relation affected by ice Mar. 15-25. The expression "n11" and "0.0" represent "no flow" and "less than 0.05 cfs", respectively.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	N11	N11	N11	N11	N11	N11	1.2	1.1	13.0	0.0	8.9	10.4
2	"	"	"	"	"	"	1.2	1.1	6.7	0.2	7.0	7.9
3	"	"	"	"	"	"	1.2	0.6	* 6.7	0.3	5.3	6.0
4	"	"	"	"	"	"	1.2	0.0	38.5	0.6	4.0	4.6
5	"	"	"	"	"	"	0.9	0.6	90.8	0.0	2.6	* 3.8
6	"	"	"	"	"	"	1.0	0.6	102.0	0.0	2.1	2.6
7	"	*	"	"	"	"	1.0	0.0	150.0	0.0	1.1	1.8
8	"	"	"	"	"	"	1.0	0.0	145.0	0.0	0.7	1.3
9	"	"	"	"	"	"	* 2.1	0.2	114.0	0.0	0.7	1.1
10	"	"	"	"	"	"	3.3	0.9	66.2	* 0.1	0.6	1.2
11	"	"	"	"	"	"	9.9	3.3	35.0	0.1	0.3	1.2
12	"	"	"	"	"	"	14.0	4.4	21.5	* 0.3	0.4	1.2
13	"	"	"	"	"	"	12.3	51.0	14.9	0.0	0.6	1.0
14	"	"	"	"	"	"	11.1	96.2	12.2	0.0	0.0	0.8
15	"	"	"	"	"	N11	8.4	86.6	9.4	0.0	0.0	0.8
16	"	"	"	"	"	0.0	9.1	56.6	7.2	0.0	0.0	0.6
17	"	"	"	"	"	0.0	10.1	31.2	5.5	0.0	0.0	0.2
18	"	"	"	"	"	0.0	21.5	17.0	4.2	0.0	0.0	0.0
19	"	"	"	"	"	* 0.6	23.0	11.4	2.6	0.0	0.0	0.0
20	"	"	"	"	"	0.8	16.4	8.4	1.7	0.0	0.0	0.6
21	"	"	"	"	"	* 1.0	13.0	5.8	1.5	0.0	0.0	0.3
22	"	"	"	"	"	30.0	10.1	5.3	2.6	0.0	0.0	0.1
23	"	"	"	"	"	75.8	7.5	* 4.4	1.0	0.0	0.8	* 0.1
24	"	"	"	"	"	* 45.8	6.0	2.8	1.2	0.0	1.2	0.1
25	"	"	"	"	"	* 23.5	3.8	1.3	1.0	54.1	11.1	0.0
26	"	"	"	"	"	* 14.6	2.9	1.0	1.2	70.4	92.0	0.0
27	"	"	"	"	"	7.5	1.4	1.0	1.2	78.8	121.0	0.0
28	"	"	"	"	"	* 4.4	* 1.5	1.0	0.9	66.2	83.6	0.0
29	"	"	"	"	N11	2.5	1.4	0.8	0.8	36.5	40.0	0.1
30	"	N11	-----	-----	-----	1.7	1.1	1.0	0.8	* 18.0	21.0	0.6
31	N11	-----	N11	N11	-----	1.2	-----	16.0	-----	11.7	14.0	-----
TOTAL	N11	N11	N11	N11	N11	209.4	198.6	411.6	859.3	337.3	419.0	48.4
MEAN	N11	N11	N11	N11	N11	6.75	6.62	13.3	28.6	10.9	13.5	1.61
MAX	N11	N11	N11	N11	N11	75.8	23.0	96.2	150.0	78.8	121.0	10.4
MIN	N11	N11	N11	N11	N11	N11	0.9	0.0	0.8	0.0	0.0	0.0
AC-FT	N11	N11	N11	N11	N11	415	394	816	1,700	669	831	96

CALENDAR YEAR 1962: MAX 102 MIN N11 MEAN 3.15 AC-FT 2,280  
 WATER YEAR 1962-63: MAX 150 MIN N11 MEAN 6.8 AC-FT 4,920

\* Discharge measurement or observation of no flow made on this day.  
 Note.--Stage-discharge relation affected by ice Mar. 16 to Apr. 14. The expression "n11" and "0.0" represent "no flow" and "less than 0.05 cfs", respectively.

## 5-1188. Short Creek below international boundary, near Roche Percee, Saskatchewan--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964											
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	SEPT.
1	0.8	0.0	N11	N11	N11	N11	* 20.5	1.8	0.0	2.8	0.0
2	0.8	0.0	"	"	"	"	84.8	1.7	0.0	1.4	0.0
3	0.8	0.0	"	"	"	"	* 255	2.6	0.0	1.0	0.0
4	0.8	0.1	"	"	"	"	347	4.2	0.0	1.0	0.0
5	0.8	0.1	"	"	"	"	164	* 4.2	0.0	1.8	0.0
6	0.8	* 0.2	"	"	"	"	* 61.4	8.4	0.0	1.7	0.0
7	0.8	0.2	"	* "	"	"	48.8	9.4	0.0	2.5	0.0
8	0.8	0.1	"	"	"	"	59.6	7.7	0.0	1.4	* 0.0
9	0.8	0.1	"	"	"	"	38.0	6.5	* 0.1	1.0	0.0
10	0.8	0.1	"	"	"	"	37.5	5.5	0.0	1.3	0.0
11	0.6	0.0	"	"	"	* N11	38.0	4.4	0.2	1.2	0.0
12	0.1	0.0	"	"	"	0.0	37.5	3.1	1.0	0.7	0.0
13	0.0	0.0	"	"	"	0.0	36.0	2.9	0.6	* 0.1	0.0
14	0.0	0.0	"	"	"	0.5	31.8	2.6	0.6	0.0	0.0
15	0.0	0.0	"	"	"	* 0.7	* 24.5	1.5	0.1	0.0	0.0
16	0.0	0.0	"	"	"	* 0.0	25.0	1.2	0.0	0.0	0.0
17	0.0	0.0	"	"	"	0.0	16.0	1.0	0.6	0.0	0.0
18	0.0	0.0	"	"	"	0.0	13.5	* 0.9	3.3	0.0	0.0
19	0.0	0.0	"	"	"	0.0	11.4	0.8	7.9	0.0	0.0
20	0.0	0.0	"	"	"	0.0	9.4	0.4	21.0	0.0	0.0
21	0.0	0.0	"	"	"	0.0	* 7.9	0.4	41.0	0.0	* 0.0
22	0.0	0.0	"	"	"	0.0	6.7	0.2	44.0	0.0	0.0
23	0.0	0.0	"	"	"	0.0	6.5	0.1	36.0	0.0	0.5
24	0.0	0.0	"	"	"	0.0	5.3	0.2	21.0	0.0	0.5
25	0.0	0.0	"	"	"	0.0	4.6	0.0	14.6	0.0	0.4
26	0.0	0.0	"	"	"	0.0	4.0	0.0	11.1	* 0.0	0.2
27	0.0	0.0	"	"	"	0.0	4.4	0.4	8.7	0.0	0.1
28	0.0	0.0	"	"	"	0.0	3.8	0.4	7.9	0.0	0.1
29	0.0	0.0	"	"	N11	0.5	2.6	0.1	6.7	0.0	0.1
30	0.0	0.0	N11	N11	-----	1.0	2.0	0.0	4.4	0.0	0.1
31	0.0	-----	-----	-----	-----	2.6	-----	0.0	-----	0.0	-----
TOTAL	8.7	0.9	N11	N11	N11	5.3	1,407.5	72.6	230.8	17.9	3.0
MEAN	0.28	0.03	N11	N11	N11	0.17	46.9	2.34	7.69	0.58	0.10
MAX	0.8	0.2	N11	N11	N11	347	2.6	9.4	44.0	2.8	0.5
MIN	0.0	0.0	N11	N11	N11	N11	2.0	0.0	0.0	0.0	0.0
AC-PT	17	1.8	N11	N11	N11	10	2,790	144	458	36	6.0
CALENDAR YEAR 1963: MAX 150 MIN N11 MEAN 6.83 AC-PT 4,940											
WATER YEAR 1963-64: MAX 347 MIN N11 MEAN 4.78 AC-PT 3,470											

\* Discharge measurement or observation of no flow made on this day.

Note.--Stage-discharge relation affected by ice Nov. 11 to Apr. 11. Backwater from debris Sept. 25-30. The expression "N11" and "0.0" represent "no flow" and "less than 0.05 cfs", respectively.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965											
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	SEPT.
1	0.1	0.0	N11	N11	N11	N11	0.1	6.9	29.6	0.0	0.0
2	0.0	0.0	"	"	"	"	0.1	5.8	51.8	0.0	"
3	"	* 0.0	"	"	"	"	0.1	* 4.9	44.0	0.0	0.0
4	"	"	"	"	"	"	0.1	4.9	29.0	0.0	1.0
5	"	"	"	"	"	"	0.1	5.6	20.1	0.0	0.4
6	"	"	"	"	"	"	* 0.1	17.0	15.0	0.0	0.2
7	"	"	"	"	"	"	0.1	99.0	11.8	0.0	0.2
8	"	"	"	"	"	"	* 4.0	113	9.8	0.0	"
9	"	"	"	"	"	"	61.4	86.6	8.3	0.0	0.1
10	"	"	"	"	"	"	44.0	51.2	6.9	0.0	* 0.0
11	"	"	"	"	"	"	39.5	* 28.5	6.0	0.0	0.2
12	"	"	"	* "	"	"	63.8	17.2	5.2	0.0	"
13	"	"	"	"	"	"	* 98.3	12.8	4.3	0.0	0.2
14	"	"	"	"	"	"	84.8	8.9	4.0	0.0	0.2
15	"	"	"	"	"	"	78.8	6.7	3.3	0.0	0.4
16	"	"	"	"	"	"	59.0	5.8	2.5	0.0	0.5
17	"	"	"	"	"	"	46.4	5.4	2.2	0.0	0.6
18	"	"	"	"	"	"	37.0	* 4.2	1.8	0.0	0.6
19	"	"	"	"	"	"	29.6	3.1	1.6	0.0	0.7
20	"	"	"	"	"	"	* 24.0	2.4	1.2	0.0	0.7
21	"	"	"	"	"	"	17.5	1.8	1.2	* 0.3	0.8
22	"	"	"	"	"	"	15.7	1.4	1.3	0.0	1.2
23	"	0.0	"	"	"	"	13.1	1.4	1.0	0.0	2.2
24	"	N11	"	"	"	"	11.5	1.6	* 0.9	0.0	2.3
25	"	"	"	"	"	"	10.7	5.2	0.7	0.0	2.0
26	"	"	"	"	"	"	10.4	6.9	0.8	0.0	1.6
27	"	"	"	"	"	"	* 9.3	59.6	0.6	0.0	0.3
28	"	"	"	"	"	"	9.0	59.6	0.2	0.0	1.4
29	"	"	"	"	N11	"	8.1	38.5	0.0	0.0	1.4
30	"	N11	"	-----	-----	"	6.7	26.0	0.0	0.0	2.4
31	0.0	-----	N11	N11	-----	* N11	-----	22.0	-----	* 0.0	-----
TOTAL	0.1	0.0	N11	N11	N11	N11	783.3	713.8	265.1	0.3	23.1
MEAN	0.0	0.0	N11	N11	N11	N11	26.1	23.0	8.84	0.01	0.77
MAX	0.1	0.0	N11	N11	N11	N11	98.3	113	51.8	0.3	2.4
MIN	0.0	N11	N11	N11	N11	N11	0.1	1.4	0.0	0.0	0.0
AC-PT	0.2	0.0	N11	N11	N11	N11	1,550	1,420	526	0.6	46
CALENDAR YEAR 1964: MAX 347 MIN N11 MEAN 4.75 AC-PT 3,460											
WATER YEAR 1964-65: MAX 113 MIN N11 MEAN 4.89 AC-PT 3,540											

\* Discharge measurement or observation of no flow made on this day.

Note.--Stage-discharge relation affected by ice or beaver dam Nov. 16 to Apr. 13, June 21 to Sept. 30. Discharge computed from manual gage readings Apr. 4013. The expression "N11" and "0.0" represent "no flow" and "less than 0.05 cfs", respectively.

5-1140. Souris (Mouse) River near Sherwood, N. Dak.

(International gaging station)

Location.--Lat 48°59'24", long 101°57'28", in NW $\frac{1}{4}$ SE $\frac{1}{4}$ NE $\frac{1}{4}$  sec.33, T.164 N., R.87 W., on right bank 0.8 mile downstream from international boundary and 16 miles northwest of Sherwood.

Drainage area.--9,650 sq mi, approximately, of which about 6,400 sq mi is probably noncontributing.

Records available.--March 1930 to September 1965. Monthly discharge only for some periods, published in WSP 1308.

Gage.--Water-stage recorder and concrete control. Datum of gage is 1,604.00 ft above mean sea level, datum of 1929. Prior to Apr. 8, 1935, staff gage at same site and datum.

Average discharge.--35 years, 96.7 cfs (70,010 acre-ft per year); median of yearly mean discharges, 87 cfs (48,500 acre-ft per year).

Extremes.--Maximums and minimums (discharge in cubic feet per second, gage height in feet).

Annual maximum discharge (*) and peak discharges above base (120 cfs), water years 1961-65											
Date	Time	Discharge	Gage height	Date	Time	Discharge	Gage height	Date	Time	Discharge	Gage height
Mar. 20, 1961	0800	* 160	a 4.63	June 7, 1963	2000	218	3.94	Apr. 6, 1964	0300	-	a 11.48
Mar. 30, 1962	2130	* 400	a 6.54	July 27, 1963	0130	184	3.35	Apr. 15, 1965	0330	540	a 8.11
June 15, 1962	0600	* 891	9.08	July 31, 1963	0830	140	3.02	Apr. 24, 1965	1300	576	b 6.95
Mar. 25, 1963	1600	* 470	a 7.66	Sept. 1, 1963	1400	143	3.03	May 17, 1965	1900	887	9.05
				Apr. 5, 1964	-	* 880	a 11.45	June 9, 1965	0900	* 1,030	10.08
								July 24, 1965	0400	164	3.24

a Backwater from ice.

b Release from Boundary Dam reservoir.

Annual minimum discharge, water years 1961-65							
Water year	Date	Discharge	Gage height	Water year	Date	Discharge	Gage height
1961	Long periods	0	-	1964	Sept. 15, 19-22, 1964	0.50	a 1.15
1962	do.	0	-	1965	Feb. 27 to Mar. 3	b .80	-
1963	do.	0	-				

a Occurred Sept. 15, 1964.

b Minimum daily.

1930-65: Maximum discharge, 7,400 cfs Apr. 28, 1948 (gage height, 23.80 ft); no flow for long periods in some years.

Maximum stage known, 23.80 ft Apr. 28, 1948. Flood in 1927 reached a stage of about 22 ft, from information by local residents.

Remarks.--Records good except those for winter periods, which are fair. Some regulation at low flows by reservoirs in Canada. Some small diversions for irrigation and municipal supply.

Cooperation.--This station is one of the international gaging stations maintained by the United States under agreement with Canada.

Revisions (water years).--WSP 1308: 1934, 1945. WSP 1728: Drainage area.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961													
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	
1		2.0	1.9	1.0	0.1	1.2	28	* 6.6	3.3	0.3			
2	0.2	2.1	2.0	.9	.1	1.0	34	6.1	3.0	.3			
3	** .4	2.0	2.1	.8	.1	.8	33	5.7	2.6	.2	(*)		
4	.4	1.8	2.1	* .8	.1	1.4	30	5.9	28	.2			
5	.4	1.8	1.9	.8	.1	1.6	* 28	7.9	26	.2			
6	.5	1.8	1.9	1.1	** .1	1.9	22	11	* 19	.2			
7	.7	1.8	1.8	1.0	.1	* 2.0	24	11	14	.2			
8	.7	1.8	1.7	.9	.1	1.8	24	8.8	11	.1			
9	.8	1.7	1.6	.9	.1	1.5	22	7.5	7.7	.1			
10	1.3	1.7	1.9	.9	.1	1.2	21	6.6	5.9	.1			
11	1.0	1.7	1.8	.9	.1	1.0	20	9.4	4.8	.1			
12	.9	1.7	1.8	.9	.1	1.2	19	11	4.0	* .1			(*)
13	1.1	1.8	* 1.8	.9	.2	1.7	20	11	3.3	.1			
14	1.3	1.8	2.0	.9	.5	* 2.5	19	11	2.8	.1			
15	1.4	* 1.8	2.2	.9	.6	2.6	17	12	2.4	0			
16	1.6	1.8	2.1	.9	.7	3.2	16	* 10	1.8	0			
17	1.6	1.8	2.0	.9	.8	4.0	15	9.1	1.7	0			
18	1.6	1.8	1.9	1.0	1.1	10	* 13	9.1	1.6	0			
19	1.5	1.9	1.8	.8	.9	30	11	9.4	1.6	0			
20	1.7	2.0	1.7	.8	.6	* 144	12	9.1	1.4	0			
21	1.8	2.0	1.5	.6	.4	* 140	12	8.2	1.2	0			
22	1.8	2.0	1.4	.5	.4	* 133	11	7.7	1.0	0			
23	1.7	2.0	1.4	.4	.4	116	11	7.2	.8	0			(*)
24	1.7	2.0	1.3	.3	.4	91	11	6.8	.7	0			
25	1.6	2.1	1.2	.2	.4	* 76	11	5.9	.6	* 0			
26	* 4.1	2.1	1.2	.2	.6	65	10	5.3	.6	0			(*)
27	3.2	2.1	1.1	.2	.9	56	8.5	4.8	.5	0			
28	2.8	2.0	1.0	.2	1.2	48	7.9	4.2	.4	0			
29	1.8	2.1	1.0	.2	-----	* 43	7.7	4.0	.3	0			
30	1.9	1.9	1.0	.1	-----	37	7.2	3.7	* .4	0			(*)
31	1.7	-----	1.0	.1	-----	34	-----	* 3.7	-----	0			-----
TOTAL	42.4	56.9	51.1	21.0	11.3	1,053.6	525.3	239.7	152.4	2.3	0	0	0
MEAN	1.37	1.90	1.65	.68	.40	34.0	17.5	7.73	5.08	.07	0	0	0
MAX	4.1	2.1	2.2	1.1	1.2	144	34	12	28	0.3	0	0	0
MIN	0.2	1.7	1.0	.1	0.1	8	7.2	3.7	.3	0	0	0	0
AC-FT	84	113	101	42	22	2,090	1,040	475	302	4.6	0	0	0

CALENDAR YEAR 1960: MAX 2,630 MIN 0.2 MEAN 124 AC-FT 90,120

WATER YEAR 1960-61: MAX 144 MIN 0 MEAN 5.91 AC-FT 4,270

\* Discharge measurement or observation of no flow made on this day.

\*\* Field estimate made on this day.

Note.--Stage-discharge relation affected by ice Mar. 18-28.

## 5-1140. Souris (Mouse) River near Sherwood, N. Dak.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1						0	210	5.1	29	25	2.0	0.4
2						0	120	5.0	28	22	2.0	.4
3						0	* 110	4.5	29	22	1.8	.4
4						0	90	4.3	32	21	1.8	.3
5					(*)	0	* 75	4.6	* 31	18	1.8	.3
6						0	60	4.5	36	26	1.7	.2
7						* 0	60	4.3	40	29	1.7	.2
8						0	47	4.3	41	20	* 1.6	.2
9				(*)		0	42	4.3	40	15	1.4	.1
10						0	31	4.1	37	13	1.3	.1
11	(*)					0	* 28	4.0	33	13	4.1	* 0
12			(*)			0	25	4.1	32	13	3.6	0
13						0	21	4.3	37	10	3.0	0
14						0	19	5.1	39	8.8	2.4	0
15		(*)				0	15	6.4	577	8.6	2.0	0
16						0	12	5.0	150	* 8.8	1.6	0
17						0	10	4.8	74	9.4	1.4	0
18						0	10	* 5.3	55	8.0	1.5	0
19						0	9.1	4.8	47	6.4	1.4	0
20						0	10	4.0	47	5.5	1.2	0
21						* 0	11	32	52	4.6	1.0	0
22						0	9.4	106	58	4.0	1.0	0
23						0	7.8	112	80	3.7	1.0	0
24						0	8.6	112	83	3.5	1.0	0
25						0	9.4	87	* 60	3.3	1.0	0
26						** 1	9.1	62	49	2.9	.8	0
27						30	8.3	44	41	2.8	.7	0
28						* 53	8.3	38	38	2.7	.6	* 0
29			(*)			20	8.0	41	37	2.6	* .5	0
30					-----	* 330	5.3	41	30	2.5	.4	0
31	(*)	-----			-----	* 320	-----	32	-----	2.2	.4	-----
TOTAL	0	0	0	0	0	754	1,089.3	799.8	1,962	337.3	47.7	2.6
MEAN	0	0	0	0	0	24.3	36.3	25.8	65.4	10.9	1.54	.09
MAX	0	0	0	0	0	330	210	112	577	29	4.1	0.4
MIN	0	0	0	0	0	0	5.3	4.0	28	2.2	.4	0
AC-FT	0	0	0	0	0	1,500	2,160	1,590	3,890	669	95	5.2

CALENDAR YEAR 1961: MAX 144 MIN 0 MEAN 5.49 AC-FT 3,980

WATER YEAR 1961-62: MAX 577 MIN 0 MEAN 13.7 AC-FT 9,910

\* Discharge measurement or observation of no flow made on this day.

\*\* Field estimate made on this day.

Note.--Stage-discharge relation affected by ice Mar. 26 to Apr. 7.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	0	* 0.8	1.2			0	40	18	13	16	132	140
2	0	.8	1.2			0	170	16	12	14	129	121
3	0	.8	1.4			0	80	14	11	14	98	98
4	0	1.0	** 1.4		(*)	* 0	60	14	* 14	15	74	80
5	0	1.3	1.3			0	50	13	28	15	58	* 63
6	0	1.2	1.2			0	* 42	13	194	15	* 47	52
7	0	.8	1.2	(*)		0	40	12	182	15	35	43
8	0	.7	1.2			0	37	10	190	17	30	37
9	0	.6	1.0			0	* 32	* 10	165	* 17	29	31
10	0	.6	1.0			0	30	10	164	17	27	28
11	.1	.6	.8			* 0	35	11	* 182	17	25	29
12	.1	.6	.6			0	24	13	* 169	16	23	29
13	.1	** .7	.6			0	22	19	* 155	16	20	31
14	0	.7	.5			0	19	19	141	17	18	30
15	.2	.7	.5			0	17	16	116	17	17	26
16	* .7	.8	.4			0	17	17	87	17	15	24
17	.6	.8	.3			0	22	18	68	17	14	22
18	.5	.8	** .2			0	20	21	54	16	12	* 20
19	.4	.8	.2			0	25	39	45	23	11	17
20	.3	.8	.2		(*)	5	29	70	38	27	10	16
21	.2	.8	.2			* 15	30	60	34	27	9.1	15
22	.2	1.0	.1			10	29	50	40	25	* 9.1	14
23	.1	.9	.1	(*)		20	26	44	38	23	11	13
24	.1	.8	.1			350	25	41	33	22	13	13
25	.1	.8	.1			* 450	* 24	38	29	* 28	18	12
26	1.2	.9	.1			350	25	35	* 27	62	40	11
27	3.5	1.0	0			250	27	29	23	134	31	8.6
28	2.5	1.0	0			200	25	24	21	58	25	6.4
29	1.6	1.2	0			160	* 22	20	20	* 68	24	4.8
30	1.2	1.2	0		-----	* 110	20	17	19	140	24	4.3
31	1.0	-----	0		-----	70	-----	15	-----	140	77	-----
TOTAL	14.7	25.5	17.1	0	0	1,990	1,064	746	2,312	1,065	1,105.2	1,039.1
MEAN	0.47	0.85	0.55	0	0	64.2	35.5	24.1	77.1	34.4	35.7	34.6
MAX	3.5	1.3	1.4	0	0	450	170	70	* 194	140	132	140
MIN	0	.6	0	0	0	0	17	10	11	14	9.1	4.3
AC-FT	29	51	34	0	0	3,950	2,110	1,480	4,590	2,110	2,190	2,060

CALENDAR YEAR 1962: MAX 577 MIN 0 MEAN 13.8 AC-FT 10,020

WATER YEAR 1962-63: MAX 450 MIN 0 MEAN 25.7 AC-FT 18,600

\* Discharge measurement or observation of no flow made on this day.

\*\* Field estimate made on this day.

Note.--Stage-discharge relation affected by ice Dec. 14 to Apr. 4.

## 5-1140. Souris (Mouse) River near Sherwood, N. Dak.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	4.2	5.3	11	2.3	2.8	3.5	250	164	33	* 44	9.4	1.8
2	* 3.5	5.3	10	2.6	2.8	2.6	400	147	30	36	10	1.8
3	2.7	5.3	8.8	3.0	* 2.8	3.8	360	147	23	32	8.8	1.4
4	2.6	5.1	8.3	3.2	3.0	4.8	680	157	20	28	8.8	1.4
5	2.6	4.9	8.1	3.5	3.1	4.9	840	* 164	* 17	30	7.8	1.2
6	3.0	4.6	7.8	* 3.5	3.1	3.9	** 820	154	17	46	8.8	1.4
7	3.8	4.4	7.4	3.5	3.1	3.6	660	145	17	68	8.1	1.6
8	4.8	4.2	7.6	3.6	3.1	3.5	** 540	152	18	48	7.6	1.6
9	3.5	5.5	** 6.4	3.5	3.1	3.4	* 460	147	17	39	* 6.4	* 1.6
10	3.2	5.6	5.6	3.4	3.1	3.2	* 400	138	16	39	* 5.8	1.6
11	3.0	4.9	5.5	3.2	3.1	3.4	370	123	14	58	5.1	1.5
12	2.6	4.6	5.5	3.2	3.2	4.4	610	117	17	57	4.8	1.3
13	2.7	** 4.3	4.8	3.2	3.2	* 10	* 660	119	17	49	4.8	1.0
14	* 3.4	4.1	4.1	3.5	3.2	8.0	* 550	126	17	* 42	4.2	.7
15	3.2	4.1	2.8	3.6	3.1	8.0	545	121	17	37	3.9	.6
16	3.1	4.1	2.6	3.8	3.1	10	* 661	104	16	34	3.6	1.0
17	5.5	5.3	2.6	3.8	3.1	* 6.0	670	94	17	30	3.4	1.0
18	4.4	8.5	2.4	3.8	3.1	5.0	612	94	* 20	26	3.1	.8
19	3.6	6.7	2.4	3.6	* 3.1	3.5	488	88	37	24	3.1	.6
20	3.2	5.8	2.3	3.6	3.4	4.0	406	* 79	52	23	3.0	.5
21	3.0	5.5	2.3	3.6	3.6	7.5	* 332	81	71	22	3.4	.5
22	3.0	5.8	2.3	* 3.5	3.4	15	275	73	66	23	3.9	* .5
23	3.2	5.8	2.6	4.1	3.0	18	227	63	61	23	3.8	.6
24	3.5	5.5	2.7	4.1	3.1	15	206	58	65	20	3.6	.6
25	3.2	5.3	3.2	3.9	3.1	10	202	51	63	19	3.4	.7
26	3.0	5.5	3.4	3.6	3.1	7.0	198	45	65	18	3.2	1.2
27	2.8	** 5.8	2.8	3.1	3.1	4.5	196	40	77	15	2.8	.9
28	3.0	6.2	2.6	3.0	3.1	3.5	* 192	34	76	13	2.7	.9
29	3.8	8.1	2.2	2.8	3.4	3.0	185	36	62	* 11	2.3	5.1
30	4.6	10	1.9	2.8	-----	3.0	179	40	51	* 9.7	1.9	3.6
31	4.8	-----	2.1	2.8	-----	* 7.5	-----	38	-----	10	1.8	-----
TOTAL	106.5	166.1	144.1	104.7	90.5	194.5	13,174	3,139	1,089	973.7	153.3	39.0
MEAN	3.44	5.54	4.65	3.38	3.12	6.27	439	101	36.2	31.4	4.95	1.30
MAX	5.6	10	6.1	3.6	18	840	164	77	68	10	10	5.1
MIN	2.5	4.1	1.9	2.3	2.8	3.0	179	34	14	9.7	1.8	.5
AC-FT	211	329	286	208	180	386	26,130	6,230	2,160	1,930	304	77

CALENDAR YEAR 1963: MAX 450 MIN 0 MEAN 26.7 AC-FT 19,320  
 WATER YEAR 1963-64: MAX 840 MIN 0.5 MEAN 52.9 AC-FT 38,430

\* Discharge measurement made on this day.

\*\* Field estimate made on this day.

Note.--Stage-discharge relation affected by ice Mar. 13 to Apr. 15.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	3.0	2.6	* 11	2.4	1.8	0.8	2.6	286	746	167	26	5.6
2	2.0	2.8	12	2.2	1.6	.8	* 2.8	221	* 831	161	40	5.6
3	1.9	2.8	9.1	2.2	1.4	.8	3.0	171	860	155	63	5.5
4	* 1.8	2.7	7.8	2.2	1.2	1.0	5.0	136	835	164	71	7.6
5	* 1.8	* 2.6	6.7	2.0	1.2	1.0	6.0	* 121	* 851	162	71	8.8
6	2.2	2.6	6.4	2.0	1.2	1.2	8.0	132	929	150	68	* 7.6
7	1.9	2.6	6.7	1.8	1.2	1.4	12	190	989	145	63	* 7.6
8	1.7	2.4	6.7	1.8	1.2	1.6	25	245	1,020	143	59	8.3
9	1.6	2.3	6.4	1.6	1.2	1.8	35	366	1,030	138	58	8.1
10	1.8	2.3	5.8	1.6	* 1.2	* 2.0	40	463	* 995	136	61	7.6
11	2.2	2.3	5.5	1.4	1.2	2.0	150	502	925	141	59	6.9
12	2.4	2.2	5.1	* 1.4	1.0	2.0	300	578	785	141	50	8.3
13	2.3	2.2	4.8	* 1.4	1.0	2.0	* 370	694	587	* 132	37	16
14	2.4	2.2	4.2	1.4	1.0	2.0	* 480	781	421	100	27	17
15	2.3	3.0	* 3.9	1.4	1.0	2.0	500	832	421	76	22	14
16	2.3	3.0	3.9	1.4	1.0	3	* 300	866	* 457	61	19	15
17	2.4	2.6	3.9	1.6	1.0	4	220	884	* 422	48	16	17
18	2.4	* 2.3	3.6	1.8	1.0	5	240	* 879	40	13	16	13
19	2.2	2.3	3.5	2.0	1.0	3	390	788	238	38	12	17
20	2.2	2.7	3.4	2.2	1.0	2.8	* 340	600	199	36	11	* 14
21	* 2.4	2.6	3.2	2.4	1.0	2.6	280	422	178	46	9.1	12
22	2.3	2.4	3.2	2.6	* .9	2.4	333	185	207	36	8.1	13
23	2.3	2.4	3.2	2.6	* .9	* 2.2	474	294	207	36	7.6	13
24	2.1	2.3	3.2	2.4	.9	2.0	568	257	199	147	* 6.9	11
25	2.0	2.4	3.1	* 2.4	.9	2.0	502	229	164	98	6.2	9.1
26	2.1	2.8	3.0	2.4	.9	2.0	368	220	138	79	6.7	8.5
27	8.0	2.8	2.8	2.2	2.0	* 2.8	210	210	* 73	8.1	9	16
28	2.2	10	* 2.6	2.2	.8	2.2	310	202	123	65	7.1	8.8
29	2.6	10	2.6	2.0	-----	2.2	317	262	* 147	55	6.2	8.3
30	2.3	10	2.6	2.0	-----	2.4	305	422	162	45	* 5.8	8.3
31	2.3	-----	2.6	2.0	-----	2.6	-----	605	-----	37	5.8	-----
TOTAL	67.8	103.4	152.5	61.0	30.5	64.8	7,162.4	13,191	15,496	3,071	923.6	315.2
MEAN	2.19	3.45	4.92	1.97	1.09	2.09	239	426	517	99.1	29.8	10.5
MAX	3.0	10	12	2.6	1.8	5	568	884	1,030	167	71	17
MIN	1.6	2.2	2.6	1.4	.8	0.8	2.6	121	123	36	5.8	5.5
AC-FT	134	205	302	121	60	129	14,210	26,160	30,740	6,090	1,830	625

CALENDAR YEAR 1964: MAX 840 MIN 0.5 MEAN 52.7 AC-FT 38,250  
 WATER YEAR 1964-65: MAX 1,030 MIN 0.8 MEAN 111 AC-FT 80,610

\* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 25-30, Dec. 27 to Apr. 22.

5-1155. Lake Darling near Foxholm, N. Dak.

Location.--Lat 48°27'27", long 101°35'14", in NE 1/4 sec. 1, T.157 N., R.85 W., on control structures of Lake Darling Dam, reservoir of Fish and Wildlife Service, on Souris River about 6 miles north of Foxholm and at mile 82.9 downstream from Canadian border.

Drainage area.--10,200 sq mi, approximately, of which about 6,700 sq mi is probably noncontributing.

Records available.--April 1936 to September 1965 (no winter records 1936-39).

Gage.--Water-stage recorder. Datum of gage is 1,577.00 ft above mean sea level, datum of 1929 (Fish and Wildlife Service bench mark). April 1936 to July 30, 1959, staff gage and July 31, 1959, to Aug. 8, 1963, wire-weight gage at same site and datum.

Extremes.--Maximums and minimums (contents in acre-feet, gage height in feet) for the water years 1961-65 are contained in the following table:

Water year	Maximum			Minimum		
	Date	Contents	Gage height	Date	Contents	Gage height
1961	Oct. 2, 1960	a 69,400	16.28	Sept. 30, 1961	b 35,300	11.06
1962	July 6, 1962	a 35,900	11.18	Sept. 30, 1962	b 31,800	10.20
1963	Aug. 12, 1963	a 42,500	12.41	Feb. 18, 25, 1963	b 31,200	10.04
1964	July 11, 1964	a 64,800	15.73	Nov. 19, 1963	b 36,800	11.37
1965	June 4, 1965	95,200	19.25	Nov. 6, 1964	53,400	14.20

a Maximum observed.

b Minimum observed.

1936-65: Maximum contents observed, 130,000 acre-ft Apr. 23, 24, 1943 (gage height, 22.83 ft); minimum observed since April 1943 when reservoir was first filled to spillway level, 31,200 acre-ft Feb. 18, 25, 1963 (gage height, 10.04 ft).

Remarks.--Reservoir is formed by earth dam; storage began in April 1936; dam completed in July 1936. Usable capacity, 108,500 acre-ft between gage height 0.0 (sill of control gages) and 21.0 ft (crest of spillway). Dead storage, 3,500 acre-ft. Water is used during periods of low flow at wildlife refuge downstream.

Cooperation.--Gage-height record furnished by Fish and Wildlife Service.

Revisions (water years).--WSP 1338: 1942. WSP 1728: Drainage area.

MONTH-END GAGE HEIGHT AND CONTENTS, WATER YEARS OCTOBER 1960 TO SEPTEMBER 1965

Date	Gage-height (feet)	Contents (acre-feet)	Change in contents (acre-feet)	Date	Gage-height (feet)	Contents (acre-feet)	Change in contents (acre-feet)
Oct. 31, 1960.....	15.64	64,100	-4,900	Oct. 31, 1963.....	11.48	37,400	-1,800
Nov. 30.....	15.50	63,000	-1,100	Nov. 30.....	11.41	37,000	-400
Dec. 31.....	15.62	64,000	+1,000	Dec. 31.....	11.52	37,600	+600
Calendar year 1960	-	-	+22,400	Calendar year 1963	-	-	+6,300
Jan. 31, 1961.....	15.54	63,300	-700	Jan. 31, 1964.....	11.51	37,600	0
Feb. 28.....	15.48	62,800	-500	Feb. 29.....	11.52	37,600	0
Mar. 31.....	15.45	62,600	-200	Mar. 31.....	11.73	38,600	+1,000
Apr. 30.....	15.04	59,300	-3,300	Apr. 30.....	14.67	56,700	+18,100
May 31.....	14.60	56,200	-3,100	May 31.....	15.15	60,200	+3,500
June 30.....	13.64	49,800	-6,400	June 30.....	15.49	62,900	+2,700
July 31.....	12.91	45,500	-4,300	July 31.....	15.40	62,200	-700
Aug. 31.....	11.70	38,500	-7,000	Aug. 31.....	14.78	57,500	-4,900
Sept. 30.....	11.08	35,300	-3,200	Sept. 30.....	14.57	56,900	-1,500
Water year 1961...	-	-	-33,700	Water year 1964...	-	-	+16,800
Oct. 31.....	10.80	34,200	-1,100	Oct. 31.....	14.28	54,000	-2,000
Nov. 30.....	10.50	33,000	-1,200	Nov. 30.....	14.29	54,000	0
Dec. 31.....	10.48	32,900	-100	Dec. 31.....	14.38	54,700	+700
Calendar year 1961	-	-	-31,100	Calendar year 1964	-	-	+17,100
Jan. 31, 1962.....	10.44	32,800	-100	Jan. 31, 1965.....	14.40	54,800	+100
Feb. 28.....	10.42	32,700	-100	Feb. 28.....	14.32	54,200	-600
Mar. 31.....	10.72	33,900	+1,200	Mar. 31.....	14.40	54,800	+600
Apr. 30.....	10.43	32,700	-1,200	Apr. 30.....	16.35	70,000	+15,200
May 31.....	10.58	33,300	+600	May 31.....	19.01	93,100	+23,100
June 30.....	11.10	35,500	+2,200	June 30.....	18.70	90,300	-2,800
July 31.....	10.85	34,800	-700	July 31.....	18.50	88,500	-1,800
Aug. 31.....	10.65	33,600	-1,200	Aug. 31.....	18.01	84,100	-4,400
Sept. 30.....	10.20	31,800	-1,800	Sept. 30.....	17.94	83,500	-600
Water year 1962...	-	-	-3,500	Water year 1965...	-	-	+27,500
Oct. 31.....	10.30	32,200	+400				
Nov. 30.....	10.18	31,700	-500				
Dec. 31.....	10.08	31,300	-400				
Calendar year 1962	-	-	-1,600				
Jan. 31, 1963.....	10.07	31,300	-				
Feb. 28.....	10.06	31,200	-100				
Mar. 31.....	10.54	33,200	+2,000				
Apr. 30.....	10.38	32,500	-700				
May 31.....	10.60	33,400	+900				
June 30.....	11.94	39,700	+6,300				
July 31.....	11.80	39,000	-700				
Aug. 31.....	11.84	39,200	+200				
Sept. 30.....	11.84	39,200	-				
Water year 1963...	-	-	+7,400				

5-1160. Souris (Mouse) River near Foxholm, N. Dak.

Location.--Lat 48°22'20", long 101°30'18", in SW 1/4 sec. 34, T.157 N., R.84 W., on left bank 30 ft upstream from county highway bridge, 3 miles east of Foxholm, 19 miles upstream from Des Lacs River, and at mile 98.3 downstream from Canadian border.

Drainage area.--10,800 sq mi, approximately, of which about 6,700 sq mi is probably noncontributing.

Records available.--June 1904 to November 1905, March to July 1906 (gage heights only), October 1936 to September 1965. Monthly discharge only for some periods, published in WSP 1308. Published as Mouse River near Foxholm, 1904-6.

Gage.--Water-stage recorder and concrete control. Datum of gage is 1,560.73 ft above mean sea level, datum of 1929. June 23, 1904, to July 31, 1906, staff gage at site 3.2 miles upstream at different datum. Apr. 1, 1937, to Mar. 25, 1938, staff gage at site 600 ft downstream from present site at datum about 0.5 ft higher.

Average discharge.--30 years, 95.0 cfs, unadjusted (68,780 acre-ft per year); median of yearly mean discharges, 55 cfs (39,800 acre-ft per year).

Extremes.--Maximum and minimum discharges for the water years 1961-65 are contained in the following table:

Water year	Maximum			Minimum		
	Date	Discharge (cfs)	Gage height (feet)	Date	Discharge (cfs)	Gage height (feet)
1961	Apr. 4, 1961	186	6.13	Sept. 24, 1961	1.2	5.16
1962	Apr. 25, 1962	218	6.22	Many days	0	-
1963	Apr. 16, 1963	225	6.24	Long periods	0	-
1964	Apr. 27, 28, 1964	314	6.43	Many days	0	-
1965	June 15, 1965	917	12.20	do.	0	-

1904-6, 1936-65: Maximum discharge, 3,040 cfs May 16, 1948 (gage height, 14.79 ft); maximum reverse flow, 25 cfs Apr. 4, 1949, caused by backwater from Des Lacs River; no flow at times in many years.

Remarks.--Records good except those for winter periods, which are fair. Flow completely regulated since 1936 by Lake Darling (see station 5-1155) and several smaller reservoirs (combined capacity, about 184,000 acre-ft). Some small diversions for irrigation and municipal supply.

Revisions (water years).--WSP 1308: 1905. WSP 1728: Drainage area.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	29	75	2.3	17	16	15	20	21	19	20	18	96
2	29	52	2.0	17	16	15	20	21	20	20	18	96
3	26	20	4.4	17	15	15	49	21	20	20	18	96
4	25	18	8.1	17	15	15	159	20	20	21	19	96
5	25	14	8.1	17	15	15	183	20	20	21	19	96
6	25	13	11	16	15	15	183	19	19	22	18	96
7	25	11	21	15	14	15	183	16	18	24	18	96
8	26	6.5	27	15	16	15	183	15	16	25	17	72
9	26	8.9	21	14	17	15	183	15	15	25	16	50
10	25	10	16	14	17	15	183	15	14	24	15	50
11	25	10	11	13	17	15	183	15	14	24	15	30
12	25	10	14	15	16	15	150	14	57	24	14	12
13	25	8.9	20	16	16	15	62	12	89	24	14	10
14	25	8.1	16	16	16	15	41	9.7	94	24	13	8.9
15	25	8.9	18	16	16	15	21	14	94	24	32	8.9
16	21	8.1	20	16	16	15	21	18	94	24	89	9.7
17	19	8.9	18	15	16	14	21	19	43	22	91	10
18	19	10	18	15	16	13	20	17	18	22	91	10
19	19	13	18	15	15	16	20	15	19	21	94	6.4
20	20	11	17	15	15	16	20	15	20	21	94	2.0
21	21	11	14	16	15	16	19	16	21	20	96	1.7
22	21	9.7	16	16	15	15	19	16	21	22	96	1.4
23	21	8.9	16	16	15	13	18	18	20	21	96	1.7
24	19	9.7	15	16	15	13	18	19	17	21	96	1.4
25	18	10	14	16	15	13	18	17	16	21	96	2.0
26	18	10	12	16	15	13	18	18	17	21	96	2.3
27	18	9.7	15	17	15	16	18	18	17	20	96	2.0
28	18	8.1	13	17	15	22	20	18	17	19	96	2.0
29	18	6.5	17	16	-----	21	22	19	18	20	96	1.7
30	18	5.8	18	16	-----	21	22	20	20	19	96	1.7
31	49	-----	18	16	-----	20	-----	20	-----	18	96	-----
TOTAL	723	414.7	458.9	489	435	482	2,097	530.7	907	674	1,779	969.8
MEAN	23.3	13.8	14.8	15.8	15.5	15.5	69.9	17.1	30.2	21.7	57.4	32.3
MAX	49	75	27	17	17	22	183	21	94	25	96	96
MIN	18	5.8	2.0	13	14	13	18	9.7	14	18	13	1.4
AC-FT	1,430	823	910	970	863	956	4,160	1,050	1,800	1,340	3,530	1,920
CAL YR 1960: TOTAL	24,852.00			MEAN 67.9		MAX 918	MIN 30	AC-FT 49,290				
MAT YR 1961: TOTAL	9,960.1			MEAN 27.3		MAX 183	MIN 1.4	AC-FT 19,760				

## 5-1160. Souris (Mouse) River near Foxholm, N. Dak.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	1.7	12	2.3	1.0	.40	.40	.50	6.9	4.7	2.5	.30	0
2	1.7	5.7	2.3	1.0	.40	.40	.60	5.5	3.5	2.5	.30	0
3	1.7	7.0	2.3	1.0	.40	.50	.60	2.1	2.3	2.9	.30	0
4	1.7	15	2.0	1.0	.40	.50	.60	1.8	2.3	2.5	.30	0
5	1.4	15	2.0	1.0	.30	.50	.60	1.6	2.3	2.5	.30	0
6	1.4	15	2.0	.80	.30	.50	.50	1.6	2.0	3.4	.30	0
7	1.4	15	2.0	.80	.30	.50	.50	1.8	2.3	2.1	.40	0
8	1.4	16	1.7	.60	.20	.50	.50	2.1	1.7	1.5	.30	0
9	1.4	18	1.7	.60	.20	.50	.50	2.1	1.7	1.5	.10	0
10	1.4	18	1.4	.80	.20	.50	.60	1.8	1.7	1.5	.10	0
11	1.7	18	1.4	.80	.20	.40	.50	1.8	1.7	1.5	.20	0
12	1.7	18	1.4	.80	.20	.40	.50	1.6	2.0	1.5	.10	0
13	1.7	17	1.2	.60	.20	.40	.50	2.4	2.0	1.5	.10	0
14	1.4	18	1.0	.60	.20	.40	.50	2.1	2.0	1.5	.10	0
15	1.4	18	.80	.60	.20	.40	.50	1.8	2.9	1.5	.10	0
16	1.4	17	.80	.40	.40	.30	.50	1.6	3.4	1.8	.10	0
17	1.4	17	.80	.40	.40	.30	33	1.8	2.9	2.8	.10	0
18	1.4	16	.60	.40	.40	.30	110	1.6	2.9	2.1	.10	0
19	1.4	15	.60	.40	.40	.30	204	1.4	2.5	1.8	.10	0
20	1.4	15	.60	.40	.40	.40	204	1.6	2.5	1.5	.10	0
21	1.4	15	.60	.40	.40	1.0	204	1.6	2.9	1.3	.10	0
22	1.4	15	.80	.40	.40	1.5	208	2.7	2.5	1.1	.10	0
23	1.4	14	.80	.40	.40	.90	181	7.7	2.2	.90	.10	0
24	1.7	13	.80	.40	.40	1.3	142	2.1	1.9	.50	.10	0
25	1.7	12	.80	.40	.40	1.7	96	2.1	2.5	.40	.10	0
26	1.4	10	.80	.40	.40	1.3	4.8	2.4	4.6	.40	0	0
27	32	10	1.0	.30	.40	1.1	8.6	2.7	4.6	.50	0	0
28	56	11	1.0	.30	.40	.60	15	2.4	4.0	.40	0	0
29	56	5.8	1.0	.30	-----	.60	6.9	4.2	3.4	.40	0	0
30	32	2.3	1.0	.30	-----	.60	4.2	14	2.9	.30	0	0
31	14	-----	1.0	.30	-----	.50	-----	10	-----	.30	0	-----
TOTAL	229.1	413.8	38.50	17.90	9.30	19.70	1,430.00	96.9	80.8	46.90	4.30	0
MEAN	7.39	13.8	1.24	.58	.33	.64	47.7	3.13	2.69	1.51	.14	0
MAX	56	18	2.3	1.0	.40	1.7	208	14	4.7	3.4	.40	0
MIN	1.4	2.3	.60	.30	.20	.30	.50	1.4	1.7	.30	0	0
AC-FT	454	821	76	36	18	39	2,840	192	160	93	8.5	0

CAL YR 1961: TOTAL 9,044.90

MEAN 24.8

MAX 183

MIN .60

AC-FT 17,940

WAT YR 1962: TOTAL 2,387.20

MEAN 6.54

MAX 208

MIN 0

AC-FT 4,730

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	0	0	0	0	0	0	0	.20	0	.10	0	0
2	0	0	0	0	0	0	0	.10	0	.10	.10	0
3	0	0	5.0	0	0	0	0	0	0	.10	.20	0
4	0	0	25	0	0	0	0	0	.10	.10	.10	0
5	0	0	25	0	0	0	0	0	.60	.10	.10	0
6	0	0	25	0	0	0	0	0	1.7	.10	.10	0
7	0	0	24	0	0	0	0	0	.40	.10	0	0
8	0	0	24	0	0	0	0	0	2.0	.10	0	0
9	0	0	24	0	0	0	0	0	2.7	0	0	0
10	0	0	24	0	0	0	0	.10	5.8	.80	0	0
11	0	0	24	0	0	0	0	.20	2.3	.30	0	0
12	0	0	24	0	0	0	0	.60	1.7	.10	0	0
13	0	0	24	0	0	0	0	1.4	1.7	.10	0	0
14	0	0	12	0	0	0	0	.60	1.0	.10	0	0
15	0	0	.20	0	0	0	117	.20	.80	0	0	0
16	0	0	.20	0	0	0	225	.10	.30	0	0	0
17	0	0	.10	0	0	0	222	.20	.20	0	0	0
18	0	0	0	0	0	0	222	.20	.40	0	0	0
19	0	0	0	0	0	0	222	.10	.40	0	0	0
20	0	0	0	0	0	0	186	.30	.10	0	0	0
21	0	0	0	0	0	0	2.6	.20	.10	0	0	0
22	0	0	0	0	0	0	.60	.10	.20	0	0	0
23	0	0	0	0	0	0	.40	.10	.10	0	0	0
24	0	0	0	0	0	0	.30	.10	.10	0	0	0
25	0	0	0	0	0	0	.30	0	.20	.10	0	0
26	0	0	0	0	0	0	.30	0	.10	.30	0	0
27	0	0	0	0	0	0	.30	0	.10	.20	0	0
28	0	0	0	0	0	0	.40	0	.10	.20	0	0
29	0	0	0	0	-----	0	.30	0	.20	.10	0	0
30	0	0	0	0	-----	0	.20	0	.10	0	0	0
31	0	-----	0	0	-----	0	-----	0	-----	0	0	-----
TOTAL	0	0	260.50	0	0	0	1,199.70	4.80	23.50	3.10	0.60	0
MEAN	0	0	8.40	0	0	0	40.0	.15	.78	.10	.019	0
MAX	0	0	25	0	0	0	225	1.4	5.8	.80	.20	0
MIN	0	0	0	0	0	0	0	0	0	0	0	0
AC-FT	0	0	517	0	0	0	2,380	9.5	47	6.2	1.2	0

CAL YR 1962: TOTAL 1,966.30

MEAN 5.39

MAX 208

MIN 0

AC-FT 3,900

WAT YR 1963: TOTAL 1,492.20

MEAN 4.09

MAX 225

MIN 0

AC-FT 2,960

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965												
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	3.8	2.9	7.0	.20	0	.10	.10	150	216	197	29	30
2	3.8	3.3	4.3	.20	0	.10	.10	194	456	29	29	29
3	4.3	3.3	4.3	.20	0	.10	.20	164	627	186	32	29
4	3.8	2.9	2.5	.20	0	.10	.20	104	655	187	42	29
5	3.8	3.3	.40	.20	0	.10	.20	106	670	176	27	29
6	3.3	3.8	.20	.10	0	.10	.20	40	680	170	30	29
7	3.3	3.3	.20	.10	0	.10	.20	.60	688	176	34	29
8	2.9	3.3	.20	.10	.10	.10	.30	.70	697	176	34	29
9	2.5	3.8	.20	.10	.10	.10	.20	.80	732	170	34	27
10	2.9	9.8	.20	0	.10	.10	.30	1.0	751	176	34	27
11	2.9	9.8	.20	0	.10	.10	.50	7.9	784	176	34	27
12	2.9	9.8	.20	0	.10	.10	.30	7.0	816	181	34	27
13	2.9	11	.20	0	.10	.10	.30	4.9	840	101	32	23
14	2.5	11	.20	0	.10	.10	.30	1.1	895	91	34	25
15	2.2	11	.20	0	.10	.10	.30	.40	909	94	32	27
16	2.2	11	.30	0	.10	.10	.30	.20	891	94	32	46
17	2.9	11	.30	0	.10	.10	.20	.20	837	96	32	38
18	3.3	11	.20	0	.10	.10	.20	1.0	766	89	32	34
19	3.3	11	.20	0	.10	.10	.20	.30	679	53	32	34
20	3.8	11	.20	0	.10	.10	.20	.20	646	42	30	36
21	3.8	11	.20	0	.10	.10	.20	.50	633	42	30	36
22	3.8	11	.20	0	.10	.10	.20	.20	609	42	30	55
23	3.8	9.8	.20	0	.10	.10	.20	.10	483	40	30	50
24	3.3	9.8	.20	0	.10	.10	.20	.10	362	38	30	38
25	3.3	9.8	.20	0	.10	.10	.20	.50	180	32	30	38
26	2.9	9.8	.20	0	.10	.10	.20	9.8	173	34	30	34
27	2.9	9.8	.20	0	.10	.10	.20	23	176	36	30	34
28	2.9	9.8	.20	0	.10	.10	.20	10	180	38	30	34
29	2.9	9.8	.20	0	.10	.10	.10	22	183	29	30	34
30	2.9	7.0	.20	0	.10	.10	32	22	190	29	30	36
31	2.9	-----	.20	0	.10	.10	-----	71	-----	27	30	-----
TOTAL	98.7	244.9	23.90	1.40	2.10	3.10	38.40	955.50	7,740	3,210	979	993
MEAN	3.18	8.16	.77	.045	.075	.10	1.28	30.8	580	104	31.6	31.1
MAX	4.3	11	7.0	.20	.10	.10	32	194	909	197	42	55
MIN	2.2	2.9	.20	0	0	.10	.10	.10	173	27	27	27
AC-FT	196	486	47	2.8	4.2	6.2	76	1,900	34,570	6,370	1,940	1,970
CAL YR 1964	TOTAL	3,853.10	MEAN 10.5	MAX 307	MIN 0	AC-FT	7,640					
MAT YR 1965	TOTAL	23,954.00	MEAN 65.6	MAX 909	MIN 0	AC-FT	47,510					

5-1165. Des Lacs River at Foxholm, N. Dak.

Location.--Lat 48°22'14", long 101°34'11", in NW¼NE¼NW¼ sec.2, T.156 N., R.85 W., on left bank 200 ft upstream from county highway bridge in Foxholm.

Drainage area.--939 sq mi, of which about 400 sq mi is probably noncontributing.

Records available.--June 1904 to July 1906, October 1945 to September 1965. Monthly discharge only for some periods, published in WSP 1308.

Gage.--Water-stage recorder. Datum of gage is 1,632.98 ft above mean sea level, datum of 1929. Prior to August 1906 and Oct. 1, 1945, to Aug. 30, 1948, staff gage at former bridge over former channel, 500 ft southwest of present site, at present datum. Aug. 31, 1948, to June 7, 1955, water-stage recorder at site 10 ft downstream from former bridge, at present datum. June 14 to Oct. 23, 1955, wire-weight gage at site 200 ft downstream from present gage at present datum.

Average discharge.--22 years, 20.0 cfs (14,480 acre-ft per year); median of yearly mean discharges, 15 cfs (10,900 acre-ft per year).

Extremes.--Maximum and minimum discharges for the water years 1961-65 are contained in the following table:

Water year	Maximum			Minimum		
	Date	Discharge (cfs)	Gage height (feet)	Date	Discharge (cfs)	Gage height (feet)
1961	Mar. 18, 1961	25	a 3.65	At times	0	-
1962	Mar. 25, 1962	50	b 4.26	do.	0	-
1963	June 9, 1963	934	13.15	do.	0	-
1964	Apr. 3, 1964	355	a 9.40	do.	0	-
1965	Apr. 15, 1965	406	c 8.91	do.	0	-

a Backwater from ice.

b Maximum gage height for year, 4.33 ft Mar. 28, 1962, backwater from ice.

c Maximum gage height for year, 9.01 ft Apr. 14, 1965, backwater from ice.

1904-6, 1945-65: Maximum discharge, 2,000 cfs Apr. 4, 1949 (gage height, 18.04 ft, backwater from ice); no flow at times in some years.

Maximum stage known since 1886, about 18.8 ft in spring of 1939, from information by local residents.

Remarks.--Records good except those for winter periods, which are fair. Some regulation at low flow by a series of wildfowl refuge ponds, combined capacity about 64,000 acre-ft. Some small diversions for irrigation above station.

Revisions.--WSP 1728: Drainage area.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	0	.50	.20	0	0	0	3.4	1.6	.30	0	0	0
2	0	.50	.20	0	0	.50	3.6	1.5	.20	0	0	0
3	.10	.50	.20	0	0	1.0	3.9	1.4	.10	0	0	0
4	.10	.50	.20	0	0	2.0	4.5	1.3	0	0	0	0
5	.10	.50	.20	0	0	3.5	5.0	1.4	0	0	0	0
6	0	.50	.20	0	0	1.0	4.4	1.4	0	0	0	0
7	0	.50	.20	0	0	.90	3.9	1.5	0	0	0	0
8	0	.50	.20	0	0	.90	3.5	1.4	0	0	0	0
9	0	.40	.20	0	0	.90	3.5	1.4	0	0	0	0
10	0	.40	.20	0	0	.90	3.3	1.4	0	0	0	0
11	.10	.50	.20	0	0	.90	2.8	1.4	0	0	0	0
12	.10	.50	.20	0	0	.80	2.7	1.4	0	0	0	0
13	.10	.50	.30	0	0	.80	2.6	1.3	0	0	0	0
14	.10	.50	.30	0	0	.70	2.6	1.2	0	0	0	0
15	.10	.60	.40	0	0	.70	2.6	1.0	0	0	0	0
16	.10	.50	.30	0	0	.80	2.3	1.0	0	0	0	0
17	.20	.50	.30	0	0	.80	2.2	.90	0	0	0	0
18	.20	.40	.30	0	0	20	2.0	.90	0	0	0	0
19	.20	.40	.20	0	0	18	2.0	.90	0	0	0	0
20	.20	.40	.10	0	0	13	2.3	.70	0	0	0	0
21	.30	.40	0	0	0	11	2.4	.60	0	0	0	0
22	.30	.40	0	0	0	9.6	2.4	.50	0	0	0	0
23	.30	.40	0	0	0	8.6	2.4	.40	0	0	0	0
24	.40	.40	0	0	0	8.2	2.1	.40	0	0	0	0
25	.40	.50	0	0	0	8.6	2.0	.20	0	0	0	0
26	.40	.50	0	0	0	7.4	2.0	.20	0	0	0	0
27	.40	.40	0	0	0	5.9	2.1	.20	0	0	0	0
28	.40	.20	0	0	0	4.6	2.0	.20	0	0	0	0
29	.50	.20	0	0	0	4.4	1.8	.20	0	0	0	0
30	.50	.20	0	0	0	3.3	1.7	.10	0	0	0	0
31	.50	0	0	0	0	2.7	1.0	0	0	0	0	0
TOTAL	6.10	13.20	4.60	0	0	142.40	84.0	28.10	0.60	0	0	0
MEAN	.20	.44	.15	0	0	4.59	2.80	.91	.020	0	0	0
MAX	.50	.60	.40	0	0	20	5.0	1.6	.30	0	0	0
MIN	0	.20	0	0	0	0	1.7	.10	0	0	0	0
AC-FT	12	26	9.1	0	0	282	167	56	1.2	0	0	0
CAL YR 1960: TOTAL	10,649.50			MEAN 29.1		MAX 910	MIN 0	AC-FT 21,120				
WAT YR 1961: TOTAL	279.00			MEAN .76		MAX 20	MIN 0	AC-FT 553				

## 5-1165. Des Lacs River at Foxholm, N. Dak.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	0	.10	0	0	0	0	12	.50	4.4	.30	.30	.10
2	0	.10	0	0	0	0	11	.40	6.2	.20	.20	.10
3	0	.10	0	0	0	0	9.0	.40	5.0	.20	.20	0
4	0	.10	0	0	0	0	7.0	.40	4.0	.20	.20	0
5	0	.10	0	0	0	0	5.5	.30	3.2	.20	.20	0
6	0	.10	0	0	0	0	3.5	.30	2.4	1.1	.20	0
7	0	.10	0	0	0	0	2.0	.30	2.0	.80	.20	0
8	0	.10	0	0	0	0	1.2	.30	1.5	1.2	.20	0
9	0	.10	0	0	0	0	1.5	.30	1.0	1.2	.20	0
10	0	.10	0	0	0	0	3.5	.30	.60	1.2	.20	0
11	0	.10	0	0	0	0	2.0	.30	.50	1.0	.50	0
12	0	.10	0	0	0	0	1.6	.30	.60	1.1	.40	0
13	0	0	0	0	0	0	1.5	.50	.50	1.2	.50	0
14	0	0	0	0	0	0	1.4	2.5	.40	1.4	.40	0
15	0	0	0	0	0	0	1.2	2.1	.70	1.2	.30	0
16	0	0	0	0	0	0	1.1	1.6	.80	1.1	.20	0
17	0	0	0	0	0	0	1.0	2.4	.70	3.8	.20	0
18	0	0	0	0	0	0	4.2	.30	.20	2.0	.20	0
19	0	0	0	0	0	0	.60	3.2	.30	19	.20	0
20	.10	0	0	0	0	2.0	.60	2.5	.30	8.4	.10	0
21	.10	0	0	0	0	5.0	.60	2.1	.50	4.5	.10	0
22	.10	0	0	0	0	10	.60	2.5	.80	2.5	.10	0
23	.10	0	0	0	0	15	.50	3.0	1.4	2.0	.40	0
24	.10	0	0	0	0	16	.40	2.6	1.8	1.6	.30	0
25	.10	0	0	0	0	22	.40	2.5	1.2	1.2	.20	0
26	.10	0	0	0	0	25	.60	2.0	.80	1.0	.20	0
27	.10	0	0	0	0	15	.60	1.6	.60	.80	.10	0
28	.10	0	0	0	0	25	.60	1.9	.50	.70	.10	0
29	.10	0	0	0	-----	22	.50	3.9	.40	.60	.10	0
30	.10	0	0	0	-----	18	.50	6.2	.40	.50	.10	0
31	.10	-----	0	0	-----	15	-----	5.8	-----	.40	.10	-----
TOTAL	1.20	1.20	0	0	0	190.0	73.40	57.20	43.30	62.70	6.90	0.20
MEAN	.039	.040	0	0	0	6.13	2.45	1.85	1.44	2.02	.22	.007
MAX	.10	.10	0	0	0	25	12	6.2	6.2	19	.50	.10
MIN	0	0	0	0	0	0	.40	.30	.20	.20	.10	0
AC-FT	2.4	2.4	0	0	0	377	146	113	86	124	14	.4
CAL YR 1961: TOTAL	257.50		MEAN .71		MAX 20	MIN 0		AC-FT 511				
WAT YR 1962: TOTAL	436.10		MEAN 1.19		MAX 25	MIN 0		AC-FT 865				

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	0	.20	.30	.10	0	0	2.0	1.5	.90	5.6	21	2.0
2	0	.20	.30	.10	0	0	2.4	1.4	1.1	4.6	24	2.0
3	0	.20	.30	.10	0	0	1.4	1.3	1.2	4.3	14	2.0
4	0	.20	.20	.10	0	0	1.3	1.0	1.1	4.0	10	1.9
5	0	.20	.20	.10	0	0	2.1	.90	31	3.9	8.0	1.9
6	0	.20	.20	0	0	0	1.3	.90	116	3.5	7.1	1.6
7	0	.20	.20	0	0	0	1.2	.80	323	3.2	6.9	1.4
8	0	.20	.20	0	0	0	.30	.70	634	3.2	6.5	1.4
9	0	.20	.20	0	0	0	1.9	.60	840	3.0	5.4	1.4
10	0	.20	.20	0	0	0	2.0	.70	513	4.6	5.0	1.3
11	0	.20	.20	0	0	0	2.4	.70	169	4.6	4.6	1.3
12	0	.20	.10	0	0	0	2.7	1.4	62	4.2	4.3	1.5
13	0	.20	.10	0	0	0	2.5	2.4	46	3.9	3.8	1.4
14	0	.20	.10	0	0	0	2.2	2.5	33	3.8	3.7	1.2
15	.10	.10	.10	0	0	0	1.7	7.8	26	3.6	3.2	1.4
16	.20	.10	.20	0	0	0	1.6	7.3	22	3.7	3.2	1.3
17	.50	.10	.10	0	0	0	1.7	5.9	18	3.3	3.4	1.0
18	.40	.10	.20	0	0	0	1.8	4.5	69	3.1	2.8	1.3
19	.40	.10	.20	0	0	0	1.7	3.6	38	3.0	2.7	1.7
20	.30	.10	.10	0	0	0	1.8	3.1	19	17	2.4	1.9
21	.30	.10	.10	0	0	0	2.2	2.7	15	16	2.2	1.6
22	.30	.20	.10	0	0	0	1.8	2.5	14	11	2.2	1.5
23	.30	.10	0	0	0	0	1.8	2.5	12	8.4	2.4	1.5
24	.20	.10	0	0	0	0	1.7	2.3	12	6.8	2.7	1.5
25	.20	.10	0	0	0	.10	1.7	2.2	13	22	2.7	1.4
26	.20	.20	0	0	0	0	1.0	1.6	2.0	14	228	2.9
27	.20	.20	.10	0	0	0	4.0	1.4	2.3	10	256	1.0
28	.20	.20	.10	0	0	0	3.5	1.5	1.8	7.6	77	1.8
29	.20	.30	.10	0	-----	3.0	1.8	1.2	7.1	33	2.4	1.1
30	.20	.40	.10	0	-----	3.1	1.7	1.0	6.5	22	2.3	1.2
31	.20	-----	.10	0	-----	1.6	-----	1.0	-----	16	2.2	-----
TOTAL	4.40	5.30	4.40	0.50	0	16.30	53.20	70.50	3,074.50	786.3	169.4	44.0
MEAN	.14	.18	.14	.016	0	.53	1.77	2.27	102	25.4	5.46	1.47
MAX	.50	.40	.30	.10	0	4.0	2.7	7.8	840	256	24	2.0
MIN	0	.10	0	0	0	0	.30	.60	.90	3.0	2.2	1.0
AC-FT	8.7	11	8.7	1.0	0	32	106	140	6,100	1,560	336	87
CAL YR 1962: TOTAL	447.80		MEAN 1.23		MAX 25	MIN 0		AC-FT 888				
WAT YR 1963: TOTAL	4,228.80		MEAN 11.6		MAX 840	MIN 0		AC-FT 8,390				

## 5-1165. Des Lacs River at Foxholm, N. Dak.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	.90	1.1	1.2	.40	.10	1.3	70	19	3.8	7.1	3.2	1.5
2	.80	1.1	1.2	.40	.10	1.0	295	19	3.2	5.7	3.0	1.4
3	.80	1.2	1.2	.30	.10	.80	330	21	2.9	5.3	2.6	1.4
4	.70	1.2	1.4	.20	.10	.60	210	21	2.5	5.9	2.5	1.4
5	.70	1.1	1.3	.20	.10	.40	105	22	2.3	23	2.4	1.4
6	.70	1.2	1.3	.10	.10	.60	55	23	2.2	27	2.2	1.3
7	.70	1.2	1.5	.10	.10	.80	34	23	2.2	26	2.0	1.3
8	.70	1.2	1.2	.20	.10	.60	37	26	6.3	45	1.7	1.3
9	.70	1.2	1.2	.30	.10	.40	32	21	8.3	34	1.8	1.2
10	.70	1.2	.90	.30	.10	.30	30	17	7.1	21	2.0	1.2
11	.70	1.1	.80	.30	.10	.30	31	15	7.7	14	1.0	1.0
12	.70	1.1	.80	.30	.10	.40	32	13	7.6	9.8	1.4	.80
13	.60	1.0	1.0	.20	.10	.60	31	12	6.6	8.2	1.6	.70
14	.60	1.0	.80	.20	.10	.30	11	5.8	7.3	1.6	.60	.60
15	.60	1.0	.60	.20	.10	.20	28	10	5.6	6.6	1.4	.60
16	.70	1.1	.60	.20	.10	.20	28	12	6.6	6.3	1.4	.70
17	.70	1.0	.60	.20	.10	.40	28	34	6.8	5.8	1.4	.70
18	.70	1.2	.40	.20	.10	.40	27	40	7.8	5.3	1.4	.50
19	.70	1.1	.40	.20	.10	.30	27	19	16	4.8	1.4	.50
20	.80	1.2	.30	.20	.10	.20	26	12	29	5.4	1.3	.50
21	1.0	1.2	.30	.20	.10	.20	25	12	23	4.6	1.5	.50
22	1.0	1.2	.30	.20	.10	.10	24	11	19	5.3	1.9	.60
23	1.0	1.2	.40	.20	.10	.10	24	10	22	4.6	2.0	.70
24	1.0	1.2	.60	.20	.10	.10	23	9.4	17	3.9	1.8	.90
25	1.0	1.2	.40	.20	.10	.10	21	7.8	9.6	3.6	1.5	.60
26	1.0	1.4	.40	.10	.10	.10	21	6.6	7.6	3.2	1.4	1.6
27	1.0	1.4	.30	.10	.10	0	22	6.0	6.3	3.2	1.4	1.6
28	1.0	1.5	.20	.10	.20	0	21	5.3	5.4	3.0	1.3	1.3
29	1.0	1.3	.20	.10	.80	0	19	4.6	13	3.0	1.3	1.1
30	1.0	1.3	.20	.10	-----	0	19	4.3	8.2	2.8	1.9	1.2
31	1.1	-----	.20	.10	-----	0	-----	3.9	-----	3.7	1.6	-----
TOTAL	25.30	35.4	22.20	6.30	3.70	10.60	1,705	470.9	271.7	314.4	55.5	30.10
MEAN	.82	1.18	.72	.20	.13	.34	56.8	15.2	9.06	10.1	1.79	1.00
MAX	1.1	1.5	1.5	.40	.80	1.3	330	40	29	45	3.2	1.6
MIN	.60	1.0	.20	.10	.10	0	19	3.9	2.2	2.8	1.3	.50
AC-FT	50	70	44	13	7.3	21	3,380	934	539	624	110	.60

CAL YR 1963: TOTAL 4,297.60

MEAN 11.8

MAX 840

MIN 0

AC-FT 8,520

WAT YR 1964: TOTAL 2,951.10

MEAN 8.06

MAX 330

MIN 0

AC-FT 5,850

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	1.3	1.2	.20	.30	.10	.10	.10	35	22	21	13	9.5
2	1.4	1.2	.20	.30	.10	.10	.20	32	26	34	12	9.7
3	1.3	1.2	.20	.30	.10	.10	.10	30	24	24	11	9.7
4	1.6	1.2	.20	.20	.10	.10	1.4	28	22	20	9.2	9.7
5	1.4	1.2	.20	.20	.10	.10	2.0	28	21	17	7.8	9.7
6	1.3	1.2	.20	.20	.20	.20	1.5	46	22	15	7.7	9.9
7	1.4	1.2	.20	.20	.20	.30	5.0	93	21	14	7.1	11
8	1.3	1.3	.30	.20	.10	1.0	24	86	19	14	6.6	10
9	1.3	1.3	.30	.20	.20	.60	55	31	18	14	21	9.7
10	1.3	1.3	.30	.20	.10	.40	50	38	18	13	28	9.0
11	1.3	1.3	.30	.20	.10	.30	100	32	17	14	26	9.0
12	1.3	1.4	.30	.10	.10	.20	230	28	17	15	23	8.2
13	1.2	1.3	.30	.10	.10	.20	270	25	34	14	21	8.0
14	1.1	1.5	.20	.10	.10	.20	360	24	145	14	19	10
15	1.1	1.5	.20	.10	.10	.10	385	22	69	13	17	11
16	1.1	1.7	.30	.10	.10	.10	241	21	277	12	17	11
17	1.1	1.4	.30	.20	.10	.10	110	20	144	12	16	11
18	1.1	1.5	.30	.20	.10	.10	72	20	73	11	14	10
19	1.1	1.4	.30	.20	.10	.10	56	19	45	11	13	12
20	1.0	1.3	.30	.20	0	.10	48	19	32	11	12	9.7
21	1.0	1.2	.30	.20	0	.10	47	19	26	11	11	9.0
22	1.1	1.0	.30	.20	0	0	44	21	23	17	11	8.6
23	1.0	.90	.20	.20	0	0	39	21	85	9.7	8.2	8.2
24	1.0	1.0	.30	.20	0	0	33	33	20	91	9.2	7.8
25	1.0	1.1	.30	.20	0	0	29	25	19	97	10	7.1
26	1.0	.70	.20	.20	0	0	29	28	24	45	10	6.6
27	1.0	.70	.20	.20	.10	0	34	33	27	27	13	6.1
28	1.0	.60	.30	.10	.10	0	35	29	21	20	14	5.6
29	1.1	.40	.30	.10	-----	0	35	24	19	17	13	5.3
30	1.2	.20	.30	.10	-----	0	36	22	18	15	11	5.2
31	1.2	-----	.30	.10	-----	0	-----	22	-----	14	9.9	-----
TOTAL	36.6	34.40	8.40	5.60	2.40	4.60	2,372.30	1,007	1,284	752	423.2	267.3
MEAN	1.18	1.15	.27	.18	.086	.15	79.1	32.5	42.8	24.3	13.7	8.91
MAX	1.6	1.7	.30	.30	.20	1.0	385	93	277	97	28	12
MIN	1.0	.20	.20	.10	0	0	.10	19	17	11	6.6	5.2
AC-FT	73	68	17	11	4.8	9.1	4,710	2,000	2,850	1,490	839	530

CAL YR 1964: TOTAL 2,947.60

MEAN 8.05

MAX 330

MIN 0

AC-FT 5,850

WAT YR 1965: TOTAL 6,197.80

MEAN 17.0

MAX 385

MIN 0

AC-FT 12,290

## 5-1175. Souris (Mouse) River above Minot, N. Dak.

Location.--Lat 48°14'45", long 101°22'15" in NW¼SE¼ sec.17, T.155 N., R.83 W., on right bank 180 ft downstream from county highway bridge, 3½ miles downstream from Des Lacs River, and at mile 124.1 downstream from Canadian border.

Drainage area.--11,300 sq mi, approximately, of which about 7,100 sq mi is probably noncontributing.

Records available.--May 1903 to September 1965. Monthly discharge only for some periods, published in WSP 1308. Published as Mouse River at Minot, 1903-24, Souris River at Minot, 1927-28, 1929-34, and Souris River near Minot, 1928-29.

Gage.--Water-stage recorder and concrete control. Datum of gage is 1,545.75 ft above mean sea level, datum of 1929. May 5, 1903, to Sept. 30, 1928, Oct. 1, 1929, to Sept. 30, 1934, staff or chain gage at mile 135.0 in Minot, at datum 12.5 ft lower; Oct. 1, 1928, to Sept. 30, 1929, staff or wire-weight gage at Saugstad bridge at mile 145.8, 5 miles southeast of Minot at datum 19.2 ft lower than present datum. Records equivalent except those for periods of extreme low flow, as some industrial and sanitary waste enters river between the sites.

Average discharge.--62 years, 136 cfs, unadjusted (98,460 acre-ft per year); median of yearly mean discharges, 85 cfs (61,500 acre-ft per year).

Extremes.--Maximum and minimum discharges for the water years 1961-65 are contained in the following table:

Water year	Maximum			Minimum		
	Date	Discharge (cfs)	Gage height (feet)	Date	Discharge (cfs)	Gage height (feet)
1961	Apr. 8, 1961	229	5.31	Sept. 28, 29, 30	2.0	a 4.14
1962	Apr. 20, 1962	211	5.26	Long periods	0	-
1963	June 9, 1963	654	b 9.07	do.	0	-
1964	Apr. 4, 1964	400	c 6.64	Many days	0	-
1965	June 16, 1965	1,220	10.94	Mar. 25-27, 1965	d .10	-

a Occurred Sept. 28, 1961.

b Backwater from vegetation.

c Backwater from ice.

d Minimum daily.

1903-65: Maximum discharge, 12,000 cfs Apr. 20, 1904 (gage height, 21.9 ft at site in Minot), from rating curve extended above 8,100 cfs; no flow at times in some years.

Maximum stage known at present site, about 23 ft in April 1904. Maximum stage known in Minot, about 26 ft in 1881, according to Apr. 20, 1904, issue of Minot Daily Optic (this peak probably occurred in 1882).

Remarks.--Records good. Flow almost completely regulated by Lake Darling (see station 5-1155) and several smaller reservoirs (combined capacity, about 248,000 acre-ft). Some small diversions for irrigation and municipal supply.

Revisions (water years).--WSP 1308: 1905, 1909-14, 1918, 1924-25, 1927. WSP 1338: 1903-4, 1906, 1917, 1928, 1929[M].

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	28	29	5.0	16	16	18	24	19	17	15	19	87
2	28	61	4.0	15	15	18	25	18	16	16	18	87
3	28	58	4.0	15	15	17	28	17	17	16	17	87
4	28	25	5.0	15	16	17	51	19	17	16	17	87
5	28	21	6.0	15	17	17	158	24	17	16	17	87
6	26	17	7.0	15	18	17	193	26	17	16	17	89
7	26	14	8.0	15	17	17	188	29	16	17	17	89
8	26	12	10	15	16	17	190	25	14	20	17	91
9	26	9.1	15	15	16	17	188	21	13	19	17	76
10	25	7.0	17	14	16	17	185	20	13	19	16	56
11	24	8.0	17	14	16	17	182	20	13	19	15	51
12	24	8.0	14	14	16	17	179	20	13	19	13	40
13	24	8.0	12	14	16	17	140	20	28	18	14	22
14	24	8.0	13	15	15	18	65	19	67	18	14	15
15	24	8.5	14	16	15	17	39	17	74	18	15	12
16	24	9.0	14	16	14	17	19	16	78	18	30	10
17	23	9.0	13	16	14	18	16	21	78	19	70	10
18	22	9.0	13	16	14	18	16	23	50	19	80	10
19	21	10	12	16	13	18	19	22	16	19	80	10
20	21	10	12	15	12	18	20	20	12	18	84	10
21	21	10	11	15	12	18	20	17	13	18	84	6.4
22	22	10	11	14	14	18	19	17	14	18	84	4.2
23	22	10	10	14	15	18	17	17	14	18	84	3.4
24	22	10	10	14	16	18	17	18	14	17	84	3.4
25	22	10	11	14	17	18	17	20	14	17	84	3.4
26	19	10	12	14	17	18	16	19	12	17	84	2.7
27	18	10	12	14	17	17	15	16	12	17	84	2.4
28	18	10	12	15	17	17	15	15	12	19	84	2.0
29	18	8.0	13	15	-----	21	16	16	11	21	87	2.0
30	17	6.0	15	16	-----	24	19	16	12	21	87	2.0
31	15	-----	16	16	-----	24	-----	18	-----	20	87	-----
TOTAL	714	434.6	348.0	464	432	558	2,096	605	714	558	1,520	1,059.9
MEAN	23.0	14.5	11.2	15.0	15.4	18.0	69.9	19.5	23.8	18.0	49.0	35.3
MAX	28	61	17	16	18	24	193	29	78	21	87	91
MIN	15	6.0	4.0	14	12	17	15	15	11	15	13	2.0
AC-FT	1,420	862	690	920	857	1,110	4,160	1,200	1,420	1,110	3,010	2,100

CAL YR 1960: TOTAL 36,645.6 MEAN 100 MAX 990 MIN 4.0 AC-FT 72,690  
 WAT YR 1961: TOTAL 9,503.5 MEAN 26.0 MAX 193 MIN 2.0 AC-FT 18,850

## 5-1175. Souris (Mouse) River above Minot, N. Dak.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	2.2	20	7.3	.90	.10	0	17	9.1	14	2.4	0	0
2	1.9	14	5.8	1.1	.10	0	16	5.8	13	2.7	0	0
3	1.9	8.2	4.2	1.4	.10	0	14	4.7	11	3.4	0	0
4	1.6	8.2	4.2	1.6	.10	0	11	3.8	8.2	4.7	0	0
5	1.6	11	3.8	1.6	.20	0	10	3.4	8.2	4.7	0	0
6	1.6	15	3.8	1.6	.20	0	11	3.0	7.3	5.8	0	0
7	1.6	16	3.4	1.6	.20	0	11	2.7	5.8	8.2	0	0
8	1.6	16	3.4	1.6	.10	0	11	2.2	5.8	10	0	0
9	1.6	17	3.0	1.9	.10	0	5.3	1.6	4.7	9.1	0	0
10	1.6	18	2.4	1.4	0	0	4.7	1.4	4.2	5.8	0	0
11	1.9	19	2.2	1.1	0	0	4.2	1.1	3.0	3.8	0	0
12	1.6	19	1.6	1.1	0	0	4.2	.90	2.7	2.4	0	0
13	1.6	19	1.4	.90	0	0	3.8	1.1	3.0	1.6	0	0
14	1.6	19	1.4	1.1	0	0	3.8	3.4	3.8	1.1	0	0
15	1.4	19	1.4	1.1	0	0	3.8	2.7	3.4	.90	0	0
16	1.1	19	1.4	1.1	.10	0	3.8	2.2	5.8	.70	0	0
17	.90	19	1.4	.90	.10	0	4.2	1.9	5.8	.70	0	0
18	.70	19	1.4	.70	0	0	5.3	1.9	6.4	.90	0	0
19	.70	19	1.4	.70	0	.50	85	1.9	7.3	1.9	0	0
20	.70	19	1.4	.90	0	1.9	205	1.1	6.4	2.2	0	0
21	.70	19	1.4	.40	0	5.0	196	.90	5.3	2.2	0	0
22	.90	19	1.4	.20	0	8.2	190	1.6	4.7	3.0	0	0
23	1.1	19	1.4	.10	0	12	190	2.2	3.8	3.4	0	0
24	1.1	19	1.4	.10	0	14	171	1.6	3.8	2.2	0	0
25	1.1	17	1.4	.10	0	20	145	1.4	3.4	1.6	0	0
26	1.1	16	1.4	.20	0	29	93	2.4	3.4	1.1	0	0
27	1.4	13	1.4	.10	0	45	22	3.0	3.0	.70	0	0
28	10	13	1.4	.10	0	72	11	3.4	2.7	.40	0	0
29	50	12	1.1	.10	-----	50	13	4.7	2.7	.10	0	0
30	56	11	.90	.10	-----	43	13	11	2.4	.10	0	0
31	46	-----	.90	.10	-----	29	-----	14	-----	0	0	-----
TOTAL	198.80	490.4	70.40	25.50	1.40	329.60	1,478.1	102.10	165.0	87.80	0	0
MEAN	6.41	16.3	2.27	.82	.050	10.6	49.3	3.29	5.50	2.83	0	0
MAX	56	20	7.3	1.9	.20	72	205	14	14	10	0	0
MIN	.70	8.2	.90	.10	0	0	3.8	.90	2.4	0	0	0
AC-FT	394	973	140	51	2.8	654	2,930	203	327	174	0	0

CAL YR 1961: TOTAL 8,766.50

MEAN 24.0

MAX 193

MIN .70

AC-FT 17,390

WAT YR 1962: TOTAL 2,949.10

MEAN 8.08

MAX 205

MIN 0

AC-FT 5,850

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	0	0	0	.80	0	0	.10	15	1.5	16	28	1.5
2	0	0	0	.60	0	0	.10	22	1.5	12	25	1.3
3	0	0	0	.40	0	0	.10	21	4.6	9.7	22	1.1
4	0	0	0	.20	0	0	.10	14	20	8.7	15	1.1
5	0	0	0	.10	0	0	.10	8.7	31	7.8	8.7	.60
6	0	0	.40	0	0	0	.10	6.0	400	5.3	6.8	.50
7	0	0	25	0	0	0	.60	6.0	482	5.3	5.3	.30
8	0	0	24	.10	0	0	1.5	3.6	672	5.3	4.6	.10
9	0	0	22	.10	0	0	1.5	2.7	825	4.6	4.0	.10
10	0	0	25	0	0	0	1.3	2.7	789	4.5	4.0	0
11	0	0	32	0	0	0	1.3	2.3	611	5.5	4.0	0
12	0	0	32	0	0	0	1.1	3.1	270	5.0	3.1	0
13	0	0	32	0	0	0	.60	6.0	112	4.8	2.7	0
14	0	0	29	0	0	0	.50	4.6	67	4.5	2.3	0
15	0	0	26	0	0	0	.40	4.0	47	4.5	2.0	0
16	0	0	13	0	0	0	8.7	4.0	35	4.5	1.8	0
17	0	0	6.8	0	0	0	148	6.8	28	4.0	1.5	0
18	0	0	4.0	0	0	0	189	9.5	33	3.5	1.5	0
19	0	0	3.1	0	0	0	192	8.0	77	3.5	1.3	0
20	0	0	2.5	0	0	0	192	7.0	66	15	.80	.10
21	0	0	2.5	0	0	0	161	6.0	35	20	.50	.10
22	0	0	2.0	0	0	0	55	4.6	28	7.8	.30	.10
23	0	0	2.0	0	0	0	24	8.7	25	8.7	.30	.10
24	0	0	2.0	0	0	0	15	6.8	20	7.8	.60	.10
25	0	0	1.5	0	0	0	12	5.3	19	26	1.1	.10
26	0	0	1.5	0	0	0	11	5.3	22	62	6.8	.10
27	0	0	1.5	0	0	0	7.8	4.0	26	201	9.7	.10
28	0	0	1.0	0	0	0	6.8	3.1	21	219	5.3	.10
29	0	0	1.0	0	-----	0	6.0	2.3	18	98	4.0	.10
30	0	0	1.0	0	-----	0	4.0	2.0	19	51	3.1	.10
31	0	-----	.80	0	-----	0	-----	2.7	-----	35	2.3	-----
TOTAL	0	0	293.60	2.30	0	0	1,041.70	207.8	4,805.6	870.3	178.40	7.70
MEAN	0	0	9.47	.074	0	0	34.7	6.70	160	28.1	5.75	.26
MAX	0	0	32	.80	0	0	192	22	825	219	28	1.5
MIN	0	0	0	0	0	0	.10	2.0	1.5	3.5	.30	0
AC-FT	0	0	582	4.6	0	0	2,070	412	9,530	1,730	354	15

CAL YR 1962: TOTAL 2,483.10

MEAN 6.80

MAX 205

MIN 0

AC-FT 4,930

WAT YR 1963: TOTAL 7,407.40

MEAN 20.3

MAX 825

MIN 0

AC-FT 14,690

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	0	2.0	.40	.30	.20	0	25	131	.80	35	1.1	20
2	0	1.8	.40	.40	.20	0	161	.44	.80	28	1.1	16
3	0	1.5	.40	.50	.20	0	326	35	.50	21	9.7	12
4	0	1.5	.30	.30	.20	0	370	33	.50	14	21	9.0
5	0	1.5	.30	.40	.20	0	349	31	.50	16	20	7.0
6	0	1.1	.30	.40	.20	0	161	42	.40	18	9.7	6.0
7	0	.80	.20	.30	.20	.10	94	57	.50	25	4.6	4.0
8	0	.80	.20	.20	.20	.10	67	48	12	22	3.6	3.0
9	0	.60	.20	.20	.20	.10	57	45	22	29	3.1	3.0
10	0	.60	.20	.10	.30	.10	45	55	15	35	2.7	2.0
11	0	.60	.20	.10	.30	.10	42	45	12	29	1.5	1.0
12	0	.50	.20	.10	.30	.10	39	29	11	20	1.5	1.0
13	0	.50	.20	.10	.30	.10	35	25	14	14	3.1	3.0
14	0	.50	.20	.10	.30	.10	33	22	11	11	6.0	4.0
15	0	.50	.20	.10	.30	.20	32	21	11	9.7	6.8	6.0
16	0	.50	.20	.10	.30	.20	31	19	12	7.8	6.8	6.0
17	0	.50	.20	.10	.30	.20	32	14	13	6.0	6.8	6.0
18	0	.50	.20	.10	.30	.20	31	29	15	6.0	6.8	6.0
19	0	.50	.20	.20	.30	.20	32	39	290	4.6	7.8	6.0
20	0	.50	.20	.30	.30	.20	29	25	110	2.7	9.7	5.0
21	0	.50	.20	.30	.30	.20	29	15	81	2.0	14	6.0
22	.20	.50	.20	.30	.20	.20	32	11	58	2.0	15	7.0
23	159	.50	.20	.30	.20	.20	178	6.8	56	2.3	19	9.0
24	123	.50	.20	.20	.20	.20	261	4.0	49	1.8	15	9.0
25	74	.50	.60	.20	.20	.20	274	2.3	42	1.5	13	9.0
26	26	.50	.40	.10	.10	.10	277	1.5	24	1.3	7.8	14
27	12	.50	.30	.10	.10	.10	284	.80	18	1.1	7.8	13
28	6.8	.50	.40	.10	.10	.10	284	.80	14	1.60	4.6	13
29	4.0	.50	.40	.10	.10	.10	277	.80	12	.30	8.7	9.0
30	3.6	.50	.20	.10	-----	.10	261	1.1	14	.50	26	8.0
31	2.3	-----	.30	.20	-----	.10	-----	1.1	-----	1.1	22	-----
TOTAL	410.90	22.30	8.60	6.40	6.60	3.60	4,148	834.20	320.10	368.30	286.3	236.0
MEAN	13.3	.74	.28	.21	.23	.12	138	26.9	30.7	11.9	9.24	7.8
MAX	159	2.0	.60	.50	.30	.20	370	131	290	35	26	20
MIN	0	.50	.20	.10	.10	0	25	.80	.40	.30	1.1	1.0
AC-Ft	815	.44	.17	.13	.13	7.1	8,230	1,650	1,820	731	568	469
CAL YR 1963:	TOTAL	7,555.60	MEAN	20.7	MAX	825	MIN	0	AC-Ft	14,990		
WAT YR 1964:	TOTAL	7,252.00	MEAN	19.8	MAX	370	MIN	0	AC-Ft	14,380		

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965												
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	8.7	3.1	11	.60	.20	.60	.50	55	62	228	40	30
2	7.8	3.6	11	.60	.30	.50	.60	141	130	336	37	33
3	6.0	3.6	8.7	.60	.20	.50	2.0	189	432	274	39	33
4	5.3	3.6	6.0	.60	.30	.40	6.0	186	578	222	37	35
5	4.6	3.6	5.3	.60	.30	.40	8.7	164	611	207	37	31
6	4.6	3.6	4.0	.60	.40	.60	11	170	626	204	44	37
7	5.3	3.6	3.6	.60	.30	.60	21	151	636	201	42	36
8	5.3	3.6	2.7	.60	.50	.60	215	124	643	192	44	35
9	5.3	3.6	2.3	.60	.50	.60	240	112	656	189	42	35
10	5.3	3.6	2.3	.60	.60	.80	130	69	684	186	42	35
11	5.3	3.6	1.5	.60	.60	1.1	430	53	711	184	50	35
12	5.3	7.8	1.3	.60	.60	1.1	450	42	735	195	58	35
13	5.3	8.7	1.1	.80	.60	1.1	450	37	774	186	56	35
14	5.3	9.7	.80	.80	.60	1.1	570	34	1,080	138	54	40
15	5.3	12	.80	.80	.60	.80	580	33	1,120	114	52	45
16	5.3	12	.80	.80	.60	.80	450	31	1,190	103	51	47
17	5.3	12	.80	.60	.60	.80	200	26	1,200	103	50	47
18	4.6	12	.60	.60	.60	.80	161	26	1,120	103	44	51
19	4.0	12	.60	.60	.60	.80	105	22	948	100	44	50
20	4.0	12	.60	.50	.60	.60	87	20	782	89	42	40
21	4.0	12	.60	.40	.60	.50	75	22	720	71	34	46
22	4.0	11	.60	.40	.50	.40	71	21	670	53	32	50
23	4.0	11	.60	.30	.40	.30	64	22	640	69	36	55
24	4.0	9.7	.60	.30	.30	.20	57	45	550	80	36	60
25	4.0	9.7	.60	.20	.30	.10	48	50	480	100	36	55
26	4.0	9.7	.60	.20	.40	.10	44	37	300	80	37	50
27	4.0	9.7	.60	.20	.80	.10	44	35	220	70	37	46
28	4.0	11	.60	.30	.80	.20	45	42	201	57	46	36
29	3.1	12	.60	.20	-----	.30	48	55	195	48	36	46
30	3.1	11	.60	.20	-----	.40	50	51	192	47	37	46
31	3.1	-----	.60	.20	-----	.50	-----	51	-----	44	36	-----
TOTAL	149.2	244.1	72.40	15.60	13.70	17.70	4,663.80	2,118	18,917	4,273	1,298	1,298
MEAN	4.81	8.14	2.34	.50	.49	.57	155	68.3	631	138	41.9	43.3
MAX	8.7	12	11	.80	.80	1.1	580	189	1,200	336	58	60
MIN	3.1	3.1	.60	.20	.20	.10	.50	20	62	44	32	33
AC-FT	296	484	144	31	27	35	9,250	4,200	37,520	8,480	2,570	2,570
CAL YR 1964: TOTAL	7,275.90								14,430			
WAT YR 1965: TOTAL	33,080.50			MEAN 19.9	MAX 370	MIN 0		AC-FT 65,610				
				MEAN 90.6	MAX 1,200	MIN .10						

5-1200. Souris (Mouse) River near Verendrye, N. Dak.

Location.--Lat 48°09'35", long 100°43'45", in NW 1/4 sec. 17, T.154 N., R.78 W., on left bank 2.7 miles north of Verendrye, 19 miles upstream from mouth of Wintering River, and at mile 210.5 downstream from Canadian border.

Drainage area.--12,000 sq mi, approximately, of which about 7,400 sq mi is probably noncontributing.

Records available.--February to June 1933 (gage height only), April 1937 to September 1965. Monthly discharge only for some periods, published in WSP 1308.

Gage.--Water-stage recorder. Datum of gage is 1,464.87 ft above mean sea level, datum of 1929. February to June 1933, chain gage at site 4 miles upstream at datum 1.65 ft higher. Apr. 1, 1937, to Mar. 3, 1938, staff gage at present site, at datum 1.97 ft higher.

Average discharge.--28 years, 147 cfs (106,400 acre-ft per year); median of yearly mean discharges, 100 cfs (72,400 acre-ft per year).

Extremes.--Maximum and minimum discharges for the water years 1961-65 are contained in the following table:

Water year	Maximum			Minimum		
	Date	Discharge (cfs)	Gage height (feet)	Date	Discharge (cfs)	Gage height (feet)
1961	Apr. 11, 1961	375	4.97	Aug. 20, 1961	3.4	a 3.38
1962	Aug. 12, 1962	1,380	11.41		1.0	c 3.33
1963	June 11, 1963	992	9.31	Feb. 21-23, 24-26	.20	d 3.29
1964	June 22, 1964	660	6.83	Feb. 16, 1964	1.0	e 3.28
1965	June 21, 1965	1,160	f 10.27	Mar. 5, 6, 1965	g 2.5	-

a Occurred Aug. 13, 1961.

b Feb. 19-21, Sept. 21-25, 1962.

c Occurred Sept. 10, 11, 1962.

d Occurred Mar. 18, 1963.

e Occurred Aug. 12, 1964.

f Maximum gage height for year, 11.46 ft Apr. 16, 1965, backwater from ice.

g Minimum daily.

1937-65: Maximum discharge, about 4,200 cfs Apr. 8, 1949 (gage height, 17.7 ft, from high watermark, backwater from ice); minimum recorded, 0.3 cfs Aug. 11-19, 1937, Oct. 10-21, 1939.

Remarks.--Records good except those for winter periods, which are fair. Flow regulated by reservoirs on Souris and Des Lacs Rivers (combined capacity, about 246,000 acre-ft). Some small diversions for irrigation and municipal supply. Records of chemical analyses for the water years 1961-65 are published in reports of the Geological Survey.

Revisions.--WSP 1728: Drainage area.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	27	33	11	12	14	18	44	28	27	10	12	58
2	27	58	11	13	14	22	43	26	25	10	17	64
3	27	53	11	14	13	28	45	27	23	10	18	64
4	28	40	12	16	12	28	53	25	20	11	14	65
5	27	34	12	20	12	35	60	27	17	12	10	67
6	27	65	12	19	13	50	62	29	15	12	7.6	69
7	28	64	12	18	14	70	64	30	14	12	5.8	69
8	30	46	13	17	16	90	89	29	13	12	5.0	73
9	31	23	12	18	18	75	199	30	12	12	5.0	73
10	29	24	12	18	18	65	255	37	12	12	5.0	80
11	23	25	12	18	18	58	238	41	11	12	5.0	84
12	20	23	12	18	18	53	225	38	12	12	4.6	87
13	28	21	12	17	17	51	149	34	21	11	4.2	84
14	55	20	12	17	16	51	161	30	16	15	4.6	71
15	51	19	11	18	14	48	184	29	12	20	5.0	58
16	45	19	10	18	13	50	152	28	11	20	4.2	55
17	38	19	10	17	13	60	120	30	11	18	4.6	48
18	34	18	9.0	16	13	75	84	27	18	15	5.0	37
19	29	18	8.0	15	13	105	60	27	31	12	4.6	30
20	24	18	8.0	15	13	130	49	27	49	12	3.8	28
21	24	18	8.0	15	13	105	45	27	58	14	5.0	27
22	24	17	9.0	15	13	90	43	25	49	18	33	25
23	24	15	10	14	22	70	38	27	35	19	53	23
24	24	14	10	13	18	62	37	27	24	16	56	25
25	24	15	10	12	15	60	37	25	20	12	56	22
26	23	16	10	12	14	58	37	25	19	11	56	22
27	23	15	10	12	15	56	36	25	16	11	56	21
28	24	14	11	12	16	55	34	24	12	10	55	18
29	27	12	12	12	-----	52	32	24	11	10	56	16
30	29	10	12	12	-----	50	30	24	11	10	56	13
31	28	-----	12	13	-----	48	-----	25	-----	11	56	-----
TOTAL	902	786	336.0	476	423	1,868	2,705	877	625	402	683.0	1,476
MEAN	29.1	26.2	10.8	15.4	15.1	60.3	90.2	28.3	20.8	13.0	22.0	49.2
MAX	55	65	13	20	22	130	255	41	58	20	56	87
MIN	20	10	8.0	12	12	18	30	24	11	10	3.8	13
AC-FT	1,790	1,560	666	944	839	3,710	5,370	1,740	1,240	797	1,350	2,930
CAL YR 1960†	TOTAL 48,777.0			MEAN 133	MAX 1,150	MIN 8.0	AC-FT 96,750					
WAT YR 1961†	TOTAL 11,559.0			MEAN 31.7	MAX 255	MIN 3.8	AC-FT 22,930					



## 5-1200. Souris (Mouse) River near Verendrye, N. Dak.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	5.7	30	9.9	3.7	3.7	3.7	15	282	25	50	12	33
2	4.4	24	8.3	4.4	3.1	3.7	30	268	28	43	12	55
3	3.1	19	8.3	4.4	3.1	3.7	190	255	26	34	11	65
4	2.4	17	8.3	4.4	3.1	4.4	220	202	23	30	10	49
5	2.4	15	4.3	4.4	3.1	3.7	270	138	20	38	9.0	34
6	3.7	13	8.3	4.4	3.1	4.4	230	115	17	31	7.5	28
7	3.7	13	9.0	3.7	2.4	3.7	270	112	17	29	6.2	20
8	3.7	13	7.7	3.7	1.9	3.7	310	116	24	41	5.2	18
9	4.4	13	6.4	3.7	1.9	3.7	260	173	34	44	4.4	17
10	5.0	13	5.7	2.4	3.1	3.7	230	182	36	38	3.6	15
11	6.4	12	4.4	2.4	2.4	4.4	220	135	33	31	3.0	15
12	6.4	11	4.4	2.4	2.4	5.7	175	103	31	33	2.4	14
13	5.7	9.9	5.0	2.4	2.4	7.7	140	82	31	30	6.4	13
14	5.0	8.3	5.7	1.9	2.4	6.4	112	78	29	28	11	12
15	5.0	9.0	5.7	1.9	1.9	6.4	110	71	34	33	11	12
16	5.7	9.0	5.7	2.4	1.9	6.4	107	62	33	33	11	9.9
17	6.4	9.9	6.4	3.1	1.9	4.4	90	58	31	28	11	9.9
18	7.0	11	5.7	3.1	1.9	3.7	74	49	54	27	9.9	9.0
19	7.7	19	5.7	3.1	2.4	3.7	62	41	96	25	9.0	8.3
20	22	18	5.0	3.1	2.4	3.7	50	38	357	24	11	8.3
21	25	14	5.0	3.7	2.5	3.7	47	37	593	23	12	8.3
22	26	9.9	3.7	3.1	2.5	3.7	43	36	631	21	13	8.3
23	26	7.7	3.7	2.4	3.7	3.7	40	36	473	20	14	9.9
24	25	6.4	3.1	1.9	3.1	3.7	37	43	292	19	14	8.3
25	23	5.7	3.1	2.4	3.1	3.7	38	44	196	18	14	7.7
26	24	7.7	3.1	3.1	3.7	3.7	105	40	149	17	14	15
27	25	13	3.7	4.4	3.1	3.1	211	37	128	16	14	14
28	29	14	3.7	4.4	2.4	3.1	262	36	116	15	13	23
29	54	13	3.7	4.4	3.7	3.1	289	29	86	15	14	17
30	54	12	3.1	4.4	-----	3.1	292	28	64	14	23	14
31	41	-----	3.1	4.4	-----	4.4	-----	28	-----	13	34	-----
TOTAL	467.8	390.5	172.9	103.6	78.3	129.9	4,529	2,954	3,705	861	345.6	570.9
MEAN	15.1	13.0	5.58	3.36	2.70	4.19	124	95	124	27.8	11.1	19.0
MAX	54	30	9.9	4.4	3.7	7.7	310	282	631	50	34	65
MIN	2.4	5.7	3.1	1.9	1.9	3.1	15	28	17	13	2.4	7.7
AC-FT	928	775	343	205	155	258	8,980	5,860	7,350	1,710	685	1,130

CAL YR 1963: TOTAL 13,852.40

MEAN 38.0

MAX 989

MIN .20

AC-FT 27,480

WAT YR 1964: TOTAL 14,308.5

MEAN 39.1

MAX 631

MIN 1.9

AC-FT 28,380

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	14	8.5	7.7	5.0	4.0	3.0	6.0	86	56	240	71	41
2	12	21	11	4.5	4.0	3.0	6.0	93	62	232	58	40
3	12	15	10	4.5	4.0	3.0	9.0	69	53	69	53	40
4	12	24	14	4.5	4.0	3.0	8.0	89	71	295	51	40
5	10	23	11	4.5	4.0	2.5	9.0	161	153	319	45	40
6	11	22	12	4.5	4.0	2.5	25	230	342	284	48	40
7	8.5	21	10	4.5	4.0	5.0	60	262	487	245	48	40
8	8.0	20	9.0	5.0	4.0	7.5	120	279	557	222	48	40
9	8.0	20	9.0	5.0	4.0	4.5	250	270	598	214	45	45
10	8.5	20	8.5	5.0	4.0	4.5	380	235	614	201	48	43
11	9.7	18	7.5	5.5	4.0	10	420	191	622	196	49	43
12	9.1	17	7.5	5.5	3.5	15	450	167	640	196	48	43
13	8.5	16	7.0	5.5	3.5	15	620	131	672	196	45	43
14	10	16	7.0	5.5	3.5	15	750	96	714	204	41	45
15	12	16	7.5	5.0	3.5	18	840	73	755	212	45	49
16	12	15	8.0	5.0	3.5	18	960	56	870	196	51	53
17	12	12	8.0	5.0	3.5	16	1,000	48	1,000	170	53	69
18	11	13	7.5	5.0	3.5	16	900	45	1,040	133	51	73
19	11	12	7.5	5.0	3.5	14	680	41	1,110	113	49	73
20	11	10	7.5	5.0	3.5	12	527	38	1,140	103	46	71
21	11	9.7	7.5	5.0	3.0	10	353	35	1,140	101	46	67
22	12	9.1	7.0	5.0	3.0	9.0	262	34	1,030	113	48	67
23	11	8.5	7.0	5.0	3.0	9.0	186	34	868	141	48	67
24	10	8.5	6.5	5.0	3.0	8.0	161	31	732	204	48	67
25	9.7	9.1	6.0	5.0	3.0	8.0	158	33	645	281	46	73
26	9.1	8.5	5.5	5.0	3.0	7.0	133	34	558	243	45	78
27	8.5	8.0	5.5	5.0	3.0	7.0	125	37	436	175	46	71
28	8.0	8.0	5.5	4.5	3.0	6.0	144	48	292	150	46	71
29	8.0	7.5	5.0	4.5	-----	6.0	118	58	270	138	43	71
30	8.0	7.5	5.0	4.5	-----	6.0	93	44	250	120	43	65
31	8.0	-----	4.5	4.5	-----	6.0	-----	60	-----	91	41	-----
TOTAL	313.6	433.9	247.2	152.5	99.5	269.5	9,750.0	3,150	17,793	5,981	1,493	1,669
MEAN	10.1	14.5	7.97	4.92	3.55	8.69	325	102	593	193	48.2	55.6
MAX	14	25	15	5.5	4.0	18	1,000	279	1,140	319	71	78
MIN	8.0	7.5	4.5	4.5	3.0	2.5	6.0	31	56	91	41	40
AC-FT	622	861	490	302	197	535	19,340	6,250	35,290	11,860	2,960	3,310

CAL YR 1964: TOTAL 14,272.0

MEAN 39.0

MAX 631

MIN 1.9

AC-FT 28,310

WAT YR 1965: TOTAL 41,352.2

MEAN 113

MAX 1,140

MIN 2.5

AC-FT 82,020

## 5-1202. Wintering River near Bergen, N. Dak.

Location.--[Lat 47°55'50", long 100°40'15", on west line of sec.4, T.151 N., R.78 W., on left down-stream wingwall of bridge, 6 miles southeast of Bergen.

Drainage area.--176 sq mi, of which about 50 sq mi is probably noncontributing.

Records available.--October 1956 to September 1965.

Gage.--Water-stage recorder. Altitude of gage is 1,590 ft (from topographic map).

Average discharge.--9 years, 3.25 cfs (2,350 acre-ft per year).

Extremes.--<sup>1</sup>Maximum and minimum discharges for the water years 1961-65 are contained in the following table:

Water year	Maximum			Minimum		
	Date	Discharge (cfs)	Gage height (feet)	Date	Discharge (cfs)	Gage height (feet)
1961	Mar. 19, 1961	1.9	a 1.71	Several months	0	-
1962	Mar. 26, 1962	45	b 2.77	do.	0	-
1963	June 10, 1963	27	2.98	do.	0	-
1964	June 19, 1964	320	4.63	do.	0	-
1965	July 23, 1965	584	5.44	do.	0	-

a Maximum gage height for year, 2.4 ft Mar. 7, 1961, backwater from ice.

b Maximum gage height for year, 3.19 ft Mar. 24, 1962, backwater from ice.

1966-65: Maximum discharge, 584 cfs July 23, 1965 (gage height, 5.44 ft); no flow for several months in each year.

Remarks.--Records fair. Some regulation by Fish and Wildlife Service dams on Cottonwood and Wintering Lakes (combined capacity, about 850 acre-ft). Records of chemical analyses for the water years 1961-64 are published in reports of the Geological Survey.

Revisions.--WSP 1728: Drainage area.

Discharge, in cubic feet per second, water years October 1960 to September 1962

Mar. 4, 1961....	0.10	Mar. 31, 1961....	0.10	Mar. 26, 1962....	29	May 19, 1962....	13
5.....	.20	Apr. 1.....	.10	27.....	34	20.....	9.7
6.....	.50	2.....	.20	28.....	24	21.....	5.8
7.....	1.0	3.....	.20	29.....	23	22.....	4.5
8.....	.50	4.....	.30	30.....	19	23.....	4.7
9.....	.20	5.....	.40	31.....	15	24.....	4.5
10.....	.20	6.....	.30	Apr. 1.....	13	25.....	4.1
11.....	.70	7.....	.30	2.....	9.7	26.....	4.2
12.....	.90	8.....	.40	3.....	7.9	27.....	4.1
13.....	1.1	9.....	.40	4.....	9.0	28.....	3.8
14.....	1.2	10.....	.30	5.....	7.9	29.....	3.8
15.....	1.4	11.....	.30	6.....	4.8	30.....	5.9
16.....	1.2	12.....	.20	7.....	3.8	31.....	6.8
17.....	1.2	13.....	.20	8.....	2.2	June 1.....	6.3
18.....	1.6	14.....	.20	9.....	1.7	2.....	5.5
19.....	1.7	15.....	.10	10.....	1.7	3.....	4.5
20.....	1.8	16.....	.10	11.....	1.6	4.....	3.7
21.....	1.7	17.....	.10	12.....	1.3	5.....	3.1
22.....	1.6	20.....	.10	13.....	.90	6.....	2.3
23.....	1.2	21.....	.10	14.....	.80	7.....	1.9
24.....	1.0	24.....	.10	15.....	.50	8.....	1.6
25.....	.80	25.....	.10	16.....	.50	9.....	1.3
26.....	.40	Mar. 21, 1962....	2.0	17.....	.20	10.....	1.0
27.....	.20	22.....	15	18.....	.20	11.....	.80
28.....	.30	23.....	30	19.....	.10	12.....	.60
29.....	.20	24.....	35	May 17.....	1.5	13.....	.40
30.....	.20	25.....	33	18.....	11	14.....	.20

Month	Cfs-days	Maximum	Minimum	Mean	Runoff in acre-feet
Calendar year 1960.....	2,522.90	250	0	6.89	5,000
March 1961.....	23.20	1.8	0	.75	46
April.....	4.50	.40	0	.15	8.9
Water year 1960-61.....	27.70	1.8	0	.076	55
Calendar year 1961.....	27.70	1.8	0	.076	55
March 1962.....	259.0	35	0	8.35	514
April.....	67.80	13	0	2.26	134
May.....	87.4	13	0	2.82	173
June.....	33.20	6.3	0	1.11	66
Water year 1961-62.....	447.40	35	0	1.23	887

Note.--Flow occurred only on days listed above.

## 5-1202. Wintering River near Bergen, N. Dak.--Continued

Discharge, in cubic feet per second, water years October 1962 to September 1965

Apr. 30, 1963...		Apr. 12, 1964...		July 19, 1964...		June 30, 1965...	
30	0.10	12	2.0	19	0.30	30	0.10
31	.10	13	2.2	20	.20	1	.10
May 1	.10	14	2.8	21	.10	2	.10
2	.20	15	2.8	22	.10	3	1.1
3	.20	16	3.1	Apr. 5, 1965	.50	13	.10
4	.60	17	2.5	7	1.0	14	.54
5	1.0	18	1.7	8	3.0	15	.52
6	1.1	19	1.2	9	.15	16	.34
7	1.3	20	.90	10	.20	17	.24
8	1.2	21	.80	11	.26	18	.18
9	.90	22	.60	12	.39	19	.14
10	1.2	23	.50	13	.28	20	.11
11	1.1	24	.40	14	.30	21	.10
12	1.7	25	.30	15	.40	22	.15
13	4.8	26	.20	16	.39	23	380
14	9.7	27	.30	17	.35	24	491
15	9.0	28	.30	18	.29	25	321
16	6.8	29	.20	19	.21	26	240
17	4.9	30	.20	20	.18	27	216
18	3.3	May 1	.20	21	.15	28	192
19	2.1	2	.20	22	.11	29	156
20	1.2	3	.80	23	.80	30	122
21	1.0	4	1.2	24	.75	31	104
22	.90	5	1.2	25	.67	Aug. 1	87
23	.60	6	3.2	26	.57	2	.73
24	.40	7	7.6	27	4.9	3	.60
25	.30	8	8.7	28	4.1	4	.47
26	.30	9	8.2	29	.29	5	.40
27	.40	10	7.6	30	.26	6	.77
28	.50	11	5.4	May 1	.20	7	.71
29	.40	12	4.1	2	1.6	8	.56
30	.30	13	3.1	3	1.4	9	.49
31	.20	14	2.0	4	1.1	10	.49
June 1	.20	15	1.4	5	1.0	11	.48
2	.20	16	1.0	6	.35	12	.45
3	.20	17	.80	7	.55	13	.38
4	.20	18	.70	8	.53	14	.30
5	.20	19	.60	9	4.4	15	.27
6	1.1	20	.50	10	3.6	16	.22
7	3.2	21	.40	11	2.7	17	.19
8	.12	22	.30	12	2.1	18	.16
9	.9	23	.20	13	1.8	19	.12
10	.25	24	.10	14	1.4	20	9.2
11	.24	June 8	2.4	15	1.2	21	7.0
12	.21	9	.95	16	1.1	22	5.6
13	.19	10	.90	17	1.0	23	4.5
14	.17	11	.48	18	.80	24	3.8
15	.14	12	.34	19	.60	25	3.2
16	.12	13	.25	20	.70	26	2.9
17	9.9	14	.19	21	.50	27	3.0
18	7.7	15	.17	22	.40	28	2.7
19	5.7	16	.19	23	.40	29	2.3
20	3.9	17	.24	24	.60	30	2.1
21	2.4	18	.55	25	.70	31	1.7
22	2.1	19	.278	26	.60	Sept. 1	1.4
23	2.1	20	.270	27	.50	2	1.1
24	1.8	21	.175	28	.50	3	.90
25	1.7	22	107	29	.50	4	.80
26	1.1	23	71	30	.40	5	.60
27	.80	24	60	31	.40	6	.50
28	.60	25	46	June 1	.40	7	.50
29	.40	26	36	2	.40	8	.40
30	.40	27	36	3	.40	9	.40
July 1	.20	28	23	4	.30	10	.20
2	.20	29	.20	5	.30	11	.20
3	.20	30	.18	6	.20	12	.20
4	.20	July 1	.15	7	.20	13	.20
5	.10	2	.12	8	.10	14	.70
6	.10	3	.11	14	.70	15	2.4
7	.10	4	8.6	15	3.1	16	2.9
8	.10	5	8.5	16	6.4	17	4.2
9	.10	6	8.8	17	5.6	18	3.5
10	.10	7	8.6	18	4.9	19	2.9
Apr. 1, 1964	.70	8	9.4	19	4.2	20	2.4
2	1.2	9	7.2	20	2.7	21	2.1
3	.22	10	5.5	21	1.6	22	2.1
4	.21	11	3.9	22	1.1	23	3.8
5	.13	12	2.8	23	.80	24	4.5
6	7.6	13	2.0	24	.50	25	3.6
7	7.1	14	1.4	25	.40	26	3.0
8	5.7	15	1.1	26	.30	27	2.6
9	4.6	16	.80	27	.30	28	2.8
10	3.5	17	.60	28	.20	29	4.3
11	2.2	18	.40	29	.10	30	9.4

Month	Cfs-days	Maximum	Minimum	Mean	Runoff in acre-feet
Calendar year 1962	447.40	35	0	1.23	887
April 1963	.20	9	0	.007	.4
May	57.20	9.7	.10	1.86	114
June	210.80	25	.20	7.03	418
July	1.40	.20	0	.045	2.8
Water year 1962-63	270.10	25	0	.74	536
Calendar year 1963	270.10	25	0	.74	536
April 1964	111.60	22	.20	3.72	221
May	59.50	8.7	0	1.92	118
June	1,561.4	278	0	52.0	3,100
July	108.30	15	0	3.49	215
Water year 1963-64	1,840.80	278	0	5.03	3,650
Calendar year 1964	1,840.80	278	0	5.03	3,650
April 1965	412.90	40	0	13.8	819
May	48.30	5.5	.40	1.56	96
June	35.30	6.4	0	1.18	70
July	2,465.30	491	0	79.5	4,890
August	914.0	87	1.7	29.5	1,810
September	64.60	9.4	.20	2.15	228
Water year 1964-65	3,940.40	491	0	10.8	7,820

Note.--Flow occurred only on days listed above.

5-1205. Wintering River near Karlsruhe, N. Dak.

Location.--Lat 48°10'14", long 100°32'20", on line between secs.10 and 11, T.154 N., R.77 W., on left bank 30 ft upstream from highway bridge, 4 miles upstream from mouth, and 7 miles northeast of Karlsruhe.

Drainage area.--705 sq mi, of which about 420 sq mi is noncontributing.

Records available.--March 1937 to September 1965. Monthly discharge only for some periods, published in WSP 1308.

Gage.--Water-stage recorder. Altitude of gage is 1,480 ft (from river-profile map).

Average discharge.--28 years, 11.1 cfs (8,040 acre-ft per year); median of yearly mean discharges, 9.0 cfs (6,520 acre-ft per year).

Extremes.--Maximum and minimum discharges for the water years 1961-65 are contained in the following table:

Water year	Maximum			Minimum		
	Date	Discharge (cfs)	Gage height (feet)	Date	Discharge (cfs)	Gage height (feet)
1961	Mar. 16, 1961	18	a 4.79	Several days	0	-
1962	Mar. 26, 1962	50	a 5.05	Long periods	0	-
1963	Mar. 28-30, 1963	b 20	-	do.	0	-
1964	June 28, 1964	113	5.96	(c)	.10	d 2.83
1965	Aug. 7, 1965	161	6.37	Many days	0	-

a Backwater from ice.

b Maximum daily.

c Dec. 16-28, 30-31, 1963, Jan. 1, 1964.

d Occurred Dec. 22-25, 1963.

1937-65: Maximum discharge, 3,000 cfs Apr. 7, 1949, by velocity-area studies; maximum gage height, 12.0 ft Apr. 7, 1949 (channel choked by packed snow); no flow at times in many years.

Maximum stage known, 12.0 ft Apr. 7, 1949 (channel choked by packed snow).

Remarks.--Records fair. Flow regulated by Fish and Wildlife Service dams on Cottonwood and Wintering Lakes (combined capacity, about 850 acre-ft). Low flows affected by diversions for irrigation.

Revisions.--WSP 1728: Drainage area.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	.60	2.2	1.4	.50	.20	.10	7.7	4.0	1.6	.70	.50	.20
2	.60	2.5	1.4	.50	.10	.10	8.6	3.8	1.6	.60	.50	.30
3	.60	1.8	1.4	.40	.10	.10	9.8	3.6	1.6	.50	.40	.40
4	.60	1.7	1.5	.40	.10	.10	12	3.6	1.5	.50	.30	.40
5	.60	1.8	1.7	.40	.10	.10	10	3.8	1.4	.40	.30	.40
6	.70	1.8	1.7	.40	.10	.10	9.5	5.2	1.2	.40	.20	.40
7	.70	1.6	1.7	.50	.10	.20	9.2	7.2	1.1	.30	.20	.40
8	.70	1.6	1.5	.50	.10	.50	9.2	7.7	.90	.20	.10	.40
9	.80	1.6	1.4	.50	.10	1.0	8.9	6.9	.90	.20	.20	.40
10	.80	1.5	1.4	.50	.10	1.5	8.9	6.2	.80	.30	.20	.50
11	.80	1.5	1.3	.50	.10	1.2	8.3	6.0	.80	.30	.20	.50
12	.80	1.6	1.2	.60	.20	1.0	8.0	6.7	.70	.30	.20	.50
13	.80	1.6	1.2	.60	.20	1.5	7.7	6.4	.60	.40	.20	.60
14	.80	1.7	1.3	.60	.20	3.0	6.4	5.5	.50	.50	.10	.70
15	.80	2.0	1.4	.60	.20	5.0	5.0	5.2	.50	.50	.10	.70
16	.80	2.2	1.4	.60	.20	16	5.2	5.2	.50	.40	0	.70
17	.80	2.3	1.4	.70	.20	16	5.2	4.8	.50	.40	0	.70
18	.80	2.2	1.4	.70	.20	16	5.7	4.2	.80	.50	.10	.50
19	.80	2.2	1.4	.60	.20	14	5.2	4.2	1.5	.60	.10	.60
20	.80	2.5	1.3	.50	.20	12	5.5	4.2	.90	.60	.10	1.3
21	.90	2.6	1.1	.50	.20	14	6.2	4.2	.70	.50	0	1.4
22	1.0	2.0	1.0	.50	.30	14	6.2	4.2	.70	.50	.10	2.1
23	1.0	2.3	.90	.40	.60	14	5.7	4.0	.80	.40	.10	2.5
24	1.0	2.3	.80	.40	.80	12	5.0	7.4	.70	.30	.10	2.9
25	1.4	2.3	.80	.30	1.0	11	4.4	5.5	.50	.30	.10	2.9
26	1.5	2.2	.70	.30	1.0	11	4.2	3.4	.40	.20	.10	3.1
27	1.2	2.2	.70	.20	.90	10	4.2	3.3	.30	.20	.10	2.6
28	1.1	2.1	.70	.20	.50	7.0	4.2	2.3	.20	.20	0	2.2
29	1.4	1.8	.60	.20	-----	7.5	4.2	2.0	.20	.30	0	1.8
30	2.2	1.6	.60	.20	-----	8.0	4.2	1.8	.50	.50	0	1.8
31	2.0	-----	.60	.20	-----	8.0	-----	1.6	-----	.50	.10	-----
TOTAL	29.40	59.3	36.90	14.00	8.30	206.00	204.5	144.1	24.90	12.50	4.70	33.90
MEAN	.95	1.98	1.19	.45	.30	6.65	6.82	4.65	.83	.40	.15	1.13
MAX	2.2	2.6	1.7	.70	1.0	16	12	7.7	1.6	.70	.50	3.1
MIN	.60	1.5	.60	.20	.10	.10	4.2	1.6	.20	.20	0	.20
AC-FT	58	118	73	28	16	409	406	286	49	25	9.3	67
CAL YR 1960:	TOTAL 3,627.60			MEAN 9.91		MAX 250		MIN 0		AC-FT 7,200		
WYR 1961:	TOTAL 778.50			MEAN 2.13		MAX 16		MIN 0		AC-FT 1,540		

## 5-1205. Wintering River near Karlsruhe, N. Dak.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	1.7	2.8	.50	0	0	0	16	5.0	8.5	2.3	1.5	1.6
2	1.2	1.6	.50	0	0	0	12	5.0	7.5	2.2	1.4	1.6
3	1.0	1.7	.50	0	0	0	12	4.8	6.5	2.3	1.3	1.4
4	1.3	1.6	.40	0	0	0	11	4.4	6.0	3.8	1.3	1.4
5	1.1	1.7	.40	0	0	0	14	4.2	5.5	4.0	1.3	1.2
6	1.0	1.7	.40	0	0	0	18	4.0	6.5	4.6	1.3	1.2
7	1.0	1.7	.30	0	0	0	15	4.0	7.7	5.7	1.1	1.2
8	1.1	1.7	.30	0	0	0	11	4.0	7.4	5.2	1.1	2.0
9	1.2	1.7	.20	0	0	0	8.5	4.4	7.4	4.6	1.0	1.6
10	2.0	1.7	.10	0	0	0	7.7	4.6	7.4	4.0	1.0	1.2
11	2.0	1.7	.10	0	0	0	7.1	4.6	7.1	3.4	1.3	1.2
12	1.6	1.7	.10	0	0	0	10	4.4	6.2	2.9	1.4	1.1
13	1.6	1.5	.10	0	0	0	14	5.0	5.4	2.6	1.4	1.0
14	1.5	1.4	0	0	0	0	13	6.6	5.0	2.3	1.6	1.0
15	1.7	1.3	0	0	0	0	12	7.7	5.0	2.2	2.9	.90
16	1.6	1.2	0	0	0	0	15	7.9	5.2	2.2	3.1	.80
17	1.4	1.2	0	0	0	0	16	11	5.2	3.1	2.5	.70
18	1.3	1.2	0	0	0	0	15	17	5.0	3.3	2.1	.60
19	1.3	1.2	0	0	0	0	16	16	4.8	3.4	1.7	.50
20	1.3	1.2	0	0	0	0	16	11	4.4	3.8	1.6	.40
21	1.3	1.1	0	0	0	0	12	8.8	4.4	3.8	1.5	.30
22	1.5	.90	0	0	0	0	9.8	8.2	4.2	3.4	1.2	.20
23	1.7	.80	0	0	0	0	9.4	8.5	4.2	3.1	2.1	.10
24	1.7	.80	0	0	0	0	8.2	8.5	4.0	2.5	2.4	.90
25	1.6	.80	0	0	0	0	6.6	7.9	4.0	2.3	2.2	.80
26	1.6	.70	0	0	0	40	5.9	7.1	3.8	2.1	2.1	.60
27	1.6	.60	0	0	0	30	5.7	6.6	3.8	1.8	2.1	.70
28	1.6	.60	0	0	0	25	5.4	6.6	2.8	1.8	2.2	.70
29	1.6	.60	0	0	-----	20	5.4	7.1	2.5	1.8	2.0	.70
30	1.7	.60	0	0	-----	25	5.2	8.5	2.5	1.7	1.9	.70
31	2.8	-----	0	0	-----	21	-----	9.0	-----	1.6	1.8	-----
TOTAL	46.6	39.00	3.90	0	0	161	332.9	222.4	159.4	93.8	53.4	29.20
MEAN	1.50	1.30	.13	0	0	5.19	11.1	7.17	5.31	3.03	1.72	.97
MAX	2.8	2.8	.50	0	0	40	18	17	8.5	5.7	3.1	2.0
MIN	1.0	.60	0	0	0	0	5.2	4.0	2.5	1.6	1.0	.20
AC-FT	92	77	7.7	0	0	319	660	441	316	186	106	58

CAL YR 1961: TOTAL 742.40 MEAN 2.03 MAX 16 MIN 0 AC-FT 1,470

WAT YR 1962: TOTAL 1,141.60 MEAN 3.13 MAX 40 MIN 0 AC-FT 2,260

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	.60	2.0	2.6	.10	0	0	7.5	6.4	2.6	2.9	4.6	3.4
2	.60	2.0	2.3	.10	0	0	4.2	5.7	2.8	2.3	5.0	3.2
3	.60	2.2	2.6	.10	0	0	2.8	5.0	3.8	2.3	7.1	2.6
4	.60	2.3	1.8	.20	0	0	4.4	4.6	4.2	2.1	11	2.3
5	.60	2.2	1.8	.20	0	0	9.8	4.6	4.5	1.8	10	2.1
6	.60	2.6	2.0	.20	0	0	11	4.4	8.8	1.8	7.7	1.7
7	.80	3.1	2.0	.20	0	0	12	5.4	8.2	1.5	6.6	1.4
8	.80	3.1	1.6	.20	0	0	12	5.4	11	1.4	5.9	1.3
9	.80	3.1	1.6	.10	0	0	12	5.2	15	1.3	5.4	1.5
10	.80	3.1	1.6	.10	0	0	9.4	5.2	13	1.1	4.8	1.7
11	.80	3.1	1.5	.10	0	.20	7.9	5.4	10	1.3	4.4	1.8
12	1.0	3.1	1.3	0	0	1.0	5.7	6.6	8.2	1.0	3.8	1.6
13	1.2	3.1	1.2	0	0	2.0	5.4	9.1	6.6	.90	3.4	1.5
14	1.6	3.1	1.2	0	0	1.6	6.6	10	5.7	.90	2.9	2.0
15	2.0	3.1	1.2	0	0	1.4	5.9	9.4	5.2	.70	2.8	2.2
16	2.0	2.9	1.3	0	0	1.2	5.4	8.2	4.8	.70	2.3	2.2
17	2.1	2.8	1.5	0	0	1.0	5.2	7.1	4.4	.60	2.3	2.1
18	2.1	2.9	1.6	0	0	.80	5.0	6.6	4.0	.80	2.1	2.0
19	2.1	2.9	1.7	0	0	.60	5.0	5.7	3.8	.30	1.7	1.7
20	2.1	2.9	1.7	0	0	1.5	4.8	5.7	3.6	.30	1.8	1.7
21	2.0	2.3	1.7	0	0	2.5	4.6	5.4	3.4	.30	1.6	1.7
22	2.0	2.3	1.6	0	0	4.0	4.2	5.2	3.3	.30	1.4	1.8
23	1.8	2.5	2.0	0	0	6.0	4.0	4.8	4.8	.30	3.3	1.8
24	1.8	2.6	1.1	0	0	7.5	3.4	4.6	5.0	.30	3.4	1.7
25	1.8	2.6	.90	0	0	9.0	3.3	4.2	5.0	2.4	2.8	2.0
26	1.7	2.3	.60	0	0	9.5	3.3	3.8	4.8	6.4	2.9	2.5
27	1.7	2.3	.40	0	0	14	3.4	3.6	4.6	8.2	3.1	2.5
28	1.7	2.3	.20	0	0	20	3.8	3.4	4.2	8.5	3.1	2.2
29	1.7	2.3	.20	0	-----	20	5.4	3.3	4.0	6.9	3.1	2.0
30	1.7	2.5	.20	0	-----	20	6.6	3.1	3.4	6.2	2.9	1.8
31	1.7	-----	.20	0	-----	10	-----	2.9	-----	5.2	2.8	-----
TOTAL	43.40	79.6	43.20	1.60	0	133.80	184.0	170.2	172.7	71.00	126.0	60.0
MEAN	1.40	2.65	1.39	.052	0	4.32	6.13	5.49	5.76	2.29	4.06	2.00
MAX	2.1	3.1	2.6	.20	0	20	12	10	15	8.5	11	3.4
MIN	.60	2.0	.20	0	0	0	2.8	2.9	2.6	.30	1.4	1.3
AC-FT	86	158	86	3.2	0	265	365	338	343	141	250	119

CAL YR 1962: TOTAL 1,218.30 MEAN 3.34 MAX 40 MIN 0 AC-FT 2,420

WAT YR 1963: TOTAL 1,085.50 MEAN 2.97 MAX 20 MIN 0 AC-FT 2,150

## 5-1205. Wintering River near Karlsruhe, N. Dak.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	1.5	2.0	2.8	.10	.30	1.2	1.5	6.5	2.8	81	10	8.3
2	1.5	2.1	2.5	.80	.30	1.2	3.0	5.9	2.8	72	9.6	7.1
3	1.6	2.1	2.3	.90	.30	1.2	8.0	8.3	2.8	69	9.3	5.9
4	1.3	2.1	2.3	1.0	.40	1.2	18	13	2.3	66	8.6	5.1
5	1.1	2.1	2.3	1.0	.40	1.4	14	12	2.1	64	7.7	4.6
6	1.2	2.1	2.3	1.0	.50	1.6	12	12	1.7	62	6.5	4.1
7	1.3	2.1	2.1	1.0	.60	1.6	12	14	1.5	59	6.2	3.0
8	1.3	2.1	1.6	.90	.60	1.6	11	13	4.8	57	5.9	2.5
9	1.3	2.1	.80	.80	.70	1.6	14	11	6.2	52	5.4	2.5
10	1.3	2.1	.60	.70	.80	1.6	14	9.0	8.3	50	4.8	2.5
11	1.3	2.2	.50	.60	1.0	1.6	15	8.0	8.6	43	4.3	2.5
12	1.4	2.2	.50	.50	1.0	1.8	15	7.1	9.0	38	3.0	2.8
13	1.5	2.2	.30	.40	1.0	1.8	16	6.5	8.3	33	3.5	2.8
14	1.3	2.5	.30	.40	1.0	2.0	16	5.6	7.4	29	2.8	2.1
15	1.3	2.6	.20	.40	1.2	2.0	15	5.4	6.8	27	1.9	2.1
16	1.3	2.5	.10	.30	1.2	2.0	16	4.6	6.8	29	1.5	1.9
17	1.4	2.6	.10	.30	1.2	2.2	9.3	4.3	7.7	26	1.1	2.3
18	1.5	2.8	.10	.30	1.2	2.2	7.1	4.8	12	23	1.0	2.8
19	1.5	3.1	.10	.30	1.4	2.2	7.4	3.3	16	21	.80	2.8
20	1.5	2.9	.10	.30	1.4	2.0	6.8	3.3	17	19	1.0	2.5
21	1.8	2.9	.10	.30	1.4	1.8	5.4	3.8	14	19	2.5	2.5
22	2.2	2.9	.10	.30	1.4	1.8	4.8	3.8	13	18	4.3	2.1
23	2.6	2.5	.10	.30	1.2	1.8	4.6	3.8	13	17	5.4	2.1
24	2.6	2.3	.10	.30	1.2	1.6	4.3	4.1	17	16	5.6	2.3
25	2.5	2.2	.10	.30	1.2	1.6	4.6	3.8	17	15	5.1	2.8
26	2.5	2.2	.10	.30	1.2	1.6	5.6	3.5	16	13	3.8	4.6
27	2.2	2.3	.20	.30	1.2	1.4	5.9	3.8	38	12	3.0	7.1
28	2.2	2.3	.30	.30	1.2	1.4	6.5	3.3	112	12	3.0	6.5
29	2.1	2.8	.20	.30	1.2	1.4	6.8	3.0	103	12	3.5	5.1
30	2.0	2.6	.10	.30	-----	1.3	7.1	3.0	91	12	8.3	4.6
31	2.0	-----	.10	.30	-----	1.4	-----	3.0	-----	11	12	-----
TOTAL	52.1	71.6	23.40	15.30	27.70	51.1	286.7	196.5	567.9	1,077	151.40	109.9
MEAN	1.68	2.39	.75	.49	.96	1.65	9.56	6.34	18.9	34.7	4.88	3.66
MAX	2.6	3.1	2.8	1.0	1.4	2.2	18	14	112	81	12	8.3
MIN	1.1	2.0	.10	.10	.30	1.2	1.5	3.0	1.5	11	.80	1.9
AC-FT	103	142	46	30	55	101	569	390	1,130	2,140	300	218
CAL YR 1963: TOTAL	1,066.40			MEAN 2.92		MAX 20		MIN 0		AC-FT 2,120		
WAT YR 1964: TOTAL	2,630.60			MEAN 7.18		MAX 112		MIN .10		AC-FT 5,220		

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	4.6	3.3	1.7	.40	0	0	.60	28	11	4.6	6.9	40
2	4.8	3.3	1.5		0	0	2.0	27	9.3	4.8	7.3	36
3	4.1	3.5	1.5		0	0	1.5	26	9.3	4.6	6.6	33
4	3.8	3.3	1.5		0	0	1.3	24	9.0	4.3	11	31
5	3.5	3.5	1.3		0	.20	1.2	22	8.6	4.1	113	30
6	3.5	3.5	1.3	.40	0	.40	1.6	32	8.3	3.5	131	27
7	3.5	3.5	1.1		0	.60	2.5	32	8.3	2.5	147	26
8	3.5	3.5	1.1		0	.60	3.0	25	7.7	2.3	151	25
9	3.5	3.3	1.1		0	.80	6.0	22	6.5	2.3	124	24
10	3.5	3.5	1.1		0	1.0	8.5	21	6.2	2.1	110	23
11	3.5	3.5	1.1	.30	0	1.5	14	20	5.9	2.3	98	22
12	3.3	3.5	1.1		0	2.0	18	17	5.1	7.9	89	22
13	3.3	3.0	1.0		0	2.5	22	15	5.1	10	83	21
14	3.3	3.5	.80		0	3.0	28	14	11	7.7	77	22
15	3.3	3.5	.80		0	2.5	32	13	12	5.1	71	24
16	3.0	3.5	.70	.30	0	1.0	28	12	9.6	3.5	63	25
17	3.0	3.5	.70		0	.50	24	12	8.3	3.0	60	26
18	3.0	3.5	.70		0	.20	26	12	7.1	3.0	58	24
19	2.8	3.5	.70		0	.10	28	11	6.8	2.8	56	22
20	2.8	3.0	.70		0	0	24	10	6.5	2.9	56	21
21	2.8	3.0	.60	.20	0	0	20	8.6	6.2	3.5	54	21
22	2.8	3.0	.50		0	0	22	8.6	6.2	2.7	52	21
23	3.0	3.8	.40		0	0	29	8.6	5.9	16	51	22
24	3.0	3.5	.40		0	0	34	8.6	5.4	16	50	22
25	3.3	2.1	.50		0	0	40	9.6	5.1	12	49	19
26	3.3	1.9	.50	.20	0	0	36	11	4.3	9.5	48	19
27	3.3	1.9	.50		0	0	38	11	5.6	7.9	47	19
28	3.3	2.1	.50		0	0	34	11	5.4	6.9	45	19
29	3.3	2.1	.50		-----	.20	30	11	5.1	8.2	46	19
30	3.3	1.9	.50		-----	.40	29	9.3	4.6	8.4	45	19
31	3.3	-----	.50	-----	-----	.60	-----	9.6	-----	7.9	43	-----
TOTAL	104.3	93.5	26.90	10.30	0	18.10	584.20	501.9	215.4	182.3	2,048.8	724
MEAN	3.36	3.12	.87	.33	0	.58	19.5	16.2	7.18	5.88	66.1	24.1
MAX	4.8	3.8	1.7	-	0	3.0	40	32	12	16	151	40
MIN	2.8	1.9	.40	-	0	0	.60	8.6	4.3	2.1	6.6	19
AC-FT	207	185	53	20	0	36	1,160	996	427	362	4,060	1,440
CAL YR 1964: TOTAL	2,707.20			MEAN 7.40		MAX 112		MIN .10		AC-FT 5,370		
WAT YR 1965: TOTAL	4,509.70			MEAN 12.4		MAX 151		MIN 0		AC-FT 8,940		

## 5-1220. Souris (Mouse) River near Bantry, N. Dak.

Location.--Lat 48°30'20", long 100°26'04", in SE 1/4 sec. 14, T.158 N., R.76 W., on left bank 200 ft upstream from Nelson bridge, 8 miles east of Bantry, 18 miles upstream from Willow Creek, and at mile 284.8 downstream from Canadian border.

Drainage area.--13,000 sq mi, approximately, of which about 8,100 sq mi is probably noncontributing.

Records available.--March 1937 to September 1965. Monthly discharge only for some periods, published in WSP 1308.

Gage.--Water-stage recorder. Datum of gage is 1,427.56 ft above mean sea level, datum of 1929, Emerson-Crookston supplementary adjustment of 1941. Prior to Mar. 16, 1938, staff gage at same site, at datum 0.17 ft lower.

Average discharge.--28 years, 164 cfs (118,700 acre-ft per year); median of yearly mean discharges, 115 cfs (83,300 acre-ft per year).

Extremes.--Maximum and minimum discharges for the water years 1961-65 are contained in the following table:

Water year	Maximum			Minimum		
	Date	Discharge (cfs)	Gage height (feet)	Date	Discharge (cfs)	Gage height (feet)
1961	May 16, 1961	268	a 4.35	Aug. 24, 1961	2.6	0.84
1962	Aug. 17, 1962	344	7.60	Mar. 8-15, 1962	2.8	b .87
1963	June 15, 16, 1963	905	10.13	Jan. 26 to Mar. 22	0	-
1964	May 13, 1964	522	c 7.45	Jan. 13, 1964	d 1.0	-
1965	June 25, 1965	971	10.54	(e)	d 4.0	-

a Maximum gage height for year, 5.20 ft Mar. 19, 1961, backwater from ice.

b Occurred May 3, 1962.

c Maximum gage height for year, 8.13 ft June 27, 1963.

d Minimum daily.

e Jan. 13-17, Feb. 1-4, 25-28, Mar. 1-4, 1965.

1937-65: Maximum discharge, 4,760 cfs Apr. 13, 1949 (gage height, 13.76 ft, from floodmark); no flow at times in each year 1937-40, 1963.

Remarks.--Records good except those for winter periods, which are fair. Flow regulated by reservoirs on Souris, Des Laes and Wintering Rivers (total capacity, about 249,000 acre-ft). Diversions for irrigation of about 7,600 acres at Eaton Dam about 42 miles above station; other small diversions for irrigation and municipal supply.

Revisions.--WSP 1728: Drainage area.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	25	29	16	18	8.0	16	24	10	51	30	12	52
2	25	30	16	16	8.0	16	24	10	50	26	11	55
3	25	31	13	15	8.0	16	25	10	51	23	10	57
4	25	32	12	18	8.0	16	27	10	48	20	9.2	59
5	25	35	11	21	8.0	17	27	11	44	18	8.9	60
6	25	42	10	21	9.0	18	28	13	39	15	8.6	60
7	26	50	10	21	10	19	28	14	36	14	8.2	56
8	27	52	10	20	11	20	28	15	32	13	8.2	59
9	27	48	10	18	12	20	27	14	29	12	8.9	63
10	26	45	10	16	13	21	26	13	25	11	10	68
11	26	45	10	15	14	22	24	13	22	11	11	71
12	27	50	11	15	15	24	22	11	21	11	9.2	73
13	27	48	12	15	15	28	20	13	20	12	7.8	75
14	29	44	13	15	15	32	18	63	21	14	6.7	77
15	28	40	14	15	15	40	17	210	24	13	5.8	78
16	26	35	15	15	15	60	16	267	26	12	4.7	79
17	25	32	16	14	15	80	15	253	26	11	4.3	80
18	32	30	17	13	15	90	19	221	28	13	4.1	78
19	41	28	18	12	15	95	19	200	25	13	3.6	75
20	46	28	19	11	15	95	21	181	24	13	3.4	70
21	46	28	20	10	16	90	21	174	23	13	3.2	65
22	44	26	18	9.0	17	75	21	167	20	14	3.4	63
23	41	22	15	8.0	18	60	18	154	18	14	3.2	56
24	38	22	14	8.0	17	50	15	141	25	14	3.2	51
25	36	24	16	8.0	16	45	13	125	37	13	3.4	46
26	32	25	18	8.0	16	40	12	110	43	8.5	3.4	42
27	32	24	18	8.0	16	35	11	94	46	13	3.9	38
28	32	22	18	8.0	16	30	11	83	44	14	19	34
29	30	20	19	8.0	-----	28	11	69	37	14	35	32
30	30	18	20	8.0	-----	26	11	60	33	15	43	30
31	29	-----	20	8.0	-----	24	-----	55	-----	15	49	-----
TOTAL	952	1,005	457	415.0	376.0	1,248	599	2,784	968	452.5	325.3	1,892
MEAN	30.7	32.5	14.7	13.4	12.4	40.3	20.0	89.8	32.3	14.6	10.5	60.1
MAX	46	53	20	21	18	95	28	267	51	30	49	80
MIN	25	18	10	8.0	16	11	10	18	8.5	3.2	3.0	30
AC-FT	1,890	1,990	906	823	746	2,480	1,190	5,520	1,920	898	645	3,570

CAL YR 1960: TOTAL 50,049.0

MEAN 137

MAX 1,110

MIN 9.0

AC-FT 99,270

WAT YR 1961: TOTAL 11,383.8

MEAN 31.2

MAX 267

MIN 3.2

AC-FT 22,580

5-1220. Souris (Mouse) River near Bantry, N. Dak.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	27	10	19	8.0	4.5	3.4	30	5.6	105	40	30	30
2	26	10	18	8.5	4.6	3.3	50	4.6	100	39	28	28
3	24	9.5	18	8.5	4.8	3.2	60	3.4	96	37	26	27
4	22	9.0	18	8.0	4.8	3.1	70	4.6	90	37	22	25
5	20	9.0	18	7.5	4.6	3.1	80	5.4	87	33	22	24
6	19	9.5	18	7.2	4.6	3.1	90	5.9	102	32	21	22
7	16	10	17	6.8	4.5	3.1	95	7.1	118	30	18	20
8	15	10	16	6.4	4.5	2.8	100	7.1	125	28	15	18
9	14	10	15	6.0	4.4	2.8	100	7.1	126	27	13	16
10	14	12	14	5.8	4.3	2.8	95	7.1	120	28	11	14
11	13	14	13	5.5	4.2	2.8	90	7.1	108	28	14	13
12	13	16	11	5.2	4.2	2.8	88	7.1	95	29	13	12
13	12	20	10	5.2	4.2	2.8	85	8.2	84	30	11	10
14	12	25	9.8	5.0	4.2	2.8	82	16	73	30	19	9.1
15	11	30	9.5	4.8	4.2	2.8	80	20	64	31	203	7.6
16	10	34	9.5	4.6	4.0	3.0	75	28	55	31	304	7.6
17	9.8	31	9.5	4.4	4.0	3.0	70	38	48	34	336	7.4
18	9.5	32	9.0	4.2	4.0	3.1	58	37	43	34	336	7.1
19	9.1	31	8.8	4.0	4.0	3.2	50	39	41	33	305	6.8
20	9.5	30	8.5	3.8	4.0	3.2	41	123	37	32	263	6.2
21	9.8	28	8.5	3.6	4.0	3.2	32	196	35	32	222	5.9
22	9.8	26	9.0	3.5	4.0	3.5	23	206	32	32	186	5.6
23	9.8	24	9.0	3.4	4.0	4.5	16	198	30	33	161	5.4
24	9.8	24	8.5	3.3	3.9	5.0	14	186	29	35	132	5.4
25	9.5	24	9.0	3.4	3.8	6.0	13	173	28	36	107	5.2
26	9.1	24	9.5	3.6	3.7	8.0	12	157	29	36	86	4.4
27	8.0	23	9.0	3.8	3.8	10	10	142	35	36	60	3.6
28	8.5	22	8.0	3.9	3.5	8.0	7.1	131	41	35	52	3.2
29	8.2	22	7.5	4.0	-----	6.0	6.5	128	42	34	40	4.6
30	8.8	20	7.2	4.2	-----	10	6.8	121	41	33	33	5.6
31	9.5	-----	7.5	4.4	-----	20	-----	111	-----	32	31	-----
TOTAL	407.5	599.0	362.3	160.5	117.1	144.4	1,629.4	2,128.3	2,059	1,017	3,129	359.7
MEAN	13.1	20.0	11.7	5.18	4.18	4.66	54.3	68.7	68.6	32.8	101	12.0
MAX	27	34	19	8.5	4.8	20	100	204	126	40	336	30
MIN	8.2	9.0	7.2	3.3	3.5	2.8	6.5	3.4	28	27	11	3.2
AC-FT	808	1,190	719	318	232	286	3,230	4,220	4,080	2,020	6,210	713

CAL YR 1961: TOTAL 10,338.6

MEAN 28.3

MAX 267

MIN 3.2

AC-FT 20,510

WAT YR 1962: TOTAL 12,113.2

MEAN 33.2

MAX 336

MIN 2.8

AC-FT 24,030

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	6.6	19	24	12	0	0	20	4.7	9.6	117	34	12
2	5.0	15	27	14	0	0	22	4.4	9.2	100	68	13
3	7.2	11	32	15	0	0	25	4.0	70	90	114	14
4	5.2	10	30	15	0	0	25	3.6	325	82	145	13
5	5.0	9.0	21	14	0	0	20	3.6	430	72	151	12
6	4.7	8.0	40	13	0	0	15	3.8	453	66	148	11
7	4.4	8.0	42	12	0	0	12	4.4	438	66	136	11
8	4.4	7.5	40	10	0	0	11	5.0	440	59	118	10
9	4.7	7.5	38	10	0	0	10	4.4	447	54	100	9.2
10	5.0	7.5	36	9.0	0	0	9.2	5.2	467	51	85	8.2
11	5.0	8.9	32	7.0	0	0	8.6	5.2	530	50	71	8.2
12	5.0	9.6	28	6.0	0	0	8.2	6.6	642	48	60	9.9
13	5.0	11	24	5.0	0	0	8.2	8.9	787	47	51	8.9
14	5.0	11	20	3.0	0	0	7.8	8.2	877	43	45	7.5
15	5.4	11	18	1.0	0	0	7.5	8.9	902	42	42	6.6
16	6.3	10	16	1.0	0	0	9.2	9.6	897	42	37	6.6
17	5.7	10	14	.80	0	0	9.6	8.2	854	63	32	7.5
18	6.6	8.0	13	.80	0	0	9.2	8.2	768	80	29	6.9
19	6.9	8.0	12	.60	0	0	9.2	7.8	649	92	25	6.0
20	7.2	10	12	.60	0	0	8.9	7.8	515	90	20	5.4
21	7.5	16	11	.40	0	0	8.9	7.5	384	80	17	5.0
22	7.8	12	11	.40	0	0	7.5	7.2	291	66	15	5.0
23	7.8	18	10	.40	0	2.0	8.6	6.9	233	56	13	5.0
24	7.8	16	10	.20	0	1.0	8.2	6.9	193	46	13	5.5
25	7.5	14	9.0	.20	0	10	6.9	6.6	172	42	11	6.0
26	7.5	12	9.0	0	0	25	6.3	7.8	161	36	13	8.0
27	7.8	12	10	0	0	30	5.7	7.5	158	30	13	9.0
28	7.8	12	10	0	0	28	5.7	7.5	156	28	11	10
29	7.8	14	11	0	0	25	6.3	7.5	155	28	11	11
30	8.9	20	11	0	0	22	5.2	7.8	133	28	11	11
31	14	-----	12	0	0	22	-----	9.2	-----	30	11	-----
TOTAL	202.5	346.0	633.0	151.40	0	165.0	324.9	204.9	12,545.8	1,824	1,650	262.4
MEAN	6.53	11.5	20.4	4.88	0	5.32	10.8	6.61	418	58.8	53.2	8.75
MAX	14	20	42	15	0	30	25	9.6	902	117	151	14
MIN	4.4	7.5	9.0	0	0	0	5.2	3.6	9.2	28	11	5.0
AC-FT	402	686	1,260	300	0	327	644	406	24,880	3,620	3,270	520

CAL YR 1962: TOTAL 11,925.9

MEAN 32.7

MAX 336

MIN 2.8

AC-FT 23,650

WAT YR 1963: TOTAL 18,309.90

MEAN 50.2

MAX 902

MIN 0

AC-FT 36,320

## 5-1220. Souris (Mouse) River near Bantry, N. Dak.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

OAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	10.1	27	11	4.5	2.4	4.8	6.8	4.7	94	260	27	18
2	10	32	12	5.5	2.4	4.6	9.3	3.8	92	248	27	16
3	7.5	48	14	6.0	2.5	4.6	9.3	6.9	89	233	24	13
4	6.6	53	16	6.5	2.5	4.6	9.3	19	88	217	23	13
5	6.0	48	16	7.0	2.5	4.6	15	30	86	224	22	29
6	5.4	40	16	7.0	2.5	4.6	20	44	75	189	22	44
7	5.2	33	16	6.0	2.5	4.9	24	65	65	174	19	50
8	4.4	31	14	6.0	2.5	5.2	23	83	67	162	18	52
9	5.4	28	14	5.4	2.5	5.7	22	160	64	153	19	50
10	8.6	25	10	4.2	2.5	5.7	22	288	60	146	17	46
11	8.9	23	8.5	3.0	2.6	6.3	22	395	63	140	14	42
12	7.5	23	8.0	1.6	2.7	6.6	22	481	70	135	8.6	40
13	6.0	20	7.5	1.0	2.8	7.2	22	517	78	129	6.6	37
14	5.0	18	7.5	1.1	2.8	7.5	22	487	77	121	6.0	34
15	4.0	18	7.0	1.1	2.8	6.9	22	428	73	112	5.2	32
16	3.8	17	7.0	1.6	3.0	6.6	22	368	71	105	4.0	30
17	3.0	17	6.5	1.7	3.2	6.0	22	316	60	95	3.4	28
18	2.4	16	6.5	2.4	3.8	5.0	22	272	66	87	4.0	27
19	2.2	16	6.5	2.4	4.0	6.0	25	228	76	78	3.4	26
20	2.4	15	6.0	2.4	4.2	6.3	18	189	84	73	2.6	24
21	3.4	15	6.0	2.4	4.2	6.3	15	160	92	55	3.0	22
22	3.0	14	6.0	2.4	4.2	6.4	12	134	107	51	2.8	22
23	2.0	14	6.0	2.4	4.2	6.4	11	112	156	45	3.2	22
24	1.8	14	6.5	2.4	4.2	6.4	9.2	97	258	40	4.0	21
25	2.0	13	6.5	2.4	4.2	6.5	8.6	84	344	38	4.7	20
26	3.0	13	6.5	2.4	4.2	6.6	8.2	72	391	39	5.7	21
27	14	13	6.5	2.4	4.2	6.6	7.5	66	392	38	6.6	20
28	26	13	6.0	2.4	4.2	6.6	7.5	81	348	36	6.0	20
29	30	12	5.5	2.4	4.2	6.6	6.3	90	310	32	7.2	20
30	27	11	5.0	2.4	-----	6.8	6.0	92	274	30	16	20
31	25	-----	4.0	2.4	-----	6.8	-----	92	-----	28	16	-----
TOTAL	251.5	680	274.5	103.3	94.5	186.5	471.0	5,465.4	4,170	3,513	351.0	859
MEAN	8.11	22.7	8.85	3.33	3.26	6.02	15.7	176	139	113	11.3	28.6
MAX	30	53	16	7.0	6.2	7.5	25	392	392	260	27	51
MIN	1.8	11	4.0	1.0	2.4	4.6	6.0	3.8	60	28	2.6	13
AC-FT	499	1,350	544	205	187	370	934	10,840	8,270	6,970	696	1,700

CAL YR 1963: TOTAL 18,334.40

MEAN 50.2

MAX 902

MIN 0

AC-FT 36,370

WAT YR 1964: TOTAL 16,419.7

MEAN 44.9

MAX 517

MIN 1.0

AC-FT 32,570

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	22	17	8.5	10	4.0	4.0	12	199	178	533	238	93
2	24	18	8.5	10	4.0	4.0	12	210	180	469	214	89
3	16	16	8.5	9.0	4.0	4.0	12	192	176	414	186	87
4	27	16	8.0	9.0	4.0	4.0	12	171	164	373	160	84
5	25	15	8.0	8.0	6.0	5.0	12	156	150	344	137	81
6	24	15	8.0	8.0	6.0	5.0	14	158	138	329	114	79
7	22	15	8.5	7.0	6.0	6.0	16	181	130	329	100	78
8	20	15	9.0	8.0	6.0	6.0	18	181	141	338	110	75
9	19	15	10	6.0	8.0	7.0	20	174	221	335	137	74
10	19	15	12	6.0	8.0	8.0	25	216	342	318	164	72
11	19	20	14	5.0	6.0	9.0	30	422	437	302	181	70
12	18	25	14	5.0	6.0	10	33	578	500	294	185	70
13	18	25	14	4.0	6.0	12	35	572	539	283	181	69
14	17	25	13	4.0	5.0	12	38	504	589	269	174	73
15	17	24	13	4.0	5.0	12	40	437	624	261	163	75
16	16	22	13	4.0	5.0	12	36	380	646	256	153	78
17	16	20	12	4.0	5.0	11	32	331	667	249	142	81
18	15	20	12	6.0	5.0	11	200	287	694	248	133	84
19	15	18	11	8.0	5.0	11	452	238	745	244	127	87
20	15	18	11	10	5.0	11	608	192	806	237	121	90
21	16	16	10	12	5.0	11	591	165	865	217	115	94
22	17	14	10	12	5.0	11	485	147	913	205	110	101
23	17	12	11	10	5.0	11	384	137	945	238	105	107
24	17	12	11	10	5.0	10	318	125	966	222	105	108
25	17	10	12	10	4.0	10	269	121	967	217	104	105
26	17	10	12	10	4.0	10	235	113	936	223	102	103
27	17	9.0	12	8.0	4.0	10	200	104	881	243	105	100
28	17	9.0	12	8.0	4.0	12	185	98	793	270	101	100
29	17	9.0	12	6.0	-----	12	174	105	695	284	101	99
30	17	8.0	11	6.0	-----	12	174	145	587	279	97	98
31	17	-----	11	6.0	-----	12	-----	169	-----	258	96	-----
TOTAL	581	481.5	340.0	232.0	147.0	285.0	4,672	7,208	16,615	9,081	4,261	2,604
MEAN	18.7	16.1	11.0	7.48	5.25	9.19	156	233	554	293	137	86.8
MAX	27	25	14	12	6.0	12	608	578	967	533	238	108
MIN	15	8.5	8.0	4.0	4.0	4.0	12	98	130	205	96	69
AC-FT	1,150	955	674	460	292	565	9,270	14,300	32,960	18,010	8,540	5,160

CAL YR 1964: TOTAL 16,616.2

MEAN 45.4

MAX 517

MIN 1.0

AC-FT 32,960

WAT YR 1965: TOTAL 46,507.5

MEAN 127

MAX 967

MIN 4.0

AC-FT 92,250

## 5-1225. Willow Creek at Dunseith, N. Dak.

Location.--Lat 48°49'12", long 100°03'45", in NE1/4NW1/4 sec.36, T.162 N., R.73 W., on right downstream wingwall of county road bridge, 0.4 mile northwest of railway station in Dunseith.

Drainage area.--142 sq mi, approximately, of which about 51 sq mi is probably noncontributing.

Records available.--September 1953 to September 1965.

Gage.--Water-stage recorder. Prior to July 16, 1957, wire-weight gage at same site. Datum of gage is 1,700.00 ft above mean sea level, datum of 1929, Emerson-Crookston supplementary adjustment of 1941.

Average discharge.--12 years, 15.4 cfs (11,150 acre-ft per year); median of yearly mean discharges, 5.1 cfs (3,700 acre-ft per year).

Extremes.--Maximums and minimums (discharge in cubic feet per second, gage height in feet).

Annual maximum discharge (\*) and peak discharges above base (40 cfs), water years 1961-65

Date	Time	Discharge	Gage height	Date	Time	Discharge	Gage height	Date	Time	Discharge	Gage height
Mar. 20, 1961	1415	-	a12.95	Mar. 22, 1963	0700	-	a12.13	May 6, 1965	1200	60	12.52
Apr. 21, 1961	1200	* 4.7	11.32	Apr. 8, 1963	0900	* 23	a12.01	May 25, 1965	1200	50	12.26
Mar. 26, 1962	1345	-	a11.89	June 17, 1964	-	* 40	-	July 20, 1965	1800	* 347	13.58
Apr. 20, 1962	2000	* 3.0	11.26	Apr. 25, 1965	0030	92	12.88	July 26, 1965	1500	191	12.67

a Backwater from ice.

No flow at times in each year.

1953-65: Maximum discharge, 410 cfs Apr. 17, 1960 (gage height, 14.6 ft); maximum gage height, 15.30 ft Apr. 5, 1955; no flow for some days in each year except 1955-56.

Remarks.--Records fair. Occasional minor regulation from changes in stoplogs at Willow Lake Outlet.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

OAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	0	.10	.10	0	0	0	1.1	1.0	.20	0	0	0
2	0	.10	.10	0	0	0	1.1	.60	.20	0	0	0
3	0	.10	.10	0	0	0	1.0	.50	.20	0	0	0
4	.10	.10	.10	0	0	0	1.0	.40	.20	0	0	0
5	.10	.10	.10	0	0	0	1.0	.40	.20	0	0	0
6	.10	.10	.10	0	0	0	1.0	1.1	.20	0	0	0
7	.10	.10	.10	0	0	0	1.1	2.1	.10	0	0	0
8	.10	.10	.10	0	0	0	1.1	2.1	0	0	0	0
9	.10	.10	.10	0	0	0	1.2	2.1	0	0	0	0
10	.10	.10	.10	0	0	0	1.2	2.0	0	0	0	0
11	.10	.20	.10	0	0	0	1.3	2.0	0	0	0	0
12	.10	.20	.10	0	0	0	1.4	2.2	0	0	0	0
13	.10	.20	.10	0	0	0	1.6	1.9	0	0	0	0
14	.10	.20	.10	0	0	0	1.8	1.6	0	0	0	0
15	.10	.20	.10	0	0	0	2.0	1.3	0	0	0	0
16	.10	.20	.10	0	0	0	2.1	1.1	0	0	0	0
17	.10	.20	.10	0	0	0	2.2	1.0	0	0	0	0
18	.10	.20	.10	0	0	0	2.4	.90	0	0	0	0
19	.10	.20	.10	0	0	0	2.2	.80	0	0	0	0
20	.10	.20	.10	0	0	.20	2.9	.70	0	0	0	0
21	.10	.20	.10	0	0	.20	4.1	1.3	0	0	0	0
22	.10	.20	.10	0	0	.50	3.9	1.4	0	0	0	.10
23	.10	.20	.10	0	0	.80	3.2	1.1	0	0	0	.10
24	.10	.20	.10	0	0	1.2	3.0	.70	0	0	0	0
25	.10	.20	0	0	0	.60	2.8	.60	0	0	0	0
26	.10	.20	0	0	0	.60	2.5	.50	0	0	0	0
27	.10	.10	0	0	0	.70	2.4	.40	0	0	0	0
28	.10	.10	0	0	0	1.5	2.1	.40	0	0	0	0
29	.10	.10	0	0	0	1.4	1.8	.30	0	0	0	0
30	.10	.10	0	0	0	1.2	1.2	.20	0	0	0	0
31	.10	0	0	0	0	1.2	1.2	.20	0	0	0	0
TOTAL	2.80	4.60	2.40	0	0	10.10	57.7	32.90	1.30	0	0	0.20
MEAN	.090	.15	.077	0	0	.33	1.92	1.06	.043	0	0	.007
MAX	.10	.20	.10	0	0	1.5	4.1	2.2	.20	0	0	.10
MIN	0	.10	0	0	0	0	1.0	.20	0	0	0	0
AC-FT	5.6	9.1	4.8	0	0	20	114	65	2.6	0	0	.4

CAL YR 1960: TOTAL 12,756.40 MEAN 34.9 MAX 320 MIN 0 AC-FT 25,300

WAT YR 1961: TOTAL 112.00 MEAN .31 MAX 4.1 MIN 0 AC-FT 222

## 5-1225. Willow Creek at Dunseith, N. Dak.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	0	.10	0	0	0	0	.10	.90	.50	0	0	0
2	0	.10	0	0	0	0	.10	.80	.40	0	0	0
3	0	.10	0	0	0	0	.50	.80	.30	.10	0	0
4	0	.10	0	0	0	0	1.0	.80	.20	.20	0	0
5	0	.10	0	0	0	0	2.0	.80	.20	.20	0	0
6	0	.10	0	0	0	0	2.6	.80	.20	.30	0	0
7	0	.10	0	0	0	0	2.7	.70	.20	.30	0	0
8	0	.10	0	0	0	0	1.7	.70	.20	.40	0	0
9	.60	.10	0	0	0	0	1.2	.70	.20	.20	0	0
10	.20	.10	0	0	0	0	.70	.70	.20	.20	0	0
11	.10	.10	0	0	0	0	.60	.80	.20	.10	0	0
12	.10	.10	0	0	0	0	.50	.80	.10	.10	0	0
13	0	.10	0	0	0	0	.60	.90	.20	.10	0	0
14	0	.10	0	0	0	0	.50	1.3	.20	.10	0	0
15	0	.10	0	0	0	0	.60	1.0	.90	.10	0	0
16	0	.10	0	0	0	0	1.9	.80	.80	0	0	0
17	.10	.10	0	0	0	0	2.5	1.4	.40	0	0	0
18	.10	.10	0	0	0	0	2.1	1.2	.30	0	0	0
19	.10	.10	0	0	0	0	1.6	.90	.20	0	0	0
20	.10	.10	0	0	0	0	1.6	.70	.20	0	0	0
21	.10	.10	0	0	0	0	1.6	.70	.20	0	0	0
22	.10	.10	0	0	0	0	1.1	.90	.20	0	0	0
23	.10	.10	0	0	0	0	1.3	.80	.20	0	.30	0
24	.10	.10	0	0	0	0	1.0	.60	.10	0	.30	0
25	.10	.10	0	0	0	.10	1.1	.60	.10	0	.10	0
26	.10	0	0	0	0	.50	1.0	.40	.10	0	0	0
27	.10	0	0	0	0	1.0	.90	.40	.10	0	0	0
28	.10	0	0	0	0	1.4	.80	.40	0	0	0	0
29	.10	0	0	0	-----	1.5	1.3	.70	0	0	0	0
30	.10	0	0	0	-----	1.0	1.0	.80	0	0	0	0
31	.10	-----	0	0	-----	.50	-----	.60	-----	0	0	-----
TOTAL	2.50	2.50	0	0	0	6.00	36.00	24.40	7.10	2.40	0.70	0
MEAN	.081	.083	0	0	0	.19	1.20	.79	.24	.077	.023	0
MAX	.60	.10	0	0	0	1.5	2.7	1.4	.90	.40	.30	0
MIN	0	0	0	0	0	0	.10	.40	0	0	0	0
AC-FT	5.0	5.0	0	0	0	12	71	48	14	4.8	1.4	0

CAL YR 1961: TOTAL 107.20

MEAN .29

MAX 4.1

MIN 0

AC-FT 213

WAT YR 1962: TOTAL 81.60

MEAN .22

MAX 2.7

MIN 0

AC-FT 162

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	0	.10	.10	0	0	0	3.0	2.7	1.1	1.0	.60	0
2	0	.10	.10	0	0	0	3.5	2.1	1.2	.80	.50	0
3	0	.10	.10	0	0	0	5.0	1.7	2.5	.70	.40	0
4	0	.10	.10	0	0	0	4.5	1.6	3.3	.60	.40	0
5	0	.10	.10	0	0	0	6.0	1.5	3.2	.60	.30	0
6	0	.20	.10	0	0	0	9.5	1.4	2.9	.50	.10	0
7	0	.20	.10	0	0	0	11	1.3	2.8	.50	0	0
8	0	.20	.10	0	0	0	12	1.1	3.9	.50	0	0
9	0	.20	0	0	0	0	4.5	1.1	5.1	.40	0	0
10	0	.20	0	0	0	0	5.0	1.1	4.7	.60	0	0
11	.10	.20	0	0	0	0	4.6	1.1	4.2	1.1	0	0
12	.10	.20	0	0	0	0	4.2	1.4	4.4	1.0	0	0
13	.10	.20	0	0	0	0	4.6	2.9	4.2	1.0	0	0
14	.10	.20	0	0	0	0	4.4	3.3	3.8	.70	0	0
15	.10	.20	0	0	0	0	3.3	3.3	3.3	.50	0	0
16	.20	.20	0	0	0	0	5.1	3.6	3.0	.40	0	0
17	.20	.20	0	0	0	0	7.3	3.9	2.6	.40	0	0
18	.10	.20	0	0	0	0	4.7	2.9	2.6	.40	0	0
19	.10	.20	0	0	0	0	4.2	2.4	2.6	.20	0	0
20	.10	.20	0	0	0	0	3.6	2.0	2.6	.20	0	0
21	.10	.20	0	0	0	1.0	3.0	1.8	2.4	.20	0	0
22	.20	.20	0	0	0	5.0	2.7	1.8	2.1	.20	0	0
23	.10	.20	0	0	0	6.0	2.4	1.9	2.1	.10	0	0
24	.10	.20	0	0	0	8.0	2.1	1.4	2.0	.30	0	0
25	.10	.20	0	0	0	10	1.9	1.3	2.0	.60	0	0
26	.10	.20	0	0	0	10	1.6	1.2	1.6	1.6	0	0
27	.10	.20	0	0	0	8.0	1.6	1.1	1.3	1.1	0	0
28	.10	.10	0	0	0	8.0	2.2	1.1	1.1	.80	0	0
29	.10	.10	0	0	-----	5.0	3.9	.90	1.1	.80	0	0
30	.10	.10	0	0	-----	5.0	2.8	.80	1.0	1.0	0	0
31	.10	-----	0	0	-----	4.0	-----	.80	-----	.50	0	-----
TOTAL	2.40	5.20	0.80	0	0	70.0	134.2	56.50	80.7	19.40	2.30	0
MEAN	.077	.17	.026	0	0	2.26	4.47	1.82	2.69	.63	.074	0
MAX	.20	.20	.10	0	0	10	12	3.9	5.1	1.6	.60	0
MIN	0	.10	0	0	0	0	1.6	.80	1.0	.10	0	0
AC-FT	4.8	10	1.6	0	0	139	266	112	160	38	4.6	0

CAL YR 1962: TOTAL 85.00

MEAN .23

MAX 2.7

MIN 0

AC-FT 169

WAT YR 1963: TOTAL 371.50

MEAN 1.02

MAX 12

MIN 0

AC-FT 737

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965												
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	2.0	1.0	.10	0	0	0	0	40	42	22	148	3.9
2	2.0	1.0	.10	0	0	0	0	40	44	21	140	2.9
3	2.0	.90	0	0	0	0	0	42	44	18	129	2.2
4	2.0	.90	0	0	0	0	0	42	44	16	120	1.9
5	2.0	.90	0	0	0	0	0	50	42	12	106	1.9
6	2.1	.90	0	0	0	0	.10	54	42	9.6	106	2.0
7	2.6	.90	0	0	0	0	.20	52	39	7.3	96	1.9
8	3.2	.80	0	0	0	0	.80	46	39	7.0	87	1.7
9	2.9	.80	0	0	0	0	.50	42	36	4.9	79	1.6
10	3.0	.80	0	0	0	0	.80	42	35	4.2	74	1.3
11	3.0	.80	0	0	0	0	1.5	42	33	4.1	64	1.1
12	2.9	.70	0	0	0	0	4.0	40	30	5.6	58	1.1
13	2.8	.70	0	0	0	0	10	39	28	4.7	56	.80
14	2.7	.70	0	0	0	0	20	38	30	4.6	52	.80
15	2.6	.70	0	0	0	0	30	37	33	4.2	48	.90
16	2.5	.70	0	0	0	0	30	36	29	3.6	46	2.2
17	2.5	.80	0	0	0	0	20	37	29	3.0	42	10
18	2.5	.70	0	0	0	0	30	35	26	2.5	39	7.0
19	2.4	.60	0	0	0	0	44	32	25	12	36	5.8
20	2.4	.60	0	0	0	0	38	35	23	103	32	7.8
21	2.5	.50	0	0	0	0	32	39	22	144	25	11
22	2.6	.50	0	0	0	0	29	33	20	136	20	23
23	2.4	.50	0	0	0	0	29	35	19	128	14	34
24	2.1	.50	0	0	0	0	50	40	18	135	13	33
25	2.0	.50	0	0	0	0	50	46	18	172	11	30
26	1.8	.40	0	0	0	0	34	44	17	187	9.3	25
27	1.6	.30	0	0	0	0	37	42	24	184	8.4	24
28	1.6	.20	0	0	0	0	40	40	23	179	7.0	22
29	1.3	.10	0	0	0	0	40	40	21	177	6.8	21
30	1.2	.10	0	0	0	0	40	38	19	172	6.0	19
31	1.1	-----	0	0	0	0	-----	42	-----	160	4.9	-----
TOTAL	70.3	19.50	0.20	0	0	0	610.90	1,258	894	2,043.3	1,683.4	300.80
MEAN	2.27	.65	.007	0	0	0	24	40.6	29.8	65.9	54.3	10.4
MAX	3.2	1.0	.10	0	0	0	50	54	44	107	148	34
MIN	1.1	.10	0	0	0	0	0	32	17	2.5	4.9	.80
AC-FT	139	39	.4	0	0	0	1,210	2,500	1,770	4,050	3,340	597
CAL YR 1964: TOTAL	1,142.60		MEAN 3.12		MAX 21	MIN 0	AC-FT 2,270					
MAX YR 1965: TOTAL	6,880.40		MEAN 18.9		MAX 187	MIN 0	AC-FT 13,650					

5-1230. Lake Metigoshe near Bottineau, N. Dak.

Location.--Lat 48°59'05", long 100°20'52", in SE 1/4 sec.35, T.164 N., R.75 W., on east end of north abutment of "Maid of Moonshine" Bridge over Lake Metigoshe, 11.7 miles northeast of Bottineau.

Drainage area.--59 sq mi (approximately).

Records available.--June 1931 to September 1932, September 1953 to September 1965.

Gage.--Water-stage recorder. Datum of gage is 2,130.00 ft above mean sea level, datum of 1929, Emerson-Crookston supplementary adjustment of 1941. 1931-32, staff gage on north abutment of bridge at datum 6.32 ft lower (reduced to elevations above mean sea level). Sept. 4, 1953, to Jan. 19, 1955, staff gage at present datum on east end of south abutment of bridge.

Extremes.--Maximum and minimum gage heights for the water years 1961-65 are contained in the following table:

Water year	Maximum		Minimum	
	Date	Gage height (feet)	Date	Gage height (feet)
1961	May 12-14, 1961.....	7.87	Sept. 7, 1961.....	6.65
1962	July 7, 1962.....	7.72	Nov. 8, 9, 1961.....	6.61
1963	June 8, 9, 1963.....	8.71	Oct. 10-13, Nov. 25-27, 1962...	7.07
1964	July 9-11, 1964.....	8.43	Nov. 18-25, Dec. 3, 5, 1963....	7.21
1965	June 13-15, 1965.....	8.64	Nov. 26, 1964.....	7.78

1953-65: Maximum gage height, 9.01 ft May 30, 1960; minimum, 6.09 ft, Aug. 19, 1959.

Remarks.--Outlet of lake is a concrete dam with removable stoplogs; average crest elevation without stoplogs, about 2,138.0 ft above mean sea level. Lake level regulated since 1959 by dam and control works in the outlet of Sharpe Lake, located on the principal tributary in Manitoba.

Gage height, in feet, at 2400 hours, water years October 1960 to September 1965

Oct. 31, 1960.... 7.47	Jan. 31, 1962.... 6.78	Apr. 30, 1963.... 8.25	July 31, 1964.... 8.19
Nov. 30..... 7.46	Feb. 28..... 6.88	May 31..... 8.39	Aug. 31..... 8.05
Dec. 31..... 7.53	Mar. 31..... 6.95	June 30..... 8.20	Sept. 30..... 7.98
Jan. 31, 1961.... 7.56	Apr. 30..... 7.12	July 31..... 7.96	Oct. 31..... 7.82
Feb. 28..... 7.64	May 31..... 7.51	Aug. 31..... 7.75	Nov. 30..... 7.81
Mar. 31..... 7.67	June 30..... 7.56	Sept. 30..... 7.52	Dec. 31..... 7.92
Apr. 30..... 7.76	July 31..... 7.38	Oct. 31..... 7.29	Jan. 31, 1965.... 7.96
May 31..... 7.75	Aug. 31..... 7.38	Nov. 30..... 7.22	Feb. 28..... 7.95
June 30..... 7.32	Sept. 30..... 7.12	Dec. 31..... 7.32	Mar. 31..... 7.92
July 31..... 7.04	Oct. 31..... 7.14	Jan. 31, 1964.... 7.34	Apr. 30..... 8.18
Aug. 31..... 6.73	Nov. 30..... 7.10	Feb. 29..... 7.43	May 31..... 8.61
Sept. 30..... 6.82	Dec. 31..... 7.47	Mar. 31..... 7.50	June 30..... 8.42
Oct. 31..... 6.64	Jan. 31, 1963.... 7.59	Apr. 30..... 7.90	July 31..... 8.33
Nov. 30..... 6.75	Feb. 28..... 7.65	May 31..... 8.13	Aug. 31..... 7.95
Dec. 31..... 6.77	Mar. 31..... 7.88	June 30..... 8.34	Sept. 30..... 8.09

5-1231. Oak Creek at Lake Metigoshe Outlet near Bottineau, N. Dak.

Location.--Lat 48°57'56", long 100°21'47", in SE $\frac{1}{4}$ SE $\frac{1}{4}$  sec.3, T.163 N., R.75 W., at outlet of Lake Metigoshe, 10 miles northeast of Bottineau.

Drainage area.--59.0 sq mi.

Records available.--October 1953 to September 1965.

Gage.--Water-stage recorder and concrete control. Datum of gage is 2,130.00 ft above mean sea level, datum of 1929, Emerson-Crookston supplementary adjustment of 1941. Prior to Jan. 20, 1955, staff gage at same site and datum. Gage is located  $1\frac{1}{2}$  miles northeast of outlet of lake and is same as that used for station on Lake Metigoshe.

Average discharge.--12 years, 3.49 cfs (2,530 acre-ft per year); median of yearly mean discharges, 1.8 cfs (1,300 acre-ft per year).

Extremes.--Maximum and minimum discharges for the water years 1961-65 are contained in the following table:

Water year	Maximum			Minimum		
	Date	Discharge (cfs)	Gage height (feet)	Date	Discharge (cfs)	Gage height (feet)
1961	(a)	-	-	Entire year	0	-
1962	(a)	-	-	do.	0	-
1963	June 10, 1963	95	b 8.69	At times	0	-
1964	May 5, 1964	6.2	c 8.11	do.	0	-
1965	July 21-23, 1965	40	d 8.53	do.	0	-

a No flow for entire year.

b Maximum gage height for year, 8.71 ft June 8, 9, 1963.

c Maximum gage height for year, 8.43 ft July 9-11, 1964.

d Maximum gage height for year, 8.64 ft June 13-15, 1965.

1953-65: Maximum discharge, 95 cfs June 10, 1963 (gage height, 8.69 ft); maximum gage height, 9.01 ft May 20, 1960; no flow at times in each year.

Remarks.--Records poor. Flow regulated since 1959 by dam and control works on the outlet of Sharpe Lake, located on the principal tributary in Manitoba.

Revisions.--WSP 1728: Drainage area.

Discharge, in cubic feet per second, water years October 1960 to September 1963

May 13, 1963....	0.10	May 30, 1963....	0.10	June 15, 1963....	19	July 1, 1963....	6.8
14.....	.10	31.....	.20	16.....	8.3	2.....	5.4
15.....	.10	1.....	.20	17.....	8.3	3.....	4.3
16.....	.10	2.....	.30	18.....	8.3	4.....	3.8
17.....	.10	3.....	1.1	19.....	26	5.....	3.3
18.....	.10	4.....	4.7	20.....	30	6.....	2.3
19.....	.10	5.....	7.1	21.....	24	7.....	2.8
20.....	.10	6.....	11	22.....	22	8.....	2.4
21.....	.10	7.....	12	23.....	19	9.....	1.4
22.....	.10	8.....	15	24.....	18	10.....	1.1
23.....	.10	9.....	15	25.....	17	11.....	1.4
24.....	2.9	10.....	59	26.....	15	12.....	.70
25.....	.17	11.....	78	27.....	14	13.....	.30
26.....	.16	12.....	53	28.....	12	14.....	.20
27.....	.15	13.....	46	29.....	14	15.....	.10
28.....	6.1	14.....	42	30.....	11		

Month	Cfs-days	Maximum	Minimum	Mean	Runoff in acre-feet
Calendar year 1960.....	2,438.80	72	0	6.66	4,840
May 1963.....	56.40	17	0	1.88	116
June.....	610.30	78	.20	20.3	1,210
July.....	37.30	6.8	0	1.20	74
Water year 1962-63.....	706.00	78	0	1.93	1,400

Note.--Flow occurred only on days listed above.



5-1234. Willow Creek near Willow City, N. Dak.

Location.--Lat 48°35'20", long 100°26'30", in NE 1/4 sec. 23, T.159 N., R.76 W., on left bank 50 ft downstream from bridge on county highway, 1 1/2 miles upstream from Snake Creek, and 7 miles west of Willow City.

Drainage area.--1,160 sq mi, approximately, of which about 430 sq mi is probably noncontributing. Records available.--August 1956 to September 1965.

Gage.--Water-stage recorder. Altitude of gage is 1,430 ft (from topographic map). Prior to Oct. 5, 1956, wire-weight gage at site 50 ft upstream at same datum.

Average discharge.--9 years, 15.8 cfs (11,440 acre-ft per year).

Extremes.--Maximums and minimums in cubic feet per second, gage height in feet).

Annual maximum discharge (\*) and peak discharges above base (50 cfs), water years 1961-65

Date	Time	Discharge	Gage height	Date	Time	Discharge	Gage height	Date	Time	Discharge	Gage height
Mar. 30, 1961	0700	* 15	5.82	June 11, 1963	0530	* 81	8.01	Apr. 24, 1965	1600	134	8.18
Apr. 10, 1962	-	* 5	6.73	Apr. 6, 1964	0600	* 89	8.13	May 17, 1965	0350	115	7.97
								June 6, 1965	1050	123	42.98
								Aug. 12, 1965	0600	* 208	10.59

a From floodmark.

b Maximum gage height for year, 10.68 ft Aug. 10, 1965, backwater from vegetation.

No flow at times in each year.

1956-65: Maximum discharge, 1,190 cfs Apr. 9, 1960 (gage height, 14.03 ft); no flow at times in each year.

A discharge of 1,340 cfs occurred Apr. 20, 1956, at site 1 mile downstream from Snake Creek (computed from rating curve extended above 1,220 cfs).

Remarks.--Records fair. Records of chemical analyses for the water years 1961-64 are published in reports of the Geological Survey.

Discharge, in cubic feet per second, water years October 1960 to September 1962

Mar. 20, 1961....	0.10	Apr. 10, 1961....	7.5	Apr. 27, 1961....	0.20	May 14, 1961....	0.10
21.....	.10	11.....	6.4	28.....	.10	15.....	.10
22.....	.10	12.....	4.5	29.....	.10	16.....	.10
23.....	.10	13.....	2.9	30.....	.10	17.....	.10
24.....	.10	14.....	2.0	May 1.....	.10	18.....	.10
29.....	5.7	15.....	1.2	2.....	.10	19.....	.10
30.....	9.5	16.....	.80	3.....	.10	20.....	.10
31.....	5.7	17.....	.60	4.....	.10	Apr. 9, 1962....	.90
Apr. 1.....	6.3	18.....	.50	5.....	.10	10.....	4.7
2.....	5.7	19.....	.40	6.....	.10	11.....	2.4
3.....	5.4	20.....	.30	7.....	.10	12.....	.70
4.....	.10	21.....	.30	8.....	.10	13.....	.50
5.....	.10	22.....	.30	9.....	.10	14.....	1.2
6.....	.10	23.....	.30	10.....	.10	15.....	1.0
7.....	.11	24.....	.20	11.....	.10	16.....	.70
8.....	.13	25.....	.20	12.....	.10	17.....	.50
9.....	8.9	26.....	.20	13.....	.10	18.....	.20

Month	Cfs-days	Maximum	Minimum	Mean	Runoff in acre-feet
Calendar year 1960.....	26,419.40	1,110	0	72.2	52,400
March 1961.....	21.40	9.5	0	.69	42
April.....	109.30	13	0	3.64	217
May.....	2.00	.10	0	.065	4.0
Water year 1960-61.....	132.70	13	0	.36	263
Calendar year 1961.....	132.70	13	0	.36	263
April 1962.....	12.40	4.7	0	.41	25
Water year 1961-62.....	12.40	4.7	0	.034	25

Note.--Flow occurred only on days listed above.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963											
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	SEPT.
1	0	0	0	0	0	0	7.5	5.8	.80	15	2.0
2	0	0	0	0	0	0	7.1	5.1	.70	13	2.8
3	0	0	0	0	0	0	6.2	4.5	.80	12	2.4
4	0	0	0	0	0	0	6.2	4.5	1.2	12	1.9
5	0	0	0	0	0	0	6.0	4.0	1.6	10	1.2
6	0	0	0	0	0	0	4.8	3.7	8.3	12	.60
7	0	0	0	0	0	0	4.0	3.6	13	14	.40
8	0	0	0	0	0	0	3.3	2.9	44	12	.10
9	0	0	0	0	0	0	11	2.8	66	11	.10
10	0	0	0	0	0	0	13	2.6	76	8.8	0
11	0	0	0	0	0	0	12	2.3	80	9.0	0
12	0	0	0	0	0	0	11	2.8	76	8.8	0
13	0	0	0	0	0	0	10	3.8	71	8.4	0
14	0	0	0	0	0	0	9.0	3.7	64	8.3	0
15	0	0	0	0	0	0	8.0	3.0	54	8.4	0
16	0	0	0	0	0	0	10	2.8	47	8.6	0
17	0	0	0	0	0	0	14	3.1	42	8.3	0
18	0	0	0	0	0	0	13	3.8	40	7.9	0
19	0	0	0	0	0	0	12	4.5	40	7.3	0
20	0	0	0	0	0	0	11	5.1	38	6.6	0
21	0	0	0	0	0	0	10	4.2	35	6.2	0
22	0	0	0	0	0	0	9.5	3.3	33	5.3	0
23	0	0	0	0	0	0	9.0	2.8	29	4.3	0
24	0	0	0	0	0	0	8.8	2.1	34	3.6	0
25	0	0	0	0	0	0	8.6	1.6	31	4.2	0
26	0	0	0	0	0	0	8.6	1.7	27	6.0	0
27	0	0	0	0	0	0	8.4	1.8	23	5.8	0
28	0	0	0	0	0	5.1	9.0	1.6	20	5.0	0
29	0	0	0	0	0	19	8.0	1.4	19	4.2	0
30	0	0	0	0	0	8.6	6.9	1.1	17	3.7	0
31	0	0	0	0	0	8.1	-----	.90	-----	3.4	0
TOTAL	0	0	0	0	0	40.8	265.9	97.00	1,032.40	253.1	12.50
MEAN	0	0	0	0	0	1.32	8.86	3.13	34.4	8.16	.40
MAX	0	0	0	0	0	19	14	5.8	80	15	3.0
MIN	0	0	0	0	0	0	3.3	.90	.70	3.4	0
AC-FT	0	0	0	0	0	81	527	192	2,050	502	25
CAL YR 1962: TOTAL	12.40	MEAN .034	MAX 4.7	MIN 0	AC-FT 25						
WAT YR 1963: TOTAL	1,701.70	MEAN 4.66	MAX 80	MIN 0	AC-FT 3,380						



5-1235.1. Deep River near Upham, N. Dak.

Location.--Lat 48°35'03", long 100°51'44", in SW 1/4 sec. 22, T.159 N., R.79 W., 0.8 mile downstream from Little Deep River and 6.3 miles west of Upham.

Drainage area.--975 sq mi, of which 605 sq mi is probably noncontributing.

Records available.--September 1957 to September 1965.

Gage.--Water-stage recorder. Altitude of gage is 1,430 ft (from topographic map).

Average discharge.--8 years, 1.99 cfs (1,440 acre-ft per year).

Extremes.--Maximum and minimum discharges for the water years 1961-65 are contained in the following table:

Annual maximum discharge (*), peak discharges above base (50 cfs), and annual minimum discharge						
Water year	Maximum			Minimum		
	Date	Time	Discharge (cfs)	Gage height (feet)	Date	Discharge (cfs)
1961	(a)	-	-	-	Entire year	0
1962	(a)	-	-	-	do.	0
1963	(a)	-	-	-	do.	0
1964	Apr. 12, 1964	0400	* 176	7.91	Long periods	0
1965	Apr. 10, 1965	1600	* 6.0	b 5.58	do.	0

a No flow for entire year.

b Backwater from ice.

1957-65: Maximum discharge, 580 cfs Apr. 5, 1960 (gage height, 10.90 ft); no flow for part or all of each year.

Flood in April 1961 reached a stage of about 16 ft, from information by local resident.

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

Revisions.--WSP 1728: Drainage area.

Discharge, in cubic feet per second, water years October 1960 to September 1964

Apr. 10, 1964....	10	May 13, 1964....	11	June 15, 1964....	1.9	July 18, 1964....	3.1
11.....	72	14.....	11	16.....	1.6	19.....	3.0
12.....	167	15.....	12	17.....	1.8	20.....	2.7
13.....	132	16.....	14	18.....	1.7	21.....	2.8
14.....	90	17.....	15	19.....	1.6	22.....	2.7
15.....	55	18.....	15	20.....	1.4	23.....	2.4
16.....	45	19.....	14	21.....	2.4	24.....	1.8
17.....	38	20.....	14	22.....	3.3	25.....	1.5
18.....	30	21.....	13	23.....	3.3	26.....	1.3
19.....	29	22.....	12	24.....	3.0	27.....	1.0
20.....	26	23.....	9.5	25.....	2.7	28.....	1.0
21.....	25	24.....	7.8	26.....	2.4	29.....	1.0
22.....	25	25.....	6.8	27.....	2.2	30.....	.60
23.....	24	26.....	5.1	28.....	2.1	31.....	.60
24.....	23	27.....	4.7	29.....	2.3	Aug. 1.....	.60
25.....	21	28.....	4.1	30.....	2.3	2.....	.50
26.....	19	29.....	3.7	July 1.....	2.4	3.....	.30
27.....	15	30.....	3.1	2.....	2.4	4.....	.30
28.....	14	31.....	2.6	3.....	2.3	5.....	.30
29.....	13	June 1.....	2.2	4.....	3.1	6.....	.20
30.....	11	2.....	1.7	5.....	4.8	7.....	.10
May 1.....	9.9	3.....	1.4	6.....	4.3	8.....	.10
2.....	9.5	4.....	1.0	7.....	4.4	9.....	.20
3.....	11	5.....	.90	8.....	4.3	10.....	.10
4.....	11	6.....	1.1	9.....	3.9	11.....	.10
5.....	11	7.....	1.4	10.....	5.0	12.....	.10
6.....	12	8.....	4.7	11.....	5.9	13.....	.10
7.....	13	9.....	4.6	12.....	5.0	14.....	.10
8.....	13	10.....	2.1	13.....	4.4	15.....	.10
9.....	13	11.....	2.1	14.....	4.1	30.....	.10
10.....	13	12.....	2.2	15.....	3.7	31.....	.10
11.....	12	13.....	2.1	16.....	3.6	Sept. 1.....	.10
12.....	12	14.....	2.4	17.....	3.3	2.....	.10
						3.....	.10

Month	Cfs-days	Maximum	Minimum	Mean	Runoff in acre-feet
Calendar year 1960.....	3,983.60	533	0	10.9	7,900
April 1964.....	884	167	0	29.5	1,750
May.....	318.8	15	2.6	10.3	692
June.....	65.90	4.7	.90	2.20	131
July.....	92.10	5.9	.60	2.97	183
August.....	3.40	.60	0	.11	6.7
September.....	.30	.10	0	.010	.6
Water year 1964.....	1,364.50	167	0	3.73	2,710

Note.--Flow occurred only on days listed above.

## RED RIVER OF THE NORTH BASIN

5-1235.1. Deep River near Upham, N. Dak.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965

HYDROLOGY - 6000 FEET PER SECOND WATER YEAR BETWEEN 1961 AND SEPTEMBER 1965												
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	0	0	0	0	0	0	0	.20	5.0	1.9	.60	0
2	0	0	0	0	0	0	0	.20	4.3	1.8	.50	0
3	0	0	0	0	0	0	0	.20	4.0	1.7	.50	0
4	0	0	0	0	0	0	0	.20	3.6	1.7	.40	0
5	0	0	0	0	0	0	0	.40	3.4	1.6	.40	0
6	0	0	0	0	0	0	.10	1.2	2.9	1.6	.30	0
7	0	0	0	0	0	0	.40	1.3	2.6	1.6	.30	0
8	0	0	0	0	0	0	1.0	2.2	1.4	.30	0	0
9	0	0	0	0	0	0	1.1	.60	1.9	1.4	.20	0
10	0	0	0	0	0	0	3.7	.50	1.7	1.4	.20	0
11	0	0	0	0	0	0	2.6	.40	1.5	1.2	.20	0
12	0	0	0	0	0	0	2.6	.40	1.3	1.2	.20	0
13	0	0	0	0	0	0	2.0	.30	1.2	1.2	.10	0
14	0	0	0	0	0	0	2.0	.30	2.3	1.4	.10	0
15	0	0	0	0	0	0	1.8	.20	2.2	1.6	.10	0
16	0	0	0	0	0	0	1.2	.20	2.4	1.8	.10	.10
17	0	0	0	0	0	0	.90	.20	2.0	2.0	.10	.20
18	0	0	0	0	0	0	.60	.20	1.6	2.0	.10	.20
19	0	0	0	0	0	0	.50	2.4	1.4	1.8	0	.20
20	0	0	0	0	0	0	.40	2.9	1.2	1.6	0	.10
21	0	0	0	0	0	0	.40	2.7	1.2	1.4	0	.10
22	0	0	0	0	0	0	.40	2.2	1.2	1.6	0	.10
23	0	0	0	0	0	0	.30	2.1	1.4	3.0	0	.10
24	0	0	0	0	0	0	.30	2.2	1.4	2.8	0	.10
25	0	0	0	0	0	0	.30	2.6	1.6	2.4	0	.10
26	0	0	0	0	0	0	.20	2.7	1.7	2.0	0	.10
27	0	0	0	0	0	0	.20	3.0	1.6	1.6	0	.10
28	0	0	0	0	0	0	.20	3.3	1.8	1.2	0	.10
29	0	0	0	0	0	0	.20	3.9	1.7	1.0	0	.10
30	0	0	0	0	0	0	.20	4.3	1.7	.80	0	.10
31	0	-----	0	0	0	0	-----	4.8	-----	.70	0	-----
TOTAL	0	0	0	0	0	0	23.60	47.40	64.2	50.40	4.70	1.80
MEAN	0	0	0	0	0	0	.79	1.53	2.14	1.63	.15	.060
MAX	0	0	0	0	0	0	3.7	4.8	5.0	3.0	.60	.20
MIN	0	0	0	0	0	0	0	.20	1.2	.70	0	0
AC-FT	0	0	0	0	0	0	47	94	127	100	9.3	3.6
CAL YR 1964:	TOTAL	1,364.50		MEAN	3.73	MAX	167	MIN	0	AC-FT	2,710	
WAT YR 1965:	TOTAL	192.10		MEAN	.53	MAX	5.0	MIN	0	AC-FT	381	

## 5-1236. Egg Creek near Granville, N. Dak.

Location.--Lat 48°21'18", long 100°49'19", on west line of sec.10, T.156 N., R.79 W., on right downstream wingwall of bridge, 2 miles downstream from Hay Coulee, 3.5 miles upstream from North Lake, and 6 miles northeast of Granville.

Drainage area.--289 sq mi, of which about 150 sq mi is probably noncontributing.

Records available.--October 1956 to September 1965.

Gage.--Water-stage recorder. Datum of gage is 1,478.14 ft above mean sea level, datum of 1929 (levels by Bureau of Reclamation).

Average discharge.--9 years, 1.68 cfs (1,220 acre-ft per year).

Extremes.--Maximums and minimums (discharge in cubic feet per second, gage height in feet).

Annual maximum discharge (\*) and peak discharges above base (20 cfs), water years 1961-65

Date	Time	Discharge	Gage height	Date	Time	Discharge	Gage height	Date	Time	Discharge	Gage height
1961	-	(a)	-	Apr. 9, 1964	1400	* 53	4.03	Apr. 12, 1965	2100	67	4.53
Apr. 2, 1962	1100	* 12	3.22	May 11, 1964	2400	33	3.71	May 10, 1965	2000	* 114	4.42
June 9, 1963	1000	* 147	5.09	July 1, 1964	1200	29	3.67	July 22, 1965	2100	28	3.70
				July 5, 1964	0200	27	3.64				

a No flow for entire year.

No flow for most of time in each year.

1956-65: Maximum discharge, 258 cfs Mar. 28, 1960 (gage height, 5.44 ft); no flow for most of time in each year.

Remarks.--Records fair.

Revisions.--WSP 1728: Drainage area.

Discharge, in cubic feet per second, water years October 1960 to September 1963

Apr. 1, 1962...	1.6	June 19, 1963...	17	July 10, 1963...	0.70	Aug. 11, 1963...	1.7
2.....	8.0	20.....	13	11.....	.80	12.....	1.8
3.....	6.9	21.....	10	12.....	.60	13.....	1.5
4.....	5.0	22.....	9.9	13.....	.40	14.....	1.3
5.....	3.0	23.....	9.2	14.....	.20	15.....	1.2
6.....	1.7	24.....	8.6	15.....	.10	16.....	1.0
7.....	.80	25.....	8.0	16.....	.10	17.....	.90
8.....	.30	26.....	6.9	17.....	.10	18.....	.80
9.....	.10	27.....	5.9	18.....	.10	19.....	.60
June 7, 1963...	12	28.....	5.2	19.....	.10	20.....	.50
8.....	113	29.....	5.0	20.....	.10	21.....	.40
9.....	143	30.....	4.3	21.....	.10	22.....	.20
10.....	136	July 1.....	3.0	22.....	.80	23.....	.10
11.....	134	2.....	2.5	23.....	3.3	24.....	.10
12.....	125	3.....	2.3	24.....	5.7	25.....	.10
13.....	105	4.....	2.2	25.....	5.9	26.....	.40
14.....	79	5.....	1.9	26.....	5.0	27.....	.40
15.....	55	6.....	1.5	27.....	3.9	28.....	.20
16.....	36	7.....	1.2	28.....	3.0	29.....	.10
17.....	25	8.....	1.0	29.....	2.3	30.....	.10
18.....	21	9.....	.90	30.....	2.0	31.....	.10

Month	Cfs-days	Maximum	Minimum	Mean	Runoff in acre-feet
Calendar year 1960.....	1,182.10	213	0	3.23	2,340
April 1962.....	27.40	8.0	0	.91	54
Water year 1961-62.....	27.40	8.0	0	.075	54
Calendar year 1962.....	27.40	8.0	0	.075	54
June 1963.....	1,090.0	146	0	36.3	2,160
July.....	19.80	3.0	0	.64	39
August.....	45.50	5.9	.10	1.47	90
Water year 1962-63.....	1,155.30	146	0	3.17	2,290

Note.--Flow occurred only on days listed above.

## 5-1236. Egg Creek near Granville, N. Dak.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	0	0	0	0	0	0	0	2.0	.80	28	.40	0
2	0	0	0	0	0	0	0	2.2	.60	26	.20	0
3	0	0	0	0	0	0	0	3.9	.40	22	.10	0
4	0	0	0	0	0	0	0	4.6	.20	18	.10	0
5	0	0	0	0	0	0	0	4.6	.20	24	0	0
6	0	0	0	0	0	0	3.0	8.6	.10	20	0	0
7	0	0	0	0	0	0	18	11	0	14	0	0
8	0	0	0	0	0	0	30	13	0	13	0	0
9	0	0	0	0	0	0	49	14	0	12	0	0
10	0	0	0	0	0	0	37	18	0	9.5	0	0
11	0	0	0	0	0	0	24	29	0	7.2	0	0
12	0	0	0	0	0	0	18	28	.10	5.0	0	0
13	0	0	0	0	0	0	12	21	.10	4.4	0	0
14	0	0	0	0	0	0	9.5	16	.10	3.9	0	0
15	0	0	0	0	0	0	6.6	13	.10	3.3	0	0
16	0	0	0	0	0	0	8.0	11	.10	2.5	0	0
17	0	0	0	0	0	0	7.4	9.2	.90	1.5	0	0
18	0	0	0	0	0	0	7.4	7.7	1.5	1.0	0	0
19	0	0	0	0	0	0	7.2	6.1	2.5	.40	0	0
20	0	0	0	0	0	0	6.4	5.5	2.5	.40	0	0
21	0	0	0	0	0	0	5.2	4.6	2.3	.40	0	0
22	0	0	0	0	0	0	4.4	4.4	2.4	.40	0	0
23	0	0	0	0	0	0	4.1	4.3	3.0	.40	0	0
24	0	0	0	0	0	0	3.4	3.6	4.1	.40	0	0
25	0	0	0	0	0	0	3.1	3.0	6.5	.50	0	0
26	0	0	0	0	0	0	2.8	2.4	8.0	.60	0	0
27	0	0	0	0	0	0	3.0	1.9	12	.40	0	0
28	0	0	0	0	0	0	3.0	1.6	16	.50	0	0
29	0	0	0	0	0	0	2.4	1.4	22	.40	0	0
30	0	0	0	0	0	0	2.2	1.1	26	.40	0	0
31	0	-----	0	0	-----	0	-----	.90	-----	.40	0	-----
TOTAL	0	0	0	0	0	0	279.1	257.60	112.50	221.10	0.80	0
MEAN	0	0	0	0	0	0	9.30	8.31	3.75	7.13	.026	0
MAX	0	0	0	0	0	0	49	29	26	28	.40	0
MIN	0	0	0	0	0	0	0	.90	0	.40	0	0
AC-FT	0	0	0	0	0	0	554	511	223	439	1.6	0

CAL YR 1963: TOTAL 1,155.30

MEAN 3.17

MAX 146

MIN 0

AC-FT 2,290

WAT YR 1964: TOTAL 871.10

MEAN 2.38

MAX 49

MIN 0

AC-FT 1,730

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	0	0	0	0	0	0	0	7.7	6.0	9.9	4.6	.10
2	0	0	0	0	0	0	0	7.4	5.5	9.2	4.4	.10
3	0	0	0	0	0	0	0	7.2	5.5	8.3	3.4	.10
4	0	0	0	0	0	0	0	7.4	5.2	7.2	2.5	.10
5	0	0	0	0	0	0	0	8.3	5.2	6.4	2.0	.10
6	0	0	0	0	0	0	0	11	5.5	5.5	2.0	.10
7	0	0	0	0	0	0	0	16	5.5	4.8	2.7	.10
8	0	0	0	0	0	0	0	41	5.2	4.3	4.3	.10
9	0	0	0	0	0	0	0	81	4.8	3.9	5.7	.10
10	0	0	0	0	0	0	0	109	4.4	3.0	5.9	.10
11	0	0	0	0	0	0	.10	103	4.1	3.0	5.5	.10
12	0	0	0	0	0	0	49	80	3.4	4.3	4.6	.10
13	0	0	0	0	0	0	63	49	3.6	3.4	3.1	.10
14	0	0	0	0	0	0	58	30	7.7	3.9	1.9	.20
15	0	0	0	0	0	0	55	20	6.9	6.1	1.7	.20
16	0	0	0	0	0	0	61	15	6.4	7.7	1.8	.40
17	0	0	0	0	0	0	58	9.9	5.7	8.3	1.7	.30
18	0	0	0	0	0	0	47	7.4	5.2	8.6	1.6	.30
19	0	0	0	0	0	0	34	5.9	5.7	7.4	1.4	.20
20	0	0	0	0	0	0	27	4.8	5.9	6.1	1.3	.20
21	0	0	0	0	0	0	21	3.9	5.9	5.0	1.2	.20
22	0	0	0	0	0	0	18	3.3	5.7	14	1.0	.40
23	0	0	0	0	0	0	14	3.1	5.5	20	.90	.60
24	0	0	0	0	0	0	13	3.4	5.7	12	.90	.50
25	0	0	0	0	0	0	12	3.7	6.1	9.2	.70	.40
26	0	0	0	0	0	0	11	3.9	6.5	6.9	.60	.40
27	0	0	0	0	0	0	9.9	3.9	7.2	4.4	.60	.40
28	0	0	0	0	0	0	9.9	3.9	7.4	3.1	.40	.40
29	0	0	0	0	0	0	8.6	4.4	7.4	3.6	.40	.40
30	0	0	0	0	0	0	8.3	5.5	7.2	3.9	.30	.50
31	0	-----	0	0	-----	0	-----	6.0	-----	4.8	.20	-----
TOTAL	0	0	0	0	0	0	576.80	666.0	172.0	208.2	69.30	7.30
MEAN	0	0	0	0	0	0	19.2	21.5	5.73	6.72	2.24	.24
MAX	0	0	0	0	0	0	63	109	7.7	20	5.9	.60
MIN	0	0	0	0	0	0	0	3.1	3.4	3.0	.20	.10
AC-FT	0	0	0	0	0	0	1,140	1,320	341	413	137	14

CAL YR 1964: TOTAL 871.10

MEAN 2.38

MAX 49

MIN 0

AC-FT 1,730

WAT YR 1965: TOTAL 1,699.60

MEAN 4.66

MAX 109

MIN 0

AC-FT 3,370

5-1237. Cutbank Creek at North Lake Outlet, near Granville, N. Dak.  
(Formerly published as Cut Bank Creek at North Lake Outlet, near Granville)

Location.--Lat 48°23'10", long 100°46'00", on south line of sec.29, T.157 N., R.78 W., on right downstream wingwall of bridge, 9 miles northeast of Granville and 13.5 miles east of Deering.

Drainage area.--534 sq mi, of which about 290 sq mi is probably noncontributing.

Records available.--October 1956 to September 1965.

Gage.--Water-stage recorder. Datum of gage is 1,477.25 ft above mean sea level, datum of 1929 (levels by Bureau of Reclamation).

Average discharge.--9 years, 0.002 cfs (1.4 acre-ft per year).

Extremes.--1956-65: Maximum discharge, 1.0 cfs Apr. 13, 1960 (gage height, 0.62 ft); no flow for most of time.

Remarks.--No flow since Apr. 23, 1960.

Revisions.--WSP 1728: Drainage area.

5-1239. Boundary Creek near Landa, N. Dak.

Location.--Lat 48°48'46", long 100°51'46", at west line of sec.26, T.162 N., R.79 W., on right bank 80 ft downstream from bridge on county road, 5 miles upstream from mouth, and 6 miles southeast of Landa.

Drainage area.--230 sq mi, of which about 60 sq mi is probably noncontributing.

Records available.--September 1957 to September 1965.

Gage.--Water-stage recorder. Datum of gage is 1,420.03 ft above mean sea level, datum of 1929.

Average discharge.--8 years, 6.77 cfs (4,900 acre-ft per year).

Extremes.--Maximums and minimums (discharge in cubic feet per second, gage height in feet).

Annual maximum discharge (\*) and peak discharges above base (50 cfs), water years 1961-65

Date	Time	Discharge	Gage height	Date	Time	Discharge	Gage height	Date	Time	Discharge	Gage height
Mar. 23, 1961	2100	* 22	5.7	June 8, 1963	1000	* 120	7.25	Apr. 13, 1965	2030	* 131	7.25
June 22, 1962	0800	* 42	6.21	Apr. 3, 1964	0500	* 198	8.03	July 28, 1965	0200	92	7.57
Mar. 29, 1963	-	54	-	May 10, 1964	0600	103	6.89	Aug. 7, 1965	0530	76	7.29

No flow for several months in each year.

1957-65: Maximum discharge, 660 cfs Mar. 30, 1960 (gage height, 10.22 ft); no flow for several months in each year.

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

Revisions.--WSP 1728: Drainage area.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	0	0	0	0	0	0	2.0	0	0	0	0	0
2	0	0	0	0	0	0	3.4	0	0	0	0	0
3	0	0	0	0	0	0	3.3	0	0	0	0	0
4	0	0	0	0	0	0	3.4	0	0	0	0	0
5	0	0	0	0	0	0	3.0	0	0	0	0	0
6	0	0	0	0	0	0	2.5	0	0	0	0	0
7	0	0	0	0	0	0	2.2	0	0	0	0	0
8	0	0	0	0	0	0	1.6	0	0	0	0	0
9	0	0	0	0	0	0	1.7	0	0	0	0	0
10	0	0	0	0	0	0	1.4	0	0	0	0	0
11	0	0	0	0	0	0	1.2	0	0	0	0	0
12	0	0	0	0	0	0	1.0	0	0	0	0	0
13	0	0	0	0	0	0	.80	0	0	0	0	0
14	0	0	0	0	0	0	.80	0	0	0	0	0
15	0	0	0	0	0	0	.50	0	0	0	0	0
16	0	0	0	0	0	.40	.40	0	0	0	0	0
17	0	0	0	0	0	.10	.40	0	0	0	0	0
18	0	0	0	0	0	.20	.20	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	.10	.10	0	0	0	0	0
21	0	0	0	0	0	1.0	.10	0	0	0	0	0
22	0	0	0	0	0	2.5	0	0	0	0	0	0
23	0	0	0	0	0	18	0	0	0	0	0	0
24	0	0	0	0	0	17	0	0	0	0	0	0
25	0	0	0	0	0	15	0	0	0	0	0	0
26	0	0	0	0	0	9.6	0	0	0	0	0	0
27	0	0	0	0	0	5.4	0	0	0	0	0	0
28	0	0	0	0	0	3.6	0	0	0	0	0	0
29	0	0	0	0	0	3.4	0	0	0	0	0	0
30	0	0	0	0	0	2.8	0	0	0	0	0	0
31	0	0	0	0	0	2.4	0	0	0	0	0	0
TOTAL	0	0	0	0	0	81.50	30.70	0	0	0	0	0
MEAN	0	0	0	0	0	2.63	1.02	0	0	0	0	0
MAX	0	0	0	0	0	18	3.8	0	0	0	0	0
MIN	0	0	0	0	0	0	0	0	0	0	0	0
AC-FT	0	0	0	0	0	162	61	0	0	0	0	0

CAL YR 1960: TOTAL 8,114.70

MEAN 22.2

MAX 550

MIN 0

AC-FT 16,100

WAT YR 1961: TOTAL 112.20

MEAN .31

MAX 18

MIN 0

AC-FT 223

## RED RIVER OF THE NORTH BASIN

5-1239. Boundary Creek near Landa, N. Dak.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	0	0	0	0	0	0	19	0	0	12	1.0	12
2	0	0	0	0	0	0	15	0	0	8.7	.80	21
3	0	0	0	0	0	0	10	0	0	7.3	.70	24
4	0	0	0	0	0	0	23	0	0	6.8	.70	24
5	0	0	0	0	0	0	25	0	0	6.5	.60	22
6	0	0	0	0	0	0	20	0	0	7.0	.40	19
7	0	0	0	0	0	0	14	0	0	6.5	.30	16
8	0	0	0	0	0	0	7.9	0	0	6.8	.20	14
9	0	0	0	0	0	0	6.5	0	0	12	.10	11
10	0	0	0	0	0	0	5.3	0	0		0	9.0
11	0	0	0	0	0	0	5.0	0	0	11	.10	7.6
12	0	0	0	0	0	0	3.9	0	0	8.7	0	6.3
13	0	0	0	0	0	0	3.0	0	0	8.7	0	5.0
14	0	0	0	0	0	0	2.5	0	0	9.3	0	3.9
15	0	0	0	0	0	0	2.2	0	0	7.9	0	3.3
16	0	0	0	0	0	0	2.0	0	0	6.8	0	2.7
17	0	0	0	0	0	0	2.0	0	0	5.7	0	2.5
18	0	0	0	0	0	0	2.0	0	0	5.7	0	2.1
19	0	0	0	0	0	0	1.6	0	0	5.5	0	1.8
20	0	0	0	0	0	0	1.3	0	22	5.0	0	1.6
21	0	0	0	0	0	0	.90	0	41	4.6	0	1.4
22	0	0	0	0	0	0	.80	0	42	3.9	0	1.3
23	0	0	0	0	0	0	.70	0	38	3.9	1.8	1.2
24	0	0	0	0	0	0	.60	0	31	3.9	.80	1.1
25	0	0	0	0	0	1.9	.50	0	25	3.5	.10	1.0
26	0	0	0	0	0	1.3	.40	0	20	3.1	0	1.0
27	0	0	0	0	0	3.3	.20	0	16	2.4	2.6	1.0
28	0	0	0	0	0	6.3	.10	0	12	1.9	19	.90
29	0	0	0	0	0	3.1	.10	0	11	1.6	16	.80
30	0	0	0	0	-----	2.1	0	-----	9.7	1.3	11	.80
31	0	-----	0	0	-----	15	-----	0	-----	1.2	7.6	-----
TOTAL	0	0	0	0	0	33.0	175.50	0	267.7	193.2	63.80	219.30
MEAN	0	0	0	0	0	1.06	5.85	0	8.92	6.23	2.06	7.31
MAX	0	0	0	0	0	15	25	0	42	14	19	24
MIN	0	0	0	0	0	0	0	0	0	1.2	0	.80
AC-FT	0	0	0	0	0	65	348	0	531	383	127	435
CAL YR 1961:	TOTAL	112.20		MEAN	.31		MIN	0				
WAT YR 1962:	TOTAL	952.50		MEAN	2.61		MAX	42		AC-FT 223		
									AC-FT	1,890		

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	.70	1.0	0	0	0	0	25	11	3.0	12	.30	0
2	.70	.80	0	0	0	0	16	10	3.9	11	.20	0
3	.60	.70	0	0	0	0	10	6.5	5.3	9.0	.10	0
4	.60	.60	0	0	0	0	12	5.0	7.6	7.6	.10	0
5	.60	.50	0	0	0	0	13	3.9	9.7	6.5	.10	0
6	.50	.50	0	0	0	0	12	2.8	25	4.8	.10	0
7	.50	.40	0	0	0	0	14	2.4	96	5.5	.20	0
8	.40	.30	0	0	0	0	14	2.7	115	3.7	.10	0
9	.40	.20	0	0	0	0	15	2.7	102	1.9	.10	0
10	.40	.20	0	0	0	0	13	2.5	85	1.4	.10	0
11	.30	.10	0	0	0	0	12	2.5	73	1.3	.10	0
12	.30	.10	0	0	0	0	10	3.0	68	1.1	.10	0
13	.30	.10	0	0	0	0	8.7	4.5	57	1.3	0	0
14	.30	.10	0	0	0	0	7.3	5.3	49	1.0	0	0
15	.50	.10	0	0	0	0	6.8	11	42	.80	0	0
16	1.0	0	0	0	0	0	7.0	14	37	.50	0	0
17	1.5	0	0	0	0	0	9.1	11	34	.30	0	0
18	1.6	0	0	0	0	0	7.9	9.3	31	.20	0	0
19	1.2	0	0	0	0	0	12	6.0	28	.10	0	0
20	1.0	0	0	0	0	0	11	5.0	25	.10	0	0
21	.90	0	0	0	0	0	8.4	5.3	22	.10	0	0
22	.80	0	0	0	0	0	8.1	6.0	19	0	0	0
23	.80	0	0	0	0	0	10	6.5	17	0	0	0
24	.70	0	0	0	0	0	12	7.0	15	0	0	0
25	.70	0	0	0	0	8.0	13	6.0	14	12	0	0
26	1.0	0	0	0	0	20	11	5.0	14	26	0	0
27	1.2	0	0	0	0	40	11	4.0	13	7.0	0	0
28	1.1	0	0	0	0	50	10	3.1	13	3.3	0	0
29	1.0	0	0	0	0	40	10	3.0	15	1.1	0	0
30	1.0	0	0	0	0	46	10	2.8	14	.70	0	0
31	1.0	0	0	0	0	34	10	2.7	0	.50	0	0
TOTAL	23.60	5.70	0	0	0	246.0	338.3	172.4	1,052.5	120.80	1.60	0
MAX	.76	.19	0	0	0	7.94	11.3	5.56	35.1	3.90	.052	0
MEAN	1.6	1.0	0	0	0	50	25	14	115	26	.30	0
MIN	.30	0	0	0	0	0	6.8	2.4	3.0	0	0	0
AC-FT	47	11	0	0	0	488	671	342	2,090	240	3.2	0
CAL YR 1962:	TOTAL	981.80	MEAN	2.69	MAX	42	MIN	0	AC-FT	1,950		
WAT YR 1963:	TOTAL	1,960.90	MEAN	5.37	MAX	115	MIN	0	AC-FT	3,890		

5-1239. Boundary Creek near Landa, N. Dak.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	0	0	0	0	0	0	15	2.4	1.9	.50	0	0
2	0	0	0	0	0	0	35	2.2	1.6	.60	0	0
3	0	0	0	0	0	0	168	6.5	1.3	.50	0	0
4	0	0	0	0	0	0	124	26	.90	.60	0	0
5	0	0	0	0	0	0	100	12	.90	1.7	0	0
6	0	0	0	0	0	0	85	25	.70	1.4	0	0
7	0	0	0	0	0	0	60	56	.60	.90	0	0
8	0	0	0	0	0	0	85	76	.70	.60	0	0
9	0	0	0	0	0	0	93	93	.80	.60	0	0
10	0	0	0	0	0	0	73	98	.80	.30	0	0
11	0	0	0	0	0	0	61	79	.60	.20	0	0
12	0	0	0	0	0	0	51	62	.60	.20	0	0
13	0	0	0	0	0	0	5.0	4.2	.60	.10	0	0
14	0	0	0	0	0	0	5.0	33	.50	.10	0	0
15	0	0	0	0	0	0	3.0	30	.40	0	0	0
16	0	0	0	0	0	0	2.0	26	.30	0	0	0
17	0	0	0	0	0	0	1.5	23	.20	0	0	0
18	0	0	0	0	0	0	1.0	20	.80	0	0	0
19	0	0	0	0	0	0	.50	17	1.8	0	0	0
20	0	0	0	0	0	0	.50	15	12	2.6	0	0
21	0	0	0	0	0	0	.50	12	10	2.3	0	0
22	0	0	0	0	0	0	.10	9.9	8.9	1.7	0	0
23	0	0	0	0	0	0	0	8.4	7.9	1.3	0	0
24	0	0	0	0	0	0	0	7.0	7.0	1.0	0	0
25	0	0	0	0	0	0	0	5.4	6.0	.80	0	0
26	0	0	0	0	0	0	0	4.8	5.0	.60	0	0
27	0	0	0	0	0	0	0	4.2	4.6	.50	0	0
28	0	0	0	0	0	0	0	3.6	3.8	.30	0	0
29	0	0	0	0	0	0	0	2.8	3.2	.40	0	0
30	0	0	0	0	0	0	.10	2.4	2.8	.20	0	0
31	0	0	0	0	0	0	.50	2.4	2.4	0	0	0
TOTAL	0	0	0	0	0	20.30	1,216.5	804.7	28.00	8.10	0	0
MEAN	0	0	0	0	0	.65	40.6	26.0	.93	.26	0	0
MAX	0	0	0	0	0	5.0	168	98	2.6	1.7	0	0
MIN	0	0	0	0	0	0	2.4	2.2	.20	0	0	0
AC-FT	0	0	0	0	0	40	2,410	1,600	56	16	0	0
CAL YR 1963: TOTAL	1,931.60					MEAN 5.29	MAX 115	MIN 0	AC-FT 3,830			
WAT YR 1964: TOTAL	2,077.60					MEAN 5.68	MAX 168	MIN 0	AC-FT 4,120			

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	0	0	0	0	0	0	0	9.4	13	7.0	59	20
2	0	0	0	0	0	0	0	8.1	13	7.0	50	13
3	0	0	0	0	0	0	0	6.7	13	7.4	45	9.9
4	0	0	0	0	0	0	0	6.3	13	6.3	41	10
5	0	0	0	0	0	0	.50	9.1	12	5.6	35	9.4
6	0	0	0	0	0	0	1.5	12	12	5.2	40	8.1
7	0	0	0	0	0	0	2.0	12	10	4.6	67	6.7
8	0	0	0	0	0	0	2.0	16	9.4	3.8	46	6.0
9	0	0	0	0	0	0	5.0	24	8.1	3.1	53	5.8
10	0	0	0	0	0	0	6.0	20	7.2	2.9	45	5.6
11	0	0	0	0	0	0	70	15	6.3	2.8	35	5.6
12	0	0	0	0	0	0	86	12	5.6	2.9	27	5.8
13	0	0	0	0	0	0	118	10	5.0	2.9	20	6.0
14	0	0	0	0	0	0	94	9.4	6.0	2.0	16	6.3
15	0	0	0	0	0	0	65	8.6	6.3	1.1	13	6.0
16	0	0	0	0	0	0	60	7.9	5.4	.60	11	6.3
17	0	0	0	0	0	0	66	7.4	5.2	.30	10	6.0
18	0	0	0	0	0	0	65	7.0	7.4	.10	8.9	6.0
19	0	0	0	0	0	0	59	6.7	12	.10	7.9	6.3
20	0	0	0	0	0	0	52	6.3	13	17	7.2	6.5
21	0	0	0	0	0	0	42	6.3	10	5.6	6.5	7.9
22	0	0	0	0	0	0	34	6.5	7.9	2.3	5.6	9.1
23	0	0	0	0	0	0	29	7.0	6.5	.70	4.8	7.6
24	0	0	0	0	0	0	26	7.9	5.6	.30	4.8	7.9
25	0	0	0	0	0	0	23	7.9	5.0	.10	4.2	7.9
26	0	0	0	0	0	0	20	7.9	5.4	25	3.6	7.6
27	0	0	0	0	0	0	17	7.6	5.8	76	2.9	8.1
28	0	0	0	0	0	0	15	7.0	5.8	89	2.6	8.4
29	0	0	0	0	0	0	12	12	5.4	82	1.9	8.4
30	0	0	0	0	0	0	11	17	5.2	77	1.9	8.6
31	0	0	0	0	0	0	0	16	0	69	16	0
TOTAL	0	0	0	0	0	0	981.00	317.0	245.5	509.70	691.8	236.8
MEAN	0	0	0	0	0	0	32.7	10.2	8.18	16.4	22.3	7.89
MAX	0	0	0	0	0	0	118	24	13	89	67	20
MIN	0	0	0	0	0	0	0	6.3	5.0	.10	1.9	5.6
AC-FT	0	0	0	0	0	0	1,950	629	487	1,010	1,370	470
CAL YR 1964: TOTAL	2,077.60					MEAN 5.68	MAX 168	MIN 0	AC-FT 4,120			
WAT YR 1965: TOTAL	2,981.80					MEAN 8.17	MAX 118	MIN 0	AC-FT 5,910			

## RED RIVER OF THE NORTH BASIN

5-1240. Souris (Mouse) River near Westhope, N. Dak.

(International gaging station)

Location.--Lat 48°59'47", long 100°57'29", in SW 1/4 sec.30, T.164 N., R.79 W., on left bank 1,200 ft upstream from second crossing of international boundary, 1 mile downstream from Fish and Wildlife Service Dam 357, 7 miles northeast of Westhope, 11 miles downstream from Boundary Creek, and at mile 358.2 downstream from international boundary.

Drainage area.--17,600 sq mi, approximately, of which about 10,700 sq mi is probably noncontributing.

Records available.--July to October 1929, April 1930 to September 1965. Monthly discharge only for some periods, published in WSP 1308.

Gage.--Water-stage recorder and concrete control. Datum of gage is 1,402.52 ft above mean sea level, datum of 1929. Prior to Mar. 28, 1938, chain gage at site 6.3 miles upstream at datum 2.52 ft higher.

Average discharge.--35 years (1930-65), 165 cfs, unadjusted (119,500 acre-ft per year); median of yearly mean discharges, 70 cfs (50,700 acre-ft per year).

Extremes.--Maximum and minimum discharges for the water years 1961-65 are contained in the following table:

Water year	Maximum			Minimum		
	Date	Discharge (cfs)	Gage height (feet)	Date	Discharge (cfs)	Gage height (feet)
1961	Oct. 1, 1960	30	5.86	At times	0	-
1962	Aug. 7, 1962	208	6.41	do.	0	-
1963	June 24, 1963	800	a 7.66	do.	0	-
1964	May 16, 17, 1964	518	7.05	do.	0	-
1965	June 26, 1965	864	8.11	do.	0	-

a Backwater from vegetation.

1929-65: Maximum discharge, 6,400 cfs Apr. 18, 1949; maximum gage height, 16.9 ft Apr. 20, 1949 (from floodmark); maximum daily reverse flow, 35 cfs Apr. 8, 1943, caused by backwater from downstream tributary inflow; no flow at times in some years.

Remarks.--Records good except those for winter periods, which are fair. Flow regulated by dams on Souris River and tributaries (combined capacity, about 321,000 acre-ft). Diversion at Eaton Dam for irrigation of about 7,600 acres, and other small diversions for irrigation and municipal supply above station. Records of chemical analyses and of water temperatures for the water years 1961-64 are published in reports of the Geological Survey.

Cooperation.--This station is maintained by the United States under agreement with Canada.

Revisions (water years).--WSP 1338: 1932.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	29	12	3.2	0	0	2.9	9.7	1.8	25	22	18	11
2	29	9.7	3.1	0	0	3.0	9.7	1.8	26	22	16	7.2
3	29	9.1	3.0	0	0	3.1	9.5	1.8	20	22	15	4.3
4	28	8.0	2.9	0	0	3.1	9.7	2.2	19	22	13	3.2
5	27	6.8	3.0	0	0	3.1	9.5	4.6	19	22	12	2.8
6	27	6.3	3.0	0	0	3.1	9.2	6.0	19	22	11	8.4
7	27	5.2	3.1	0	0	3.1	8.9	6.0	18	22	11	11
8	26	4.8	3.2	0	.10	3.2	8.9	7.0	16	22	10	12
9	25	5.5	3.0	0	.10	3.1	8.9	7.4	16	21	10	17
10	26	5.7	2.9	0	.10	3.1	7.9	6.0	16	20	9.7	11
11	26	5.2	3.0	0	.20	3.2	7.2	4.6	15	20	11	15
12	27	4.6	3.2	0	.30	3.2	6.8	4.2	17	19	11	17
13	26	4.3	2.9	.10	.50	3.1	5.8	6.8	21	19	10	15
14	26	4.3	2.7	.20	.20	2.9	4.9	12	18	19	9.7	13
15	27	4.3	2.8	.20	.20	3.1	4.9	17	20	18	9.7	12
16	25	4.3	2.9	.20	.20	3.4	4.8	17	19	19	8.9	8.4
17	25	4.0	2.8	.20	.20	3.6	4.8	15	19	19	6.8	5.6
18	23	3.8	2.9	.20	.20	3.6	4.8	15	21	17	7.9	6.0
19	21	3.6	2.9	.10	.20	3.6	3.7	15	24	16	13	7.0
20	21	3.6	2.3	.10	.20	4.1	2.5	14	23	15	14	7.9
21	21	4.2	2.0	.10	.30	4.2	2.0	15	22	15	13	7.9
22	21	3.9	2.0	.10	.60	5.9	1.6	14	20	17	12	7.2
23	21	4.6	1.5	.10	1.0	13	1.5	14	21	17	11	12
24	21	3.9	.70	.10	1.2	13	1.5	13	23	18	8.1	13
25	19	3.8	.10	.20	1.4	11	1.6	13	24	19	7.4	11
26	19	3.8	0	.20	1.8	9.7	1.6	13	24	19	8.1	9.5
27	19	3.5	0	0	2.4	9.2	1.5	14	24	19	8.9	8.6
28	18	3.5	0	0	2.8	9.5	2.5	15	24	19	8.9	9.2
29	18	3.5	0	0	-----	9.7	1.8	15	24	18	8.6	7.7
30	17	3.4	0	0	-----	9.5	1.6	14	23	18	8.4	11
31	17	-----	0	0	-----	9.5	-----	15	-----	18	9.5	-----
TOTAL	731	153.2	65.10	2.10	14.20	168.8	159.3	320.2	620	595	331.6	291.9
MAX	23.6	5.11	2.10	.068	.51	5.45	5.31	10.3	20.7	19.2	10.7	9.73
MIN	29	12	3.2	.20	2.8	13	9.7	17	26	22	18	17
MIN	17	3.4	0	0	0	2.9	1.5	1.8	15	15	6.8	2.8
AC-FT	1,450	304	129	4.2	28	335	316	635	1,230	1,180	658	579
CAL YR 1960: TOTAL	94,689.00			MEAN 259		MAX 2,040	MIN 0		AC-FT 187,800			
MAT YR 1961: TOTAL	3,452.40			MEAN 9.46		MAX 29	MIN 0		AC-FT 6,850			

## 5-1240. Souris (Mouse) River near Westhope, N. Dak.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	13	9.1	2.7	0	0	0	.50	1.2	3.3	6.1	5.7	7.5
2	14	6.1	2.7	0	0	0	3.0	1.3	3.2	5.7	5.9	7.0
3	12	9.1	2.7	0	0	0	3.1	1.2	3.1	5.5	5.7	6.8
4	12	4.6	2.7	0	0	0	2.9	1.2	3.0	6.1	5.9	7.0
5	12	3.5	2.6	0	0	0	2.7	1.1	3.0	6.3	6.3	6.8
6	10	3.1	2.5	0	0	0	3.1	2.1	3.5	7.0	6.3	7.3
7	8.8	2.7	2.4	0	0	0	3.6	9.1	4.0	6.1	16	6.8
8	8.8	2.5	2.3	0	0	0	3.0	9.7	4.3	5.9	12	6.3
9	8.3	2.1	2.2	0	0	0	1.9	8.8	4.3	5.9	11	6.3
10	5.9	2.1	2.0	0	0	0	1.9	7.5	4.3	5.7	10	6.8
11	8.3	2.7	1.8	0	0	0	1.9	7.8	4.8	6.1	8.3	7.3
12	17	2.9	1.7	0	0	0	1.9	7.3	4.8	6.6	12	7.3
13	16	3.0	1.6	0	0	0	1.9	6.6	4.0	6.8	25	7.0
14	13	2.9	.70	0	0	0	1.9	7.3	4.8	7.0	22	8.0
15	13	2.9	.20	0	0	0	1.9	6.6	9.7	7.0	15	18
16	12	3.0	.10	0	0	0	2.0	6.6	6.6	7.0	12	15
17	11	3.0	.10	0	0	0	2.0	7.0	5.5	6.6	11	15
18	11	2.9	.10	0	0	0	1.9	6.6	5.3	6.3	11	15
19	8.8	2.9	.10	0	0	0	1.9	5.7	5.2	6.3	10	15
20	7.7	2.8	.10	0	0	0	1.7	5.2	5.5	6.3	10	15
21	13	2.9	.10	0	0	0	1.2	4.5	5.3	6.6	9.7	14
22	12	2.9	.10	0	0	0	1.3	5.2	5.3	7.0	8.8	13
23	7.3	2.8	.10	0	0	0	1.3	5.0	5.7	7.3	10	13
24	8.5	2.7	.10	0	0	0	1.4	4.2	5.5	7.0	9.1	13
25	11	2.7	.10	0	0	0	1.3	3.8	5.7	7.0	9.4	13
26	18	2.6	.10	0	0	0	1.6	3.3	5.3	7.3	10	13
27	14	2.7	.10	0	0	0	1.6	3.0	4.5	7.0	10	13
28	11	2.7	.10	0	0	0	1.3	2.9	4.6	7.3	9.4	11
29	9.4	2.8	0	0	-----	0	1.3	4.0	4.8	7.0	8.5	9.1
30	7.8	2.8	0	0	-----	0	1.3	3.9	5.3	6.6	8.3	8.5
31	9.1	-----	0	0	-----	0	-----	3.2	-----	5.9	7.8	-----
TOTAL	343.7	101.5	32.10	0	0	0	58.30	152.9	144.2	202.3	322.1	311.8
MEAN	11.1	3.38	1.04	0	0	0	1.94	4.93	4.81	6.53	10.4	10.4
MAX	18	9.1	2.7	0	0	0	3.6	9.7	9.7	7.3	25	18
MIN	5.9	2.1	0	0	0	0	.50	1.1	3.0	5.5	5.7	6.3
AC-FT	682	201	64	0	0	0	116	303	286	401	639	618

CAL YR 1961: TOTAL 2,980.40

MEAN 8.17

MAX 26

MIN 0

AC-FT 5,910

WAT YR 1962: TOTAL 1,668.90

MEAN 4.57

MAX 25

MIN 0

AC-FT 3,310

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	8.5	1.2							1.2	316	26	19
2	11	1.1							1.2	214	22	18
3	11	1.0				.10			1.8	51	20	16
4	10	.90							3.6	25	20	18
5	6.1	.90							2.3	25	20	30
6	2.7	.80				0			3.0	25	21	28
7	1.8	.80				0			1.6	25	22	28
8	3.6	.70				0			1.2	25	22	28
9	20	.50				0			.70	26	22	28
10	24	.40				0			.30	27	25	28
11	25	.20				0			.10	26	23	28
12	24	.10				0				26	23	26
13	23					0				25	22	22
14	23					0				25	22	20
15	25					0			.10	26	21	18
16	28		.10		.10	0				28	22	19
17	30					0			62	24	21	20
18	28					0			316	23	21	19
19	27					0			316	25	21	20
20	25					.50			332	25	22	19
21	25	.10				1.8			357	28	23	20
22	24					1.5			450	25	23	20
23	23					1.0		.20	550	24	22	17
24	20					.80		.30	445	27	22	16
25	18					.60		.90	386	30	23	16
26	16					.40		1.2	330	35	22	15
27	14					.40		1.9	290	32	20	13
28	13					.30		1.6	332	35	19	13
29	11					.30		1.9	332	35	20	14
30	3.3					.30		1.1	326	31	20	14
31	1.6					.10		.90	-----	26	20	-----
TOTAL	525.6	10.40	3.10	3.10	2.80	8.50	3.00	12.20	4,821.50	1,340	672	610
MEAN	17.0	.35	.10	.10	.10	.27	.10	.39	161	43.2	21.7	20.3
MAX	30	1.2	-	-	-	1.8	-	1.9	530	316	26	30
MIN	1.6	-	-	-	-	0	-	-	-	23	19	13
AC-FT	1,040	21	6.2	6.2	5.6	17	6.0	24	9,560	2,660	1,330	1,210

CAL YR 1962: TOTAL 1,730.70

MEAN 4.74

MAX 30

MIN 0

AC-FT 3,430

WAT YR 1963: TOTAL 8,012.20

MEAN 22.0

MAX 530

MIN 0

AC-FT 15,890

## 5-1240. Souris (Mouse) River near Westhope, N. Dak.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	17	31	0	0	0	0	.60	.10	2.5	125	22	16
2	19	8.6	0	0	0	0	.90	.10	16	125	21	16
3	19	2.6	0	0	0	0	.90	.10	20	129	20	16
4	18	1.0	0	0	0	0	.80	.20	31	136	21	16
5	17	.20	0	0	0	0	.80	.90	31	132	20	15
6	19	0	0	0	0	0	.70	9.8	26	129	20	15
7	20	0	0	0	0	0	.70	68	25	125	20	15
8	24	0	0	0	0	0	.70	50	22	155	20	15
9	25	0	0	0	0	0	.60	64	20	199	17	15
10	24	0	0	0	0	0	.60	249	21	204	16	19
11	22	0	0	0	0	0	.70	292	22	204	16	58
12	22	0	0	0	0	.10	.80	321	22	208	16	140
13	24	0	0	0	0	.10	.80	384	21	208	16	140
14	24	0	0	0	0	.10	.30	492	21	208	17	143
15	24	0	0	0	0	0	.20	507	21	191	16	143
16	25	0	0	0	0	0	.10	518	21	125	16	143
17	27	0	0	0	0	0	.10	518	23	122	16	143
18	27	0	0	0	0	0	.10	455	22	118	16	143
19	25	0	0	0	0	0	.10	235	25	125	16	140
20	25	0	0	0	0	0	.10	132	24	84	16	143
21	26	0	0	0	0	.50	.10	82	24	28	16	140
22	25	0	0	0	0	1.0	.10	6.1	24	23	14	140
23	25	0	0	0	0	.90	.10	2.0	23	20	14	140
24	25	0	0	0	0	.60	.10	1.4	65	17	14	147
25	25	0	0	0	0	.40	.10	2.3	122	17	14	147
26	24	0	0	0	0	.20	.10	.90	122	18	16	140
27	24	0	0	0	0	0	.10	.50	129	16	16	140
28	24	0	0	0	0	0	.10	.60	125	17	16	151
29	25	0	0	0	0	0	.10	.80	125	18	16	159
30	25	0	0	0	0	0	.10	.60	125	20	17	170
31	21	-----	0	0	-----	0	-----	.50	-----	23	17	-----
TOTAL	716	43.40	0	0	0	3.80	11.60	4,393.90	1,320.5	3,269	528	2,983
MEAN	23.1	1.45	0	0	0	.12	.39	142	44.0	105	17.0	99.4
MAX	27	31	0	0	0	1.0	.90	518	129	208	22	170
MIN	17	0	0	0	0	0	.10	.10	2.5	16	14	15
AC-FT	1,420	86	0	0	0	7.5	23	8,720	2,620	6,480	1,050	5,920
CAL YR 1963: TOTAL	8,232.50		MEAN 22.6		MAX 530	MIN 0		AC-FT 16,330				
WAT YR 1964: TOTAL	13,269.20		MEAN 36.3		MAX 518	MIN 0		AC-FT 26,320				

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	159	1.6					.10	240	143	370	204	263
2	162	.90					.10	230	143	115	208	263
3	151	.40					.10	215	174	115	208	263
4	151	.30					.10	152	308	115	235	253
5	151	.20					.10	244	560	115	301	263
6	155	.10		.10		.10	.10	272	586	112	301	268
7	147	.10					.10	337	605	92	301	268
8	147	.10					.10	367	611	95	306	268
9	147	.10					.10	367	614	92	306	258
10	147	.10					.20	378	630	92	311	263
11	143	.10		0		.20	.20	378	639	95	306	268
12	143	.10		0		.20	.40	444	605	92	306	268
13	143	.10		0		.20	.50	570	596	120	252	263
14	111	.10		0		.20	.60	599	608	191	178	268
15	73	.20	.10	0	.10	.20	.80	621	633	191	183	268
16	61	.20		0		.10	1.0	614	685	191	183	263
17	29	.20		0		.10	1.2	608	698	191	178	268
18	28	.20				.10	1.5	602	705	195	178	277
19	28	.10				.10	1.8	602	714	204	174	277
20	26	.10				.10	2.2	592	721	208	174	277
21	27	.10				.10	2.5	563	733	204	174	277
22	27	.10				.10	2.4	434	766	199	174	277
23	26	.10				.10	2.4	609	785	199	174	277
24	26	.10		.10		.10	2.0	308	802	191	174	277
25	26	.10				.10	1.8	143	816	195	170	277
26	26	.10				.10	3.7	132	826	195	200	270
27	26	.10				.10	84	132	850	199	263	277
28	26	.10				.10	90	143	850	199	277	277
29	26	.10				.10	92	143	740	204	272	277
30	22	.10				.10	156	143	500	195	268	277
31	5.0	-----				.10	-----	147	-----	199	263	-----
TOTAL	2,565.0	6.30	3.10	2.40	2.80	3.60	448.10	11,129	18,646	5,170	7,202	8,034
MEAN	82.7	.21	.10	.077	.10	.12	14.9	359	622	167	232	268
MAX	162	1.6	-	-	-	.20	156	621	850	370	311	277
MIN	5.0	.10	-	0	-	-	.10	132	143	92	170	253
AC-FT	5,090	13	6.2	4.8	5.6	7.1	889	22,070	36,980	10,250	14,280	15,940
CAL YR 1964: TOTAL	15,084.20		MEAN 41.2		MAX 518	MIN 0		AC-FT 29,920				
WAT YR 1965: TOTAL	53,212.30		MEAN 146		MAX 850	MIN 0		AC-FT 105,500				

5-1245. Isabella River near Isabella, Minn.

Location.--Lat 47°48'00", long 91°31'15", in NW 1/4 sec. 6, T. 61 N., R. 9 W., on left bank 200 ft upstream from Bald Eagle Lake, half a mile upstream from Snake River, and 14½ miles northwest of Isabella.

Drainage area.--341 sq mi.

Records available.--October 1952 to September 1961 (discontinued).

Gage.--Water-stage recorder. Datum of gage is 1,453.10 ft above mean sea level, datum of 1929.

Average discharge.--9 years, 280 cfs.

Extremes.--Maximum discharge during water year 1961, 1,370 cfs Apr. 25 (gage height, 7.03 ft, from floodmark); minimum, 24 cfs Aug. 21, 22; minimum gage height, 2.86 ft Aug. 22.  
1952-61: Maximum discharge, 3,550 cfs May 4, 1954 (gage height, 9.31 ft); minimum, 24 cfs Aug. 21, 22, 1961; minimum gage height, 2.86 ft Aug. 22, 1961.

Remarks.--Records good except those for winter periods, which are poor.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	46	71	83	64	38	43	468	750	523	88	49	59
2	46	86	85	62	37	43	454	706	632	80	48	62
3	46	96	90	61	37	43	443	670	702	77	47	63
4	46	110	95	60	37	43	450	632	738	76	45	59
5	47	127	105	60	36	43	485	600	726	72	44	57
6	46	133	113	59	36	43	520	572	688	69	42	66
7	45	126	125	60	36	43	530	572	636	66	41	79
8	45	124	133	62	36	43	530	590	583	64	39	77
9	45	114	138	63	36	43	580	618	534	60	38	75
10	45	102	140	64	37	43	625	642	492	57	37	118
11	45	100	140	63	37	43	636	642	457	56	36	366
12	45	96	140	63	37	43	653	625	432	56	35	520
13	47	93	140	62	38	42	678	628	412	55	33	639
14	52	91	140	62	39	42	692	674	376	56	32	730
15	51	91	140	60	40	42	723	830	345	59	30	806
16	50	101	138	60	40	43	762	994	314	61	29	802
17	48	102	135	59	41	43	792	1,100	283	60	27	754
18	47	110	130	59	41	42	797	1,150	254	58	27	716
19	47	118	122	58	41	42	835	1,090	225	59	26	597
20	47	122	115	57	41	42	910	982	202	60	25	516
21	45	127	110	55	42	43	1,020	870	186	59	24	464
22	49	122	105	54	42	44	1,130	779	168	56	27	422
23	50	114	97	53	42	45	1,230	720	151	55	43	380
24	50	118	91	52	42	47	1,330	670	142	60	45	342
25	49	110	87	50	42	53	1,360	632	129	64	43	307
26	50	107	82	48	42	80	1,300	600	120	61	42	276
27	50	98	76	47	43	263	1,180	569	112	59	41	254
28	50	87	72	45	43	471	1,030	541	108	56	43	228
29	50	83	68	44	-----	450	895	506	100	55	47	219
30	52	83	66	42	-----	454	815	478	95	52	50	213
31	57	-----	65	40	-----	474	-----	454	-----	51	57	-----
TOTAL	1,488	3,160	3,366	1,748	1,099	3,278	23,853	21,886	10,865	1,917	1,192	10,266
MEAN	48.0	105	109	56.4	39.3	106	795	706	362	61.8	38.5	342
MAX	57	133	140	64	43	474	1,360	1,150	738	88	57	806
MIN	45	71	65	40	36	42	443	454	95	51	24	57
CFSM	.14	.31	.32	.17	.12	.31	2.33	2.07	1.06	.18	.11	1.00
IN.	.16	.34	.37	.19	.12	.36	2.60	2.39	1.18	.21	.13	1.12
CAL YR 1960: TOTAL	92,484			MEAN 253		MAX 2,160	MIN 43	CFSM .74	IN 10.09			
WAT YR 1961: TOTAL	84,118			MEAN 230		MAX 1,360	MIN 24	CFSM .68	IN 9.17			

5-1250. South Kawishiwi River near Ely, Minn.

Location.--Lat 47°50'24", long 91°41'43", in NE 1/4 sec. 23, T.62 N., R.11 W., on left bank 5 miles upstream from Birch Lake and 9 miles southeast of Ely.

Records available.--October 1951 to September 1961 (discontinued).

Gage.--Water-stage recorder. Altitude of gage is 1,430 ft (from topographic map prepared by Minnesota Power & Light Co.).

Average discharge.--10 years, 437 cfs.

Extremes.--Maximum discharge during water year 1961, 1,740 cfs Apr. 27 (gage height, 4.99 ft); minimum, 25 cfs Oct. 12 (gage height, 1.42 ft).

1951-61: Maximum discharge, 5,130 cfs May 4, 1954 (gage height, 7.25 ft); minimum, 25 cfs Oct. 12, 1960.

Remarks.--Records good except those for winter periods, which are fair. Records of chemical analyses for the water year 1961 are published in reports of the Geological Survey.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	39	56	111	80	52	58	117	1,400	795	255	118	58
2	38	60	111	79	51	58	120	1,310	795	245	122	68
3	36	60	110	77	51	58	122	1,240	802	232	120	64
4	35	60	109	76	50	58	127	1,180	838	222	115	58
5	34	62	110	74	50	59	133	1,130	882	212	113	58
6	32	64	111	73	50	59	141	1,100	921	210	107	60
7	31	65	111	72	50	59	145	1,070	929	203	100	59
8	30	73	112	72	50	59	145	1,040	905	199	99	59
9	28	76	113	71	51	59	145	1,000	875	190	94	60
10	27	80	113	71	51	60	145	994	830	187	94	100
11	27	87	114	72	52	60	147	1,000	788	183	90	170
12	28	93	116	73	53	60	153	1,010	740	179	87	192
13	39	97	118	74	55	60	155	1,040	702	181	83	217
14	40	103	119	74	56	60	159	1,100	653	183	80	276
15	40	108	119	75	57	59	174	1,300	618	174	78	350
16	40	111	118	76	57	59	194	1,410	575	166	75	448
17	39	113	117	76	58	59	203	1,540	555	162	71	591
18	36	115	114	76	58	59	220	1,620	535	157	74	721
19	36	117	110	75	57	60	268	1,680	510	155	70	781
20	34	117	106	74	57	62	337	1,670	490	155	68	760
21	33	117	104	73	57	62	728	1,610	476	151	64	721
22	34	118	100	71	57	63	728	1,530	462	143	63	665
23	36	118	97	69	57	64	882	1,430	448	141	64	608
24	36	120	94	67	57	68	1,230	1,300	444	151	60	560
25	36	120	92	64	58	73	1,530	1,210	423	145	58	525
26	39	122	91	61	58	89	1,700	1,120	402	137	57	490
27	40	122	89	59	58	100	1,730	1,040	354	135	53	462
28	40	118	87	57	58	106	1,690	977	298	131	54	435
29	41	116	85	55	-----	110	1,600	913	276	129	56	423
30	45	112	83	53	-----	113	1,510	845	263	127	58	419
31	48	-----	81	52	-----	115	-----	795	-----	122	57	-----
TOTAL	1,117	2,900	3,265	2,171	1,526	2,148	16,678	37,604	18,584	5,362	2,502	10,458
MEAN	36.0	96.7	105	70.0	54.5	69.3	556	1,213	619	173	80.7	349
MAX	48	122	119	80	58	115	1,730	1,680	929	255	122	781
MIN	27	56	81	52	50	58	117	795	263	122	53	58
CFSM	-	-	-	-	-	-	-	-	-	-	-	-
IN	-	-	-	-	-	-	-	-	-	-	-	-
CAL YR 1960: TOTAL	134,798			MEAN 368		MAX 2,660	MIN 27	CFSM -		IN -		
WAT YR 1961: TOTAL	104,315			MEAN 286		MAX 1,730	MIN 27	CFSM -		IN -		



## 5-1255. Stony River near Isabella, Minn.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	78	75	57	23	18	16	23	462	569	168	157	62
2	70	83	55	23	18	16	23	506	518	160	143	57
3	70	93	53	23	18	15	23	518	484	150	136	57
4	66	102	53	23	18	16	24	512	466	143	136	57
5	64	114	51	23	18	16	26	490	420	140	136	55
6	60	133	51	23	20	15	32	457	385	129	157	51
7	60	140	49	23	20	15	34	425	360	150	179	51
8	60	136	49	23	20	15	35	400	325	202	219	51
9	57	133	47	23	18	15	37	375	300	240	249	53
10	55	126	46	23	16	15	35	350	276	290	262	57
11	60	120	46	23	16	15	35	325	262	325	262	64
12	66	120	44	23	16	15	35	335	262	340	262	68
13	71	114	42	22	18	15	35	345	258	340	249	75
14	75	111	42	22	18	15	34	370	254	320	240	83
15	80	108	40	22	18	15	32	410	240	290	236	93
16	80	105	39	23	18	15	32	446	232	258	223	96
17	83	96	37	24	18	15	32	479	223	232	202	96
18	83	93	37	23	18	15	35	518	215	206	187	93
19	80	91	35	22	18	15	39	557	206	183	175	88
20	78	86	35	22	18	14	40	593	194	175	153	83
21	73	83	34	21	16	14	44	617	187	168	143	78
22	70	80	34	21	16	14	49	653	183	164	126	75
23	68	78	32	21	16	14	55	684	183	150	114	73
24	68	73	30	20	16	14	66	710	190	153	108	78
25	68	70	30	20	16	15	83	744	194	160	99	80
26	68	68	30	18	16	15	99	772	194	164	88	83
27	68	64	29	18	16	15	143	793	187	168	80	86
28	70	60	27	18	16	16	194	763	179	171	71	91
29	73	60	27	18	-----	18	300	717	187	171	70	93
30	70	57	26	18	-----	22	395	665	175	179	66	96
31	73	-----	24	18	-----	23	-----	623	-----	168	64	-----
TOTAL	2,167	2,872	1,231	667	488	483	2,069	16,616	8,288	6,257	4,996	2,223
MEAN	69.9	95.7	39.7	21.5	17.4	15.6	69.0	536	276	202	161	74.1
MAX	83	140	57	24	20	23	395	793	569	340	262	96
MIN	55	57	24	18	16	14	23	325	175	129	64	51
CFSM	.39	.53	.22	.12	.10	.09	.38	2.98	1.53	1.12	.90	.41
IN.	.45	.59	.25	.14	.10	.10	.43	3.43	1.71	1.29	1.03	.46

CAL YR 1961: TOTAL 29,215.6

MEAN 80.0

MAX 653

MIN 6.4

CFSM .44

IN 6.04

WAT YR 1962: TOTAL 48,357

MEAN 132

MAX 793

MIN 14

CFSM .74

IN 9.99

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	96	40	29	24	10	9.2	55	147	292	139	47	78
2	96	40	30	24	10	9.2	93	163	297	117	45	72
3	96	37	30	23	10	9.2	168	167	286	107	41	67
4	93	39	32	23	10	9.2	262	159	270	94	39	60
5	93	39	32	23	10	9.2	305	151	250	86	35	56
6	91	39	32	23	10	9.2	318	143	240	78	35	51
7	88	42	32	23	10	9.4	324	147	231	70	34	47
8	80	42	35	23	10	9.8	318	143	221	60	34	43
9	75	42	35	23	10	10	302	139	216	56	34	39
10	70	42	34	23	10	11	292	131	216	51	32	37
11	68	40	34	22	10	11	270	131	212	49	30	39
12	64	40	34	21	10	12	250	131	212	63	32	43
13	64	40	30	21	9.9	12	226	139	221	72	32	39
14	68	39	29	20	9.9	11	212	143	240	70	28	35
15	68	39	29	19	9.9	11	198	139	255	67	27	34
16	66	37	29	19	9.8	12	189	147	270	63	34	35
17	64	35	26	18	9.8	13	194	151	270	60	39	34
18	60	35	26	17	9.7	13	180	163	276	58	45	39
19	57	34	26	17	9.7	13	189	171	286	58	60	43
20	53	32	26	16	9.7	13	189	180	276	60	80	39
21	49	32	27	15	9.6	12	184	194	270	63	94	37
22	49	32	27	15	9.6	12	176	202	270	63	111	35
23	47	30	27	14	9.5	12	167	207	270	60	117	34
24	46	30	27	14	9.5	13	159	202	260	58	117	36
25	44	29	26	13	9.4	16	151	198	240	51	117	35
26	42	29	26	12	9.3	18	143	189	226	49	114	34
27	42	29	25	12	9.2	18	139	189	202	51	111	32
28	42	29	25	11	9.1	18	135	198	180	54	107	32
29	42	29	24	11	-----	23	139	207	163	54	97	30
30	42	29	24	11	-----	35	139	236	147	51	92	30
31	40	-----	24	10	-----	40	-----	265	-----	49	83	-----
TOTAL	1,995	1,071	892	560	273.6	433.6	6,066	5,272	7,265	2,081	1,943	1,263
MEAN	64.4	35.7	28.8	18.1	9.77	14.0	202	170	242	67.1	62.7	42.1
MAX	96	42	35	24	10	40	324	265	297	139	117	78
MIN	40	29	24	10	9.1	9.2	55	131	147	49	27	30
CFSM	.36	.20	.16	.10	.05	.08	1.12	.94	1.35	.37	.35	.23
IN.	.41	.22	.18	.12	.06	.09	1.25	1.09	1.90	.43	.40	.26

CAL YR 1962: TOTAL 46,045

MEAN 126

MAX 793

MIN 14

CFSM .70

IN 9.51

WAT YR 1963: TOTAL 29,115.0

MEAN 79.8

MAX 324

MIN 9.1

CFSM .44

IN 6.02

## 5-1255. Stony River near Isabella, Minn.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	28	20	75	30	20	18	13	605	286	885	39	49
2	28	20	75	28	20	18	12	661	250	787	39	60
3	28	20	75	28	20	18	13	703	226	682	35	75
4	27	20	72	28	19	18	13	703	198	577	34	94
5	25	19	72	28	19	18	14	703	176	486	30	114
6	27	20	70	28	19	18	17	724	167	402	27	155
7	25	20	67	27	19	18	18	794	159	342	25	176
8	24	20	67	27	19	18	18	843	159	319	24	194
9	22	20	65	27	19	18	18	878	167	281	22	216
10	24	22	60	27	19	17	18	871	163	245	24	245
11	22	22	58	27	18	17	24	850	163	216	24	260
12	20	24	56	25	18	17	37	801	159	194	24	250
13	19	24	54	24	18	17	54	738	155	171	22	240
14	18	24	54	22	18	17	70	675	143	151	22	221
15	18	20	51	22	17	15	89	612	135	135	20	198
16	18	24	49	20	17	15	124	538	131	124	20	184
17	17	25	47	22	17	15	167	466	131	114	19	171
18	17	22	45	22	17	14	202	415	143	104	18	155
19	17	22	43	22	17	14	226	365	171	94	17	143
20	15	22	43	22	17	17	255	324	212	86	17	135
21	17	24	41	22	17	15	292	302	245	80	17	124
22	20	30	37	22	17	15	318	276	276	72	15	117
23	22	35	35	22	17	14	348	276	408	65	15	128
24	22	39	34	24	17	14	377	270	584	60	15	131
25	24	45	32	25	17	14	396	286	822	58	17	135
26	22	56	32	24	17	14	408	330	1,020	54	17	151
27	22	63	32	24	17	14	415	365	1,129	51	15	171
28	22	70	32	24	17	14	427	383	1,120	49	25	180
29	24	75	32	24	17	13	460	396	1,060	47	32	194
30	22	75	30	20	-----	13	524	365	980	43	35	202
31	22	-----	30	20	-----	13	-----	324	-----	41	41	-----
TOTAL	678	942	1,565	757	520	490	5,367	16,842	11,129	7,014	746	4,868
MEAN	21.9	31.4	50.5	24.4	17.9	15.8	179	543	371	226	24.1	162
MAX	28	75	75	30	20	18	524	878	1,120	885	41	260
MIN	15	19	30	20	17	13	12	270	131	41	15	49
CFSM	.12	.17	.29	.14	.10	.09	.99	3.02	2.06	1.26	.13	.90
IN.	.14	.19	.32	.16	.11	.10	1.11	3.48	2.30	1.45	.15	1.01

CAL YR 1963: TOTAL 28,342.0

MEAN 77.6

MAX 324

MIN 9.1

CFSM .43

IN 5.86

WAT YR 1964: TOTAL 50,918

MEAN 139

MAX 1,120

MIN 12

CFSM .77

IN 10.52

DISCHARGE, IN CUBIC FEET PER SECOND, OCTOBER TO DECEMBER 1964

DAY	OCT.	NOV.	DEC.	DAY	OCT.	NOV.	DEC.	DAY	OCT.	NOV.	DEC.	DAY	OCT.	NOV.	DEC.
1	207	78	45	9	159	65	39	17	104	54	43	25	83	45	41
2	216	75	45	10	151	65	39	18	97	54	43	26	83	47	41
3	216	75	45	11	147	65	41	19	92	49	41	27	83	47	41
4	207	72	43	12	147	65	41	20	92	47	41	28	86	47	41
5	198	70	41	13	139	63	41	21	92	47	41	29	83	47	41
6	189	67	41	14	128	63	41	22	86	45	41	30	80	45	41
7	189	67	39	15	121	58	43	23	86	45	41	31	78		
8	171	65	39	16	114	54	43	24	86	45	41				
TOTAL												4,010	1,731	1,285	
MEAN												129	57.7	41.5	
MAX												216	78	45	
MIN												78	45	39	
CFSM												.72	.32	.23	
IN.												.83	.36	.27	

CAL YR 1964: TOTAL 54,759

MEAN 150

MAX 1,120

MIN 12

CFSM .83

IN 11.31

WAT YR 1965: TOTAL

MEAN

MAX

MIN

CFSM

IN

5-1260. Dunka River near Babbitt, Minn.

Location.--Lat 47°41'55", long 91°52'05", in NW $\frac{1}{4}$ NE $\frac{1}{4}$  sec.9, T.60 N., R.12 W., on left bank 1.8 miles upstream from Birch Lake and  $\frac{2}{3}$  miles northeast of Babbitt.

Drainage area.--53.0 sq mi.

Records available.--October 1951 to September 1962 (discontinued).

Gage.--Water-stage recorder. Datum of gage is 1,488.98 ft above mean sea level, datum of 1929.

Average discharge.--11 years, 37.4 cfs.

Extremes.--Maximum and minimum discharges for the water years 1961-62 are contained in the following table:

Water year	Maximum			Minimum		
	Date	Discharge (cfs)	Gage height (feet)	Date	Discharge (cfs)	Gage height (feet)
1961	Apr. 22, 1961	487	7.33	Aug. 20, 21, 22, 1961	0.60	a 3.64
1962	July 10, 1962	371	6.79	Feb. 8-12, 1962	b 1.6	-

a Occurred Aug. 21, 1961.

b Minimum daily.

1951-62: Maximum discharge, 691 cfs Apr. 16, 1954 (gage height, 7.84 ft); minimum, 0.60 cfs Aug. 20, 21, 22, 1961.

Remarks.--Records good except those for winter periods, which are fair. Records of chemical analyses for the water years 1961-62 are published in reports of the Geological Survey.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	1.5	8.3	4.3	1.8	.70	1.1	26	87	70	3.2	2.2	7.2
2	2.1	13	4.6	1.7	.70	1.2	21	80	116	2.7	3.7	47
3	8.0	12	5.0	1.6	.70	1.2	20	72	126	2.5	6.0	47
4	6.8	10	5.4	1.5	.70	1.3	18	73	108	2.2	7.6	34
5	5.6	9.7	6.1	1.6	.70	1.4	17	57	89	2.0	2.2	27
6	4.9	9.1	6.2	1.7	.70	1.4	16	56	75	1.9	1.7	24
7	4.0	8.5	5.9	1.7	.80	1.4	15	70	60	1.7	4.3	22
8	8.0	7.0	5.4	1.7	.80	1.6	14	78	49	1.6	5.1	24
9	5.1	7.5	5.1	1.7	.80	1.4	14	82	45	1.5	4.4	24
10	4.6	8.0	5.0	1.6	.80	1.4	13	75	40	1.5	5.1	59
11	3.5	8.1	5.0	1.7	.80	1.3	13	66	35	1.5	4.8	166
12	2.5	8.0	5.0	1.7	.80	1.3	12	58	34	1.6	3.5	231
13	3.1	8.1	5.4	1.6	.80	1.3	12	66	36	2.1	1.9	231
14	4.9	8.3	5.6	1.5	.80	1.4	13	85	34	2.6	1.8	223
15	6.4	8.6	5.1	1.6	.80	1.4	14	158	31	3.0	2.6	219
16	9.7	8.4	4.5	1.6	.80	1.4	16	249	25	2.7	1.1	204
17	10	8.1	4.2	1.6	.80	1.5	20	257	22	2.4	1.2	166
18	7.0	8.0	4.0	1.5	.80	1.6	28	228	19	2.3	1.0	132
19	5.5	7.8	3.6	1.5	.80	1.7	52	190	15	3.0	.90	107
20	5.2	7.4	3.3	1.4	.90	1.8	105	154	13	2.3	.70	74
21	5.1	6.8	3.0	1.2	1.1	2.2	281	132	11	2.1	.70	65
22	5.0	6.0	2.4	1.1	1.2	3.0	454	107	8.8	2.1	3.2	61
23	5.0	6.0	2.2	1.0	1.3	4.7	407	88	8.0	2.2	6.0	54
24	4.9	5.6	2.0	1.0	1.5	5.4	315	74	7.2	4.0	6.6	48
25	4.9	5.4	1.8	.90	1.4	6.3	278	69	6.6	4.3	1.4	41
26	4.9	5.3	1.7	.80	1.3	8.4	211	68	6.2	5.3	.90	39
27	5.4	5.0	1.6	.80	1.2	13	177	59	6.0	7.6	.80	35
28	4.9	4.7	1.6	.80	1.2	28	148	50	4.9	6.2	.80	34
29	4.8	4.5	1.6	.80	-----	42	123	44	4.2	5.3	1.3	32
30	5.1	4.4	1.7	.70	-----	38	104	38	3.6	2.7	6.8	29
31	5.6	-----	1.8	.70	-----	30	-----	35	-----	2.4	3.9	-----
TOTAL	164.0	227.6	120.1	42.10	25.70	208.9	2,957	3,005	1,108.5	88.5	94.20	2,506.2
MEAN	5.29	7.59	3.87	1.36	.92	6.74	98.6	96.9	37.0	2.85	3.04	85.5
MAX	10	13	6.2	1.8	1.5	42	454	257	126	7.6	7.6	231
MIN	1.5	4.4	1.6	.70	.70	1.1	12	35	3.6	1.5	.70	7.2
CFSM	.10	.14	.07	.03	.02	.13	1.86	1.83	.70	.05	.06	1.58
IN.	.12	.16	.08	.03	.02	.15	2.07	2.11	.78	.06	.07	1.76
CAL YR 1960: TOTAL	9,833.10			MEAN 26.9		MAX 332		MIN .90		CFSM .51		IN 6.90
WAT YR 1961: TOTAL	10,547.80			MEAN 28.9		MAX 454		MIN .70		CFSM .55		IN 7.40

## 5-1260. Dunka River near Babbitt, Minn.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	29	22	11	3.5	1.8	1.9	13	247	116	54	84	20
2	27	24	11	3.5	1.8	1.9	11	213	114	46	70	20
3	25	42	11	3.5	1.8	1.9	9.1	173	103	40	58	19
4	25	50	11	3.5	1.8	2.0	11	152	94	33	53	19
5	25	49	11	3.3	1.8	2.0	12	137	96	31	54	18
6	25	46	11	3.2	1.7	1.9	20	124	96	28	74	17
7	24	41	10	3.1	1.7	1.9	21	110	90	50	103	19
8	22	37	10	3.0	1.6	1.9	21	97	79	159	120	18
9	18	34	9.4	2.9	1.6	1.9	19	92	68	302	102	18
10	18	29	8.8	2.8	1.6	1.9	20	92	66	360	98	23
11	22	29	8.3	2.8	1.6	1.9	17	91	103	352	76	41
12	26	29	7.4	2.8	1.6	1.9	15	103	111	304	78	54
13	34	31	7.2	2.8	1.7	1.9	13	131	102	236	83	48
14	42	31	6.8	2.8	1.7	1.9	11	147	84	184	74	42
15	43	29	6.4	2.7	1.7	1.9	12	159	69	139	64	29
16	37	27	6.0	2.6	1.8	2.0	18	169	60	107	54	27
17	36	25	5.8	2.5	1.8	2.2	18	171	54	85	46	21
18	31	24	5.5	2.3	1.8	2.5	21	160	53	71	39	19
19	27	22	5.4	2.2	1.8	2.8	25	154	52	59	36	17
20	24	19	5.2	2.1	1.8	3.5	31	169	47	49	39	13
21	23	16	5.1	2.1	1.7	4.5	40	169	43	49	29	16
22	22	16	5.0	2.0	1.7	5.1	54	160	59	60	22	14
23	21	16	4.8	1.9	1.7	5.5	52	171	57	72	25	11
24	19	15	4.6	1.9	1.8	5.8	54	220	69	75	31	17
25	20	15	4.6	1.8	1.8	6.1	59	234	78	103	34	24
26	22	15	4.4	1.8	1.8	6.4	66	209	76	132	34	28
27	22	14	3.9	1.8	1.8	7.0	84	178	65	139	33	27
28	22	14	3.7	1.8	1.8	7.5	148	145	55	120	26	25
29	26	12	3.7	1.8	-----	10	224	129	61	92	20	26
30	27	11	3.7	1.8	-----	14	269	111	63	85	19	24
31	25	-----	3.7	1.8	-----	17	-----	116	-----	90	22	-----
TOTAL	809	784	215.4	78.4	48.6	130.6	1,388.1	4,733	2,283	3,706	1,700	714
MEAN	26.1	26.1	6.95	2.53	1.74	4.21	46.3	153	76.1	120	54.8	23.8
MAX	43	50	11	3.5	1.8	17	269	247	116	360	120	54
MIN	18	11	3.7	1.8	1.6	1.9	9.1	91	43	28	19	11
CFSM	.49	.49	.13	.05	.03	.08	.87	2.88	1.44	2.26	1.03	.45
IN.	.57	.55	.15	.06	.03	.09	.97	3.32	1.60	2.60	1.19	.50
CAL YR 1961: TOTAL	11,844.50			MEAN 32.5	MAX 454	MIN .70	CFSM .61	IN 8.31				
WAT YR 1962: TOTAL	16,590.1			MEAN 45.5	MAX 360	MIN 1.6	CFSM .86	IN 11.64				

Note.--No gage-height record Feb. 2-27.

5-1265. Bear Island River near Ely, Minn.

Location--Lat 47°49'50", long 91°50'20", in SW $\frac{1}{4}$  sec.23, T.62 N., R.12 W., on right bank 10 ft downstream from State Highway 1 and 6 miles southeast of Ely.

Drainage area--68.5 sq mi.

Records available--October 1952 to September 1962 (discontinued).

Gage--Water-stage recorder. Datum of gage is 1,388.86 ft above mean sea level, datum of 1929.

Average discharge--10 years, 41.6 cfs.

Extremes--Maximum and minimum discharges for the water years 1961-62 are contained in the following table:

Water Year	Maximum			Minimum		
	Date	Discharge (cfs)	Gage height (feet)	Date	Discharge (cfs)	Gage height (feet)
1961	Apr. 24, 25, 1962	242	7.20	Oct. 11, 12, 1960	0.30	a 4.45
1962	July 11, 1962	256	6.86	Sept.30, 1962	6.5	5.55

a Occurred Aug. 27-29, 1961.

1952-62: Maximum discharge, 423 cfs May 3, 1954 (gage height, 7.03 ft); maximum gage height, 7.20 ft Apr. 24, 25, 1961; minimum discharge, 0.30 cfs Oct. 11, 12, 1961; minimum gage height, 4.33 ft Sept. 15, 16, 1955.

Remarks--Records good except those for period of no gage-height record and those for winter periods, which are fair. Flow regulated by several lakes. Records of chemical analyses for the water years 1961-62 are published in reports of the Geological Survey.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	1.2	1.9	4.0	7.7	7.0	7.2	14	204	122	14	5.2	1.6
2	1.2	2.3	4.3	7.7	7.0	7.2	15	194	122	14	5.0	1.8
3	1.1	2.3	4.6	7.7	7.0	7.3	17	187	118	13	4.8	1.5
4	1.0	2.2	4.8	7.8	7.1	7.3	19	179	115	12	4.5	1.4
5	1.0	2.2	5.1	7.8	7.2	7.4	23	172	107	11	4.2	1.4
6	.80	2.0	5.4	7.8	7.3	7.5	26	170	101	10	4.0	2.0
7	.70	1.9	5.7	7.9	7.4	7.6	28	170	94	9.6	3.9	1.8
8	.60	2.4	5.9	7.9	7.4	7.6	28	168	88	9.2	3.6	1.7
9	.50	2.5	6.1	8.0	7.5	7.7	29	162	83	8.7	3.3	1.7
10	.40	2.3	6.3	8.0	7.5	7.8	29	156	78	8.1	3.4	9.1
11	.30	2.5	6.5	8.1	7.4	7.8	29	155	71	7.8	3.0	19
12	.50	2.6	6.6	8.1	7.4	7.9	29	147	66	7.4	2.9	17
13	1.6	2.7	6.7	8.1	7.3	8.0	30	155	59	7.7	2.4	19
14	1.0	2.7	6.8	8.2	7.2	8.1	31	164	55	7.6	2.1	26
15	.90	2.8	6.9	8.2	7.1	8.2	35	189	52	7.2	1.9	31
16	.80	3.2	7.0	8.2	7.0	8.3	46	194	48	6.8	1.7	37
17	.80	3.2	7.1	8.2	6.9	8.4	64	198	42	6.5	1.7	42
18	.80	3.2	7.1	8.2	6.8	8.5	78	200	39	6.0	2.0	49
19	.80	3.1	7.1	8.2	6.8	8.6	107	198	34	7.7	1.7	56
20	.60	3.1	7.2	8.1	6.8	8.7	149	193	31	7.2	1.6	63
21	.60	3.2	7.2	8.1	6.8	8.9	215	189	27	6.7	1.5	68
22	.90	3.4	7.3	8.0	6.9	9.1	232	183	24	6.6	1.4	68
23	.90	3.2	7.3	7.9	6.9	9.2	240	177	23	6.7	1.4	68
24	.80	3.2	7.4	7.8	7.0	9.3	240	170	20	7.2	1.2	64
25	.90	3.2	7.4	7.7	7.0	9.6	240	162	20	7.0	1.2	64
26	1.0	3.3	7.5	7.6	7.0	9.9	236	155	19	7.0	1.0	61
27	1.0	3.3	7.5	7.5	7.1	10	231	147	18	7.0	1.0	59
28	1.0	2.9	7.6	7.4	7.1	11	225	141	16	6.6	1.2	58
29	.90	3.2	7.6	7.3	-----	11	219	134	16	6.4	1.0	56
30	1.3	3.6	7.7	7.2	-----	12	214	128	15	6.0	1.6	55
31	1.5	-----	7.7	7.1	-----	13	-----	122	-----	5.6	1.2	-----
TOTAL	27.40	83.6	203.4	243.5	198.9	270.1	3,118	5,263	1,723	254.3	76.6	1,004.0
MEAN	.88	2.79	6.56	7.85	7.10	8.71	104	170	57.4	8.20	2.47	33.5
MAX	1.6	3.6	7.7	8.2	7.5	13	240	204	122	14	5.2	68
MIN	.30	1.9	4.0	7.1	6.8	7.2	19	122	15	5.6	1.0	1.4
CFSM	.01	.04	.10	.11	.10	.13	1.52	2.48	.04	.12	.04	.49
IN.	.01	.05	.11	.13	.11	.15	1.69	2.86	.94	.14	.04	.55

CAL YR 1960: TOTAL 12,014.60 MEAN 32.8 MAX 225 MIN .30 CFSM .48 IN 6.52  
 WAT YR 1961: TOTAL 12,465.80 MEAN 34.2 MAX 240 MIN .30 CFSM .50 IN 6.77

Note.--No gage-height record Feb. 19 to Mar. 27.



5-1270. Kawishiwi River near Winton, Minn.

Location.--Lat 47°56'05", long 91°45'50", in NE¼NW¼ sec.20, T.63 N., R.11 W., at powerplant of Minnesota Power & Light Co., just upstream from Fall Lake, 1.8 miles east of Winton.

Drainage area.--1,200 sq mi, approximately.

Records available.--June 1905 to June 1907, October 1912 to September 1919 (fragmentary), September 1923 to September 1965. Monthly discharge only for some periods, published in WSP 1308.

Average discharge.--46 years (1905-6, 1915-17, 1918-19, 1923-65), 956 cfs (unadjusted).

Extremes.--Maximum and minimum discharges for the water years 1961-65 are contained in the following table:

Water year	Maximum daily		Minimum daily	
	Date	Discharge (cfs)	Date	Discharge (cfs)
1961	May 21, 1961.....	4,300	Many days.....	0
1962	May 30, 1962.....	4,620	Jan. 7, Feb. 11, 1962.....	32
1963	June 20, 1963.....	1,950	Jan. 6, 1963.....	46
1964	June 30, 1964.....	5,330	Dec. 25, 1963.....	0
1965	May 10, 1965.....	5,800	Jan. 31, 1965.....	0

1905-7, 1912-19, 1923-65: Maximum daily discharge, 16,000 cfs May 18, 1950; no flow at times.

Remarks.--Records good. Daily discharge computed from powerplant records. Flow regulated by powerplant and by Camp Six, Bald Eagle, Gabbro, Little Gabbro, Birch, White Iron, South Farm, Farm, and Garden Lakes. Records of chemical analyses for the water year 1961 are published in reports of the Geological Survey.

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

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	65	165	0	133	100	216	391	3,580	1,620	250	125	190
2	65	165	0	101	100	329	359	3,640	2,010	250	222	157
3	101	165	0	133	100	420	262	3,100	2,180	218	93	125
4	165	68	0	66	100	471	332	2,430	2,140	250	190	88
5	101	68	129	98	100	501	448	1,900	2,270	153	93	28
6	133	32	108	66	115	468	391	1,590	1,990	250	190	157
7	165	133	464	262	100	499	310	1,650	1,640	185	93	125
8	133	101	367	101	100	483	326	2,910	1,410	218	28	125
9	133	133	367	133	100	562	326	2,060	1,080	0	157	125
10	101	68	302	133	100	465	390	2,540	1,170	125	125	1,820
11	133	133	270	165	100	592	293	2,570	1,090	125	157	1,470
12	212	165	133	101	100	528	390	2,440	1,250	125	125	952
13	733	101	133	100	100	463	358	2,360	1,240	190	125	885
14	508	68	198	133	100	558	358	2,680	1,240	222	125	918
15	254	68	165	133	100	331	492	2,290	1,180	125	93	1,180
16	49	4.0	133	101	68	457	487	3,320	998	93	125	1,240
17	65	107	101	100	100	458	439	4,070	956	60	125	1,180
18	0	0	133	100	100	426	522	4,110	859	190	157	1,200
19	65	0	198	100	68	297	684	4,290	762	157	125	1,420
20	32	97	204	132	68	265	724	4,240	789	254	93	1,550
21	65	32	168	100	100	198	1,780	4,300	683	279	93	1,670
22	97	0	200	100	68	424	1,770	3,730	667	441	190	1,630
23	32	0	216	132	35	327	1,720	3,770	558	376	125	1,930
24	101	0	168	100	99	327	2,000	2,860	370	441	93	1,340
25	165	65	200	100	67	392	2,500	2,390	390	344	93	1,250
26	133	0	168	100	67	364	2,640	2,790	410	344	125	862
27	101	0	200	100	132	262	2,680	2,800	282	311	125	631
28	133	0	200	100	166	456	3,190	2,890	315	261	190	711
29	101	97	168	100	-----	326	3,410	2,740	347	250	125	692
30	133	65	116	132	-----	407	3,420	2,080	282	153	190	692
31	101	-----	133	100	-----	351	-----	1,440	-----	93	125	-----
TOTAL	4,375	2,100.0	5,342	3,588	2,653	12,623	33,392	88,660	32,178	6,733	4,040	25,943
MEAN	141	70.0	172	116	94.8	407	1,113	2,860	1,073	217	130	865
MAX	733	165	464	262	166	592	3,420	4,300	2,270	441	222	1,820
MIN	0	0	0	66	35	198	262	1,440	282	0	28	28
(+)	-85.3	+144	+24	+8	+5.8	-270	+312	+288	+23	-35	-84.3	+88
MEAN±	55.7	214	196	124	101	137	1,425	3,148	1,096	182	45.7	953
CFSM±	.05	.18	.16	.10	.08	.11	1.19	2.62	.91	.15	.04	.79
IN±	.05	.20	.19	.12	.09	.13	1.33	3.02	1.02	.18	.04	.89

## OBSERVED

## ADJUSTED ±

CAL YR 1960: TOTAL 271,999.00 MEAN 743 MAX 5,780 MIN 0 MEAN 732 CFSM .61 IN 8.33  
 WAT YR 1961: TOTAL 221,627.00 MEAN 607 MAX 4,300 MIN 0 MEAN 642 CFSM .54 IN 7.26

+ Change in contents, equivalent in cubic feet per second, in Camp Six, Bald Eagle, Gabbro, Little Gabbro, Birch, White Iron, South Farm, Farm, and Garden Lakes.

\* Adjusted for change in reservoir contents.

## 5-1270. Kawishwi River near Winton, Minn.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	725	762	895	397	265	301	331	1,330	4,110	1,450	1,330	628
2	725	794	928	397	265	366	265	1,390	3,810	1,230	1,160	660
3	725	762	895	365	265	366	394	1,390	3,650	1,080	1,220	594
4	692	794	891	397	265	398	297	1,580	3,550	956	1,190	595
5	694	794	859	397	297	203	362	1,650	3,420	992	1,290	544
6	727	665	880	365	233	332	394	1,980	3,180	992	1,780	365
7	694	697	799	32	265	364	329	2,190	2,870	2,020	1,720	397
8	662	822	747	265	265	396	329	2,230	2,450	2,520	1,600	397
9	630	794	695	265	233	364	362	2,430	2,230	3,280	1,550	397
10	694	794	695	330	265	364	362	2,600	2,120	3,450	1,430	462
11	710	923	663	265	32	396	362	2,690	2,030	3,590	1,580	429
12	794	859	663	297	265	299	362	2,890	2,170	3,470	1,510	429
13	794	921	663	297	265	396	297	2,870	2,250	3,530	1,480	397
14	794	992	598	297	265	396	329	2,930	2,180	3,510	1,480	365
15	794	992	496	297	265	364	329	2,880	2,070	3,420	1,590	397
16	729	992	497	297	297	396	362	3,230	1,940	3,220	1,510	397
17	794	960	430	265	265	364	361	3,290	1,810	3,350	1,530	332
18	729	1,020	429	282	97	364	393	3,500	1,600	2,890	1,450	365
19	745	960	429	282	233	364	361	3,490	1,380	2,460	1,320	332
20	694	960	429	282	265	347	393	3,630	1,150	2,030	1,160	397
21	694	960	429	282	265	396	393	3,870	1,070	1,690	1,080	397
22	694	960	462	282	265	364	425	4,010	1,260	1,640	924	494
23	694	1,020	429	282	265	396	490	4,130	1,330	1,340	924	462
24	662	960	397	282	265	396	462	4,300	1,660	1,560	924	558
25	694	960	397	402	265	396	554	4,540	1,510	1,470	956	494
26	694	928	429	434	233	202	425	4,570	1,730	1,470	924	429
27	694	928	397	466	265	364	683	4,390	1,480	1,470	844	462
28	694	960	397	368	269	331	816	4,600	1,350	1,510	725	462
29	694	928	365	400	-----	396	820	4,360	1,390	1,550	660	429
30	678	895	397	233	-----	396	1,110	4,620	1,420	1,430	665	397
31	697	-----	397	233	-----	396	-----	4,180	-----	1,430	595	-----
TOTAL	22,134	26,756	18,077	9,735	6,959	11,173	13,152	97,740	64,170	66,000	38,101	13,453
MEAN	714	892	583	314	249	360	438	3,153	2,139	2,129	1,229	448
MAX	794	1,020	928	466	297	398	1,110	4,620	4,110	3,590	1,780	660
MIN	630	665	365	32	32	202	265	1,330	1,070	956	595	332
(+)	-84	-143	-85	-33	+ 5	-187	+136	+261	+179	-9	-40	+36
MEAN*	630	749	498	281	254	173	574	3,414	2,120	2,120	1,189	484
CFSM*	.52	.62	.42	.23	.21	.14	.48	2.84	1.93	1.77	.99	.40
IN†	.61	.70	.48	.27	.22	.17	.53	3.27	2.15	2.04	1.14	.45

OBSERVED

ADJUSTED ‡

CAL YR 1961: TOTAL 276,777.00	MEAN 758	MAX 4,300	MIN 0	MEAN 760	CFSM .63	IN 8.61
WAT YR 1962: TOTAL 387,450	MEAN 1,062	MAX 4,620	MIN 32	MEAN 1,065	CFSM .89	IN 12.03

† Change in contents, equivalent in cubic feet per second, in Camp Six, Bald Eagle, Gabbro, Little Gabbro, Birch, White Iron, South Farm, Farm, and Garden Lakes.

‡ Adjusted for change in reservoir contents.

## LAKE OF THE WOODS BASIN

5-1270. Kawishwi River near Winton, Minn.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	397	366	266	299	166	249	714	876	1,340	1,090	496	184
2	429	331	266	265	198	249	962	941	1,400	946	496	129
3	397	396	298	201	216	249	1,290	973	1,420	924	232	218
4	429	267	266	256	168	184	1,040	941	1,450	854	290	218
5	397	267	333	166	233	232	1,040	941	1,520	685	464	284
6	397	117	301	0	233	329	1,170	908	1,540	565	398	251
7	397	197	301	263	233	329	1,140	1,000	1,490	659	408	348
8	365	229	301	198	198	379	1,260	973	1,460	562	277	284
9	332	164	201	231	166	462	1,240	1,020	1,490	433	375	394
10	397	129	268	183	166	429	1,300	986	1,570	374	246	403
11	365	129	283	166	251	397	1,360	1,020	1,550	471	161	435
12	365	261	233	134	334	560	1,450	812	1,600	813	278	696
13	429	198	298	198	205	593	1,460	954	1,560	928	278	522
14	397	198	331	198	302	464	1,400	1,080	1,430	895	343	429
15	333	165	267	220	424	497	1,270	1,020	1,400	734	278	305
16	333	230	299	198	368	399	1,180	1,080	1,400	729	408	325
17	365	230	234	166	368	593	986	1,080	1,370	583	311	422
18	365	198	265	166	249	528	922	1,080	1,590	597	311	358
19	365	165	233	166	249	463	890	1,020	1,770	597	278	546
20	397	198	233	198	281	528	825	1,150	1,950	597	343	479
21	300	215	298	198	249	528	821	992	1,920	624	472	434
22	332	230	267	166	233	528	918	992	1,800	710	569	467
23	397	133	299	334	265	545	910	960	1,630	712	468	370
24	365	262	299	198	233	595	786	895	1,350	662	531	433
25	365	165	299	166	145	595	818	863	1,430	662	408	433
26	365	198	299	166	249	563	851	863	1,410	662	408	466
27	365	168	299	111	249	594	883	895	1,410	630	533	373
28	332	265	267	233	216	560	851	1,200	1,230	630	467	314
29	332	232	299	234	-----	592	941	1,260	1,250	533	467	194
30	300	331	267	231	-----	641	876	1,460	1,120	579	499	342
31	331	-----	267	134	-----	691	-----	1,290	-----	496	366	-----
TOTAL	11,435	6,632	8,637	6,043	6,847	14,545	31,554	31,525	44,850	20,936	11,859	11,056
MEAN	369	221	279	195	245	469	1,052	1,017	1,495	675	383	369
MAX	429	396	333	334	424	691	1,460	1,460	1,950	1,090	569	696
MIN	300	117	201	0	145	184	714	812	1,120	374	161	129
(+)	-56	+ 16	-48	-36	-109	-303	+ 333	+217	-10	-17	-9	-33
MEAN†	313	237	231	159	136	166	1,385	1,234	1,485	658	374	336
CFSM†	.26	.20	.19	.13	.11	.14	1.15	1.03	1.24	.55	.31	.28
IN‡	.30	.22	.22	.15	.12	.16	1.28	1.19	1.38	.63	.36	.31
OBSERVED								ADJUSTED ‡				
CAL YR 1962: TOTAL 347,187	MEAN 951			MAX 4,620			MIN 32	MEAN 973	CFSM .81	IN 10.98		
WAT YR 1963: TOTAL 205,919.00	MEAN 564			MAX 1,950			MIN 0	MEAN 559	CFSM .47	IN 6.32		

† Change in contents, equivalent in cubic feet per second, in Camp Six, Bald Eagle, Gabbro, Little Gabbro, Birch, White Iron, South Farm, Farm, and Garden Lakes.

‡ Adjusted for change in reservoir contents.

## 5-1270. Kawishiwi River near Winton, Minn.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	374	342	315	250	125	339	292	1,660	3,340	5,150	531	591
2	285	374	438	218	157	370	210	1,920	3,120	4,690	564	363
3	406	392	372	218	125	495	274	2,190	2,880	4,410	749	747
4	341	277	282	282	157	527	242	2,170	2,390	4,450	467	354
5	373	362	315	218	125	494	274	2,800	2,140	3,620	467	341
6	304	342	404	250	125	462	274	2,960	2,140	3,490	402	439
7	370	374	340	250	156	462	306	3,070	2,120	2,910	370	439
8	499	342	391	218	188	526	278	4,280	2,210	2,320	434	535
9	465	374	282	218	157	430	246	4,580	2,310	1,700	434	358
10	497	251	218	218	125	526	246	4,680	2,380	1,770	309	406
11	465	342	250	218	123	462	273	4,660	2,250	1,790	443	374
12	497	406	250	175	190	460	283	4,730	2,040	1,780	281	439
13	465	342	250	185	125	460	370	4,640	2,080	1,410	314	503
14	465	374	282	124	158	460	338	4,580	1,980	1,150	314	471
15	497	342	250	157	156	492	408	4,450	1,720	922	314	717
16	341	348	250	160	157	395	370	4,420	1,580	1,020	281	688
17	405	252	218	125	125	426	496	4,000	1,710	1,080	323	871
18	405	213	282	130	125	426	396	3,850	1,690	1,080	314	804
19	438	342	437	65	157	458	477	3,980	1,620	1,020	414	804
20	194	314	345	157	125	453	370	3,500	1,810	1,100	249	868
21	374	218	313	157	157	520	686	2,790	1,620	957	377	804
22	535	286	218	125	125	359	576	2,660	1,430	924	455	804
23	325	286	185	125	157	424	797	2,960	2,220	795	291	1,170
24	422	254	250	125	188	391	750	2,900	2,480	666	346	1,190
25	406	222	46	190	188	497	875	3,720	3,210	649	378	1,170
26	374	284	347	190	188	113	972	3,590	3,130	486	281	1,270
27	314	347	250	125	281	376	1,100	3,820	4,140	591	281	1,050
28	342	315	282	125	243	226	1,190	3,740	4,770	576	627	1,020
29	374	360	250	125	403	161	1,270	3,680	4,510	467	619	954
30	374	298	185	157	-----	263	1,620	3,740	5,330	499	587	1,020
31	309	-----	250	157	-----	274	-----	3,550	-----	467	580	-----
TOTAL	12,235	9,575	8,747	5,437	4,811	12,732	16,259	110,270	76,350	53,939	12,546	21,564
MEAN	395	319	282	175	166	411	542	3,557	2,545	1,740	405	719
MAX	535	406	438	282	403	527	1,620	4,730	5,330	5,150	627	1,270
MIN	194	213	46	65	123	113	210	1,660	1,430	467	249	341
(+)	-168	-97	-7	+10	-11	-281	+304	+250	448	-41	-103	+115
MEAN#	227	222	275	185	155	130	846	3,807	2,593	1,741	302	834
CFSM#	.19	.18	.23	.15	.13	.11	.71	3.17	2.16	1.45	.25	.70
IN#	.22	.21	.26	.18	.14	.12	.79	3.66	2.41	1.67	.29	.78

OBSERVED

ADJUSTED †

CAL YR 1963: TOTAL 209,772.00	MEAN 575	MAX 1,950	MIN 0	MEAN 555	CFSM .46	IN 6.27
WAT YR 1964: TOTAL 344,465	MEAN 941	MAX 5,330	MIN 46	MEAN 946	CFSM .79	IN 10.73

† Change in contents, equivalent in cubic feet per second, in Camp Six, Bald Eagle, Gabbro, Little Gabbro, Birch, White Iron, South Farm, Farm, and Garden Lakes.

‡ Adjusted for change in reservoir contents.

## 5-1270. Kawishwi River near Winton, Minn.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	859	649	377	312	298	297	396	2,980	4,120	1,060	406	282
2	1,020	681	248	172	140	277	396	3,090	3,140	1,680	655	250
3	1,020	681	312	204	237	374	364	3,600	2,740	1,650	558	273
4	1,050	681	249	266	204	374	364	3,870	2,740	1,750	591	282
5	1,050	714	281	266	153	374	364	4,670	2,800	1,680	623	250
6		988	681	175	234	282	374	396	2,880	1,310	623	282
7		924	679	268	266	218	374	427	5,320	2,820	1,280	591
8		891	679	236	266	218	465	363	5,590	2,780	1,250	439
9		891	681	203	234	218	488	298	5,760	2,750	1,140	558
10		924	656	203	172	315	552	363	5,800	2,810	1,160	558
11		956	647	268	266	250	550	492	5,760	2,620	1,160	494
12		956	704	203	266	218	531	362	5,720	2,640	1,120	526
13		956	712	97	234	250	404	394	5,440	2,550	1,200	480
14		924	712	236	266	250	404	394	5,250	2,250	1,000	329
15		891	647	261	234	185	476	426	5,280	1,860	988	194
16		891	679	332	266	250	431	426	5,140	1,650	988	314
17		859	583	203	172	250	464	459	5,050	1,060	1,020	378
18		891	712	203	201	250	528	491	5,020	1,140	1,120	346
19		827	648	268	266	218	496	603	5,080	1,240	912	314
20		794	528	203	249	250	464	811	4,890	2,040	960	314
21		811	561	203	234	250	313	889	5,070	1,940	863	249
22		778	528	236	234	185	464	915	5,530	2,190	935	97
23		778	496	299	107	218	464	1,220	5,500	1,990	799	281
24		778	496	234	223	249	335	1,380	5,450	1,640	668	317
25		746	496	299	266	249	464	1,430	5,490	1,500	683	281
26		746	496	172	234	184	399	1,930	5,460	1,430	603	281
27		746	501	269	234	249	431	1,910	5,070	1,490	623	545
28		746	496	298	266	249	345	2,120	4,900	1,440	526	494
29		746	496	320	266	-----	367	2,470	4,670	1,500	623	281
30		681	484	344	266	-----	367	2,810	4,440	1,280	655	281
31		746	-----	344	0	-----	364	-----	4,660	-----	526	250
TOTAL	26,864	18,404	7,844	7,141	6,487	13,010	25,663	154,580	65,030	31,932	12,648	20,666
MEAN	867	613	253	230	232	420	855	4,986	2,168	1,030	408	689
MAX	1,050	714	377	312	315	552	2,810	5,800	4,120	1,750	655	1,670
MIN	681	484	97	0	140	277	298	2,980	1,060	526	97	250
(+)	-128	-204	+ 24	-18	-28	-240	+210	+200	-10	-10	-1	+ 30
MEAN*	739	409	277	212	204	180	1,065	5,186	2,368	1,020	407	719
CFSM*	.62	.34	.23	.18	.17	.15	.89	4.32	1.97	.85	.34	.60
IN*	.71	.38	.27	.20	.18	.17	.99	4.98	2.20	.98	.39	.67
OBSERVED								ADJUSTED †				
CAL YR 1964: TOTAL 367,020				MEAN 1,003		MAX 5,330		MIN 65		MEAN 1,005		
WAT YR 1965: TOTAL 390,269.00				MEAN 1,069		MAX 5,800		MIN 0		MEAN 1,072		
										CFSM .84		
										IN 11.40		
										CFSM .89		
										IN 12.12		

† Change in contents, equivalent in cubic feet per second, in Camp Six, Bald Eagle, Gabbro, Little Gabbro, Birch, White Iron, South Farm, Farm, and Garden Lakes.

\* Adjusted for change in reservoir contents.

5-1275. Basswood River near Winton, Minn.

(International gaging station)

Location--Lat 48°04'55", long 91°39'10", in sec.30, T.65 N., R.10 W., on Jackfish Bay of Basswood Lake, used to determine discharge at outlet (lat 48°06', long 91°39', in sec.19, T.65 N., R.10 W., on international boundary 14 miles northeast of Winton).

Drainage area--1,740 sq mi, approximately (above outlet of Basswood Lake).

Records available--March to June 1924, September 1925 to March 1928, January 1930 to September 1965. Monthly discharge only for some periods, published in WSP 1308.

Gage--Water-stage recorder. Datum of gage is 1,299.80 ft above mean sea level, adjustment of 1928 by Geodetic Survey of Canada. Prior to June 2, 1938, staff gages at several sites on Jackfish Bay at same datum. June 2 to Oct. 27, 1938, staff gage at Williams Island half a mile northeast of present gage at present datum.

Average discharge--37 years (1925-27, 1930-65), 1,299 cfs.

Extremes--Maximum and minimum discharges for the water years 1961-65 are contained in the following Table:

Water year	Date	Maximum		Minimum		
		Discharge (cfs)	Gage height (feet)	Date	Discharge (cfs)	Gage height (feet)
1961	May 22, 1961	4,030	2.48	Dec. 4, 1960	206	-0.78
1962	June 1, 1962	4,490	2.72	Feb. 28, 1962	500	-1.11
1963	June 22, 1963	1,840	1.16	Dec. 15-16, 1962	264	-1.57
1964	July 5, 1964	4,840	2.80	Feb. 20-22, 1964	261	-1.58
1965	May 25, 1965	6,140	3.53	Feb. 28, 1965	392	-1.28

1924, 1925-28, 1930-65: Maximum discharge, 15,600 cfs May 24, 1950 (gage height, 6.94 ft); minimum, 73 cfs Dec. 5, 1948.

Remarks--Records excellent. Flow affected by storage on Kawishiwi River.

Cooperation--This station is maintained by the United States under agreement with Canada.

Revisions (water years)--WSP 955: Drainage area. WSP 1145: 1935, 1937.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	287	248	216	216	226	232	507	2,350	3,200	1,000	468	299
2	284	248	214	216	226	229	507	2,450	3,110	929	474	344
3	284	246	214	216	226	229	500	2,600	3,020	880	462	320
4	274	243	214	218	226	229	507	2,700	2,990	860	455	316
5	264	246	221	218	226	232	507	2,740	2,960	810	436	316
6	261	243	218	221	224	237	507	2,760	2,900	770	423	320
7	257	243	218	226	224	246	500	2,780	2,820	741	392	320
8	254	243	218	229	224	254	500	2,800	2,740	712	380	316
9	248	240	216	229	224	267	500	2,780	2,620	665	370	320
10	246	237	214	229	224	280	494	2,740	2,470	648	354	462
11	243	237	214	226	226	291	494	2,680	2,330	631	328	640
12	248	240	214	226	229	308	500	2,680	2,300	622	320	770
13	270	234	214	226	229	324	507	2,740	2,210	622	312	890
14	267	234	214	226	229	338	507	2,790	2,100	597	299	970
15	270	232	214	226	229	354	522	3,040	2,030	589	291	1,040
16	264	226	214	226	229	370	580	3,250	1,960	551	284	1,090
17	261	226	214	226	229	386	622	3,430	1,890	544	277	1,130
18	254	224	214	226	229	386	640	3,590	1,820	529	284	1,180
19	251	224	211	226	229	392	656	3,720	1,740	529	277	1,210
20	248	221	211	226	229	399	694	3,830	1,680	522	274	1,260
21	246	221	211	224	226	405	920	3,920	1,620	507	270	1,340
22	248	216	211	224	229	411	1,090	3,990	1,570	488	267	1,420
23	243	214	214	221	226	411	1,220	4,010	1,500	481	267	1,470
24	246	214	214	221	229	417	1,380	3,900	1,440	507	257	1,520
25	248	214	211	224	229	423	1,520	3,770	1,360	507	264	1,520
26	243	211	211	221	229	423	1,680	3,700	1,300	507	261	1,480
27	240	211	211	224	232	468	1,810	3,680	1,250	544	257	1,460
28	234	218	214	224	232	514	1,960	3,680	1,180	529	254	1,410
29	234	216	214	224	-----	514	2,100	3,650	1,130	514	254	1,420
30	237	216	216	224	-----	522	2,200	3,520	1,070	507	261	1,400
31	240	-----	216	226	-----	514	-----	3,320	-----	494	257	-----
TOTAL	7,894	6,886	6,640	6,935	6,369	11,005	26,631	99,590	62,310	19,327	10,029	27,953
MEAN	255	230	214	224	227	355	868	3,213	2,077	623	324	932
MAX	287	248	221	229	232	522	2,200	4,010	3,200	1,000	474	1,520
MIN	234	211	211	216	224	229	494	2,350	1,070	481	254	299
CFSM	.15	.13	.12	.13	.13	.20	.51	1.85	1.19	.36	.19	.54
IN.	.17	.15	.14	.15	.14	.24	.57	2.13	1.33	.41	.21	.60
CAL YR 1960: TOTAL	349,345			MEAN 954		MAX 4,820	MIN 211	CFSM .55	IN 7.47			
WAT YR 1961: TOTAL	291,569			MEAN 799		MAX 4,010	MIN 211	CFSM .46	IN 6.23			

5-1275. Basswood River near Winton, Minn.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	1,360	1,120	1,180	790	580	507	544	970	4,470	2,080	2,260	1,320
2	1,340	1,130	1,180	790	580	507	544	1,040	4,450	2,030	2,200	1,280
3	1,320	1,130	1,190	780	580	507	544	1,100	4,310	1,950	2,160	1,240
4	1,290	1,130	1,190	770	580	507	544	1,180	4,470	1,890	2,120	1,210
5	1,260	1,130	1,190	760	589	514	544	1,270	4,320	1,850	2,080	1,180
6	1,240	1,130	1,190	750	580	514	544	1,360	4,220	1,790	2,140	1,140
7	1,200	1,090	1,190	741	573	522	551	1,460	4,090	1,840	2,160	1,110
8	1,180	1,090	1,190	722	565	522	551	1,570	3,960	1,920	2,200	1,080
9	1,260	1,090	1,190	712	558	529	573	1,680	3,810	2,120	2,200	1,060
10	1,270	1,090	1,180	694	551	529	580	1,800	3,650	2,460	2,140	1,050
11	1,270	1,090	1,160	675	551	536	580	1,920	3,500	2,680	2,140	1,050
12	1,270	1,090	1,140	665	544	536	580	2,090	3,360	2,840	2,120	1,040
13	1,280	1,100	1,140	656	551	536	580	2,220	3,270	2,960	2,090	1,020
14	1,290	1,130	1,100	648	558	544	573	2,380	3,160	3,060	2,060	970
15	1,300	1,130	1,090	631	558	536	573	2,520	3,060	3,130	2,020	910
16	1,290	1,130	1,080	622	565	544	573	2,650	3,010	3,200	1,970	880
17	1,270	1,130	1,060	614	558	544	573	2,820	2,990	3,250	1,930	860
18	1,240	1,140	1,030	597	551	536	573	2,920	2,890	3,250	1,920	840
19	1,200	1,140	1,020	589	544	536	580	3,110	2,770	3,210	1,890	830
20	1,150	1,140	990	580	544	536	589	3,340	2,670	3,140	1,850	820
21	1,110	1,150	980	580	529	536	597	3,470	2,550	3,080	1,820	810
22	1,080	1,160	950	580	529	536	622	3,610	2,460	3,040	1,770	800
23	1,060	1,170	940	580	522	529	622	3,770	2,410	2,890	1,720	860
24	1,050	1,180	920	573	514	529	640	3,880	2,360	2,840	1,690	930
25	1,020	1,190	900	565	514	529	656	3,990	2,330	2,750	1,640	990
26	1,010	1,180	880	558	507	529	665	4,110	2,300	2,630	1,590	1,040
27	1,090	1,180	858	558	507	529	722	4,200	2,270	2,590	1,560	1,070
28	1,020	1,190	840	573	507	536	810	4,280	2,220	2,460	1,510	1,080
29	1,030	1,180	840	580	-----	544	850	4,360	2,210	2,410	1,450	1,050
30	1,060	1,190	830	580	-----	544	910	4,410	2,140	2,390	1,400	1,010
31	1,100	-----	800	589	-----	544	-----	4,450	-----	2,320	1,360	-----
TOTAL	36,820	34,120	32,410	20,102	15,389	16,419	18,387	83,930	95,680	80,010	59,160	30,530
MEAN	1,181	1,137	1,045	648	550	530	613	2,707	3,189	2,581	1,908	1,018
MAX	1,360	1,190	1,190	790	589	544	910	4,450	4,470	3,250	2,260	1,320
MIN	1,000	1,090	800	558	507	507	544	970	2,140	1,790	1,360	800
CFSM	.68	.65	.60	.37	.32	.30	.35	1.56	1.63	1.48	1.10	.58
IN.	.79	.73	.69	.43	.33	.35	.39	1.79	2.05	1.71	1.26	.65
CAL YR 1961: TOTAL	373,499			MEAN 1,023		MAX 4,010	MIN 216	CFSM .59		IN 7.98		
WAT YR 1962: TOTAL	522,957			MEAN 1,433		MAX 4,470	MIN 507	CFSM .82		IN 11.18		

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	960	448	312	338	295	344	580	1,080	1,280	1,640	1,060	631
2	920	442	304	338	299	338	640	1,080	1,340	1,560	1,060	622
3	900	436	303	338	299	338	732	1,080	1,340	1,560	1,000	622
4	880	423	295	333	303	344	800	1,070	1,360	1,520	980	597
5	860	417	291	328	303	338	870	1,060	1,380	1,470	940	573
6	840	411	287	328	303	338	930	1,060	1,410	1,420	910	551
7	820	411	284	328	303	333	950	1,090	1,440	1,360	880	544
8	800	399	280	324	299	338	960	1,100	1,450	1,290	860	529
9	790	392	277	328	299	338	980	1,120	1,480	1,220	850	514
10	770	386	274	328	299	338	1,010	1,120	1,600	1,190	810	500
11	760	370	270	324	299	349	1,040	1,100	1,590	1,180	790	500
12	750	364	267	320	299	364	1,080	1,100	1,620	1,200	780	500
13	730	359	267	316	299	375	1,100	1,120	1,660	1,190	770	494
14	710	349	267	312	303	380	1,120	1,130	1,680	1,180	732	494
15	690	344	264	312	308	386	1,130	1,130	1,680	1,170	712	494
16	650	338	264	308	312	392	1,140	1,130	1,680	1,170	741	500
17	630	328	270	308	320	417	1,140	1,130	1,660	1,140	712	500
18	600	328	270	308	333	430	1,140	1,130	1,660	1,120	694	529
19	580	328	274	303	344	442	1,150	1,130	1,740	1,130	675	536
20	570	324	277	301	349	455	1,160	1,140	1,760	1,140	665	529
21	550	320	280	299	354	462	1,150	1,140	1,800	1,130	648	529
22	540	320	287	297	354	474	1,140	1,140	1,820	1,120	665	529
23	530	328	295	295	354	474	1,140	1,140	1,810	1,090	694	529
24	520	320	299	295	354	481	1,130	1,140	1,810	1,060	684	522
25	510	316	312	299	349	494	1,120	1,130	1,810	1,060	665	522
26	500	312	316	299	349	500	1,120	1,130	1,810	1,060	656	529
27	490	316	320	299	344	507	1,100	1,160	1,800	1,060	640	529
28	485	316	324	299	344	522	1,100	1,170	1,790	1,080	656	536
29	474	316	328	295	-----	529	1,100	1,190	1,750	1,090	648	529
30	462	312	333	295	-----	536	1,080	1,210	1,710	1,080	648	522
31	455	-----	333	295	-----	544	-----	1,260	-----	1,060	640	-----
TOTAL	20,773	10,773	9,028	9,690	8,970	12,906	30,832	34,910	48,700	37,770	23,845	16,035
MEAN	.669	.359	.291	.313	.320	.416	1.028	1.126	1.623	1.218	.769	.535
MAX	960	448	333	338	354	544	1,160	1,260	1,820	1,640	1,060	631
MIN	455	312	264	295	295	333	580	1,060	1,280	1,060	640	494
CFSM	.38	.21	.17	.18	.18	.24	.59	.65	.93	.70	.44	.31
IN.	.44	.23	.19	.21	.19	.28	.66	.75	1.04	.81	.51	.34
CAL YR 1962: TOTAL	460,144			MEAN 1,261		MAX 4,470	MIN 264	CFSM .72		IN 9.83		
WAT YR 1963: TOTAL	264,195			MEAN 724		MAX 1,820	MIN 264	CFSM .42		IN 5.65		

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965												
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	1,070	960	810	490	417	405	588	2,220	5,730	2,430	1,190	684
2	1,080	950	780	488	411	417	597	2,430	5,520	2,430	1,170	665
3	1,090	950	760	485	411	417	597	2,620	5,300	2,430	1,150	648
4	1,100	930	741	485	405	423	597	2,840	5,040	2,430	1,120	640
5	1,120	930	712	483	411	423	597	3,040	4,880	2,390	1,080	622
6	1,070	920	712	483	411	430	597	3,290	4,740	2,360	1,130	614
7	1,090	920	694	480	405	430	665	3,560	4,580	2,280	1,130	622
8	1,070	910	665	478	405	430	675	3,790	4,450	2,240	1,080	640
9	1,060	950	648	473	399	436	675	4,010	4,370	2,160	1,050	665
10	1,060	960	631	467	417	442	675	4,260	4,260	2,100	1,030	675
11	1,060	960	640	464	423	468	732	4,450	4,130	2,030	1,000	684
12	1,060	1,000	622	464	430	474	750	4,640	4,050	2,000	1,010	656
13	1,060	1,010	606	464	430	494	760	4,800	3,920	2,040	990	648
14	1,060	1,030	588	462	430	507	790	4,940	3,810	2,000	960	656
15	1,060	1,010	580	462	430	507	830	5,180	3,650	1,970	940	712
16	1,060	1,010	580	462	423	522	850	5,380	3,450	1,960	910	741
17	1,050	990	573	455	423	529	870	5,500	3,250	1,930	870	790
18	1,050	980	558	448	423	551	900	5,610	3,060	1,880	850	820
19	1,050	960	544	442	423	565	930	5,650	2,920	1,850	810	840
20	1,050	950	529	442	423	573	960	5,690	2,870	1,810	780	850
21	1,060	940	529	442	417	573	1,020	5,860	2,770	1,750	741	880
22	1,060	930	525	442	411	573	1,100	5,920	2,820	1,710	703	910
23	1,050	910	523	442	411	573	1,200	5,940	2,950	1,640	675	940
24	1,030	890	520	442	411	573	1,280	6,010	2,820	1,580	648	960
25	1,010	880	515	442	411	573	1,380	6,070	2,750	1,560	631	970
26	1,010	860	508	436	405	573	1,480	6,070	2,630	1,500	640	980
27	1,010	860	500	436	405	573	1,620	6,070	2,570	1,420	760	990
28	990	840	495	430	405	573	1,760	6,070	2,500	1,360	722	1,000
29	980	810	492	423	405	580	1,890	6,010	2,520	1,320	712	1,030
30	960	810	490	423	405	580	2,060	5,920	2,440	1,280	712	1,250
31	960	810	490	417	405	588	2,220	5,840	2,440	1,240	703	797
TOTAL	32,490	28,030	18,560	14,152	11,620	15,775	29,425	149,660	110,690	59,070	27,897	23,782
MEAN	1,048	934	599	457	415	509	981	4,828	3,690	1,905	900	793
MAX	1,120	1,030	1,010	490	430	588	2,060	6,070	5,730	2,430	1,190	1,250
MIN	960	810	490	417	399	405	588	2,220	2,440	1,240	631	614
CFSM	.60	.54	.34	.26	.24	.29	.56	2.77	2.12	1.10	.52	.46
IN.	.69	.60	.40	.30	.29	.34	.63	3.20	2.37	1.26	.60	.51
CAL YR 1964: TOTAL 456,852 MEAN 1,248 MAX 4,600												
WAT YR 1965: TOTAL 521,151 MEAN 1,428 MAX 6,070 MIN 261 MIN 399												
CFSM -.72 IN 9.76												
CFSM -.82 IN 11.14												



DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963												
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	3,190	1,840	1,410	1,220	1,060	982	1,040	2,860	4,410	6,430	4,620	3,030
2	3,130	1,840	1,400	1,210	1,060	982	1,100	2,890	4,570	6,550	4,990	2,990
3	3,100	1,830	1,390	1,210	1,050	982	1,260	2,890	4,700	6,370	4,480	2,950
4	3,070	1,830	1,380	1,200	1,050	974	1,340	2,920	4,810	6,300	4,460	2,910
5	3,060	1,830	1,370	1,200	1,040	974	1,410	2,930	4,850	6,260	4,370	2,850
6	3,050	1,830	1,360	1,190	1,040	974	1,470	2,950	4,910	6,190	4,280	2,810
7	3,030	1,820	1,350	1,190	1,040	966	1,540	3,020	4,930	6,120	4,230	2,780
8	3,020	1,820	1,340	1,190	1,040	966	1,600	3,050	4,930	6,010	4,190	2,720
9	3,000	1,820	1,320	1,180	1,040	966	1,640	3,090	5,050	5,900	4,120	2,700
10	2,990	1,820	1,310	1,180	1,030	958	1,700	3,130	5,230	5,820	4,030	2,650
11	2,990	1,800	1,300	1,170	1,030	958	1,740	3,140	5,290	5,820	3,950	2,630
12	2,930	1,780	1,300	1,160	1,030	958	1,790	3,200	5,400	5,800	3,910	2,600
13	2,820	1,750	1,290	1,160	1,020	958	1,840	3,220	5,520	5,690	3,840	2,540
14	2,770	1,730	1,290	1,150	1,020	950	1,910	3,280	5,610	5,590	3,780	2,500
15	2,680	1,710	1,290	1,150	1,010	950	1,960	3,310	5,670	5,460	3,760	2,440
16	2,630	1,690	1,280	1,140	1,010	958	2,040	3,360	5,780	5,360	3,780	2,390
17	2,540	1,670	1,280	1,140	999	966	2,100	3,390	5,840	5,170	3,660	2,350
18	2,490	1,640	1,280	1,130	999	974	2,160	3,380	5,930	5,070	3,620	2,440
19	2,430	1,620	1,270	1,130	990	974	2,260	3,340	6,040	5,010	3,520	2,410
20	2,360	1,600	1,270	1,120	990	974	2,310	3,460	6,120	4,930	3,470	2,340
21	2,280	1,580	1,260	1,120	990	974	2,350	3,500	6,210	4,870	3,420	2,270
22	2,230	1,560	1,260	1,110	990	982	2,400	3,500	6,300	4,790	3,420	2,220
23	2,210	1,530	1,250	1,110	990	982	2,470	3,520	6,320	4,700	3,420	2,210
24	2,180	1,510	1,250	1,100	982	982	2,530	3,520	6,370	4,570	3,380	2,180
25	2,130	1,490	1,240	1,100	982	982	2,570	3,520	6,450	4,500	3,340	2,140
26	2,100	1,470	1,240	1,090	982	990	2,630	3,500	6,500	4,440	3,280	2,130
27	2,060	1,460	1,240	1,090	982	990	2,670	3,710	6,450	4,510	3,220	2,140
28	2,000	1,450	1,230	1,080	982	999	2,720	3,950	6,540	4,680	3,220	2,070
29	1,960	1,440	1,230	1,080	-----	1,010	2,790	4,030	6,570	4,720	3,160	2,020
30	1,900	1,420	1,220	1,070	-----	1,010	2,820	4,100	6,520	4,680	3,120	2,000
31	1,840	-----	1,220	1,070	-----	1,020	-----	4,260	-----	4,620	3,060	-----
TOTAL	80,170	50,180	40,120	35,440	28,428	30,265	60,160	103,960	169,910	166,770	116,680	74,410
MEAN	2,586	1,673	1,294	1,143	1,015	976	2,005	3,354	5,664	5,380	3,764	2,480
MAX	3,190	1,840	1,410	1,220	1,060	982	1,020	2,890	6,550	6,550	4,990	3,030
MIN	1,840	1,220	1,220	1,070	982	950	1,040	2,860	4,410	4,440	3,060	2,000
CFSM	.50	.32	.25	.22	.20	.19	.39	.65	1.10	1.04	.73	.48
IN.	.58	.36	.29	.26	.20	.22	.43	.75	1.22	1.20	.84	.54
CAL YR 1962: TOTAL	1,477,050		MEAN 4,047		MAX 11,000		MIN 1,220		CFSM -.78		IN 10.64	
WYR 1963: TOTAL	956,493		MEAN 2,621		MAX 6,570		MIN 950		CFSM .51		IN 6.89	

CAL YR 1962: TOTAL	1,477,050	MEAN	4,047	MAX	11,000	MIN	1,220	CFSM	.78	IN	10.64
WAT YR 1963: TOTAL	956,493	MEAN	2,621	MAX	8,570	MIN	950	CFSM	.51	IN	6.89

## 5-1280. Namakan River at outlet of Lac la Croix, Ontario--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	1,960	1,290	1,140	1,140	1,110	982	950	2,790	8,290	11,200	7,070	3,650
2	1,900	1,290	1,140	1,140	1,100	974	950	2,930	8,110	11,300	6,960	3,650
3	1,900	1,260	1,140	1,140	1,100	966	950	3,090	8,020	11,400	6,730	3,630
4	1,870	1,250	1,140	1,140	1,090	966	958	3,220	8,040	11,500	6,540	3,520
5	1,860	1,240	1,130	1,130	1,090	958	958	3,470	7,920	11,700	6,390	3,550
6	1,810	1,240	1,130	1,130	1,080	958	1,010	3,860	7,970	11,700	6,060	3,550
7	1,760	1,250	1,120	1,130	1,070	950	1,030	4,230	7,990	11,900	5,760	3,550
8	1,740	1,250	1,160	1,140	1,060	942	1,040	4,590	8,130	12,000	5,610	3,550
9	1,730	1,240	1,170	1,140	1,060	942	1,040	4,890	8,950	12,100	5,420	3,570
10	1,710	1,200	1,170	1,130	1,050	942	1,040	5,290	9,360	12,100	5,250	3,570
11	1,700	1,200	1,170	1,120	1,050	926	1,050	5,630	9,580	12,100	5,170	3,570
12	1,690	1,200	1,170	1,120	1,050	926	1,050	5,990	9,640	11,900	4,910	3,550
13	1,660	1,200	1,190	1,120	1,040	926	1,090	6,320	9,740	11,800	4,750	3,540
14	1,630	1,180	1,190	1,110	1,040	926	1,130	6,570	9,860	11,600	4,660	3,520
15	1,620	1,180	1,190	1,110	1,040	918	1,180	6,820	9,880	11,400	4,530	3,500
16	1,610	1,160	1,180	1,100	1,030	918	1,230	7,100	9,940	11,200	4,460	3,490
17	1,590	1,150	1,180	1,110	1,010	918	1,250	7,370	10,000	10,900	4,400	3,490
18	1,570	1,150	1,170	1,120	999	918	1,310	7,620	10,100	10,700	4,300	3,490
19	1,540	1,140	1,170	1,110	999	918	1,370	7,830	10,100	10,500	4,210	3,470
20	1,540	1,120	1,160	1,110	990	926	1,420	8,080	10,100	10,100	4,140	3,440
21	1,530	1,130	1,160	1,110	982	934	1,530	8,220	10,100	9,940	4,050	3,410
22	1,510	1,140	1,160	1,100	990	934	1,680	8,380	10,100	9,710	3,910	3,410
23	1,500	1,150	1,160	1,100	999	934	1,790	8,590	10,100	9,460	3,810	3,540
24	1,480	1,170	1,160	1,110	999	942	1,900	8,610	10,600	9,120	3,740	3,540
25	1,460	1,170	1,150	1,130	999	950	2,000	8,730	10,700	8,850	3,660	3,570
26	1,400	1,150	1,160	1,130	999	950	2,120	8,570	10,800	8,590	3,630	3,600
27	1,390	1,170	1,160	1,130	990	950	2,220	8,610	10,800	8,340	3,570	3,550
28	1,380	1,150	1,150	1,130	982	950	2,380	8,590	10,900	8,080	3,580	3,630
29	1,370	1,150	1,150	1,130	982	950	2,500	8,540	10,900	7,850	3,650	3,630
30	1,350	1,140	1,150	1,120	982	950	2,660	8,500	11,100	7,620	3,630	3,710
31	1,310	1,150	1,150	1,110	950	950	2,830	8,380	11,100	7,350	3,650	3,650
TOTAL	50,070	35,710	35,920	34,790	29,980	29,194	42,796	201,390	288,020	324,010	148,220	106,410
MEAN	1,615	1,190	1,159	1,122	1,034	942	1,427	6,496	9,601	10,450	4,781	3,547
MAX	1,990	1,290	1,190	1,140	1,110	982	1,010	7,370	10,000	12,100	7,070	3,710
MIN	1,310	1,120	1,120	1,100	982	918	950	2,790	7,920	7,350	3,570	3,410
CF5M	.31	.23	.22	.22	.20	.18	.28	1.26	1.86	2.02	.93	.69
IN.	.36	.26	.26	.25	.22	.21	.31	1.45	2.07	2.33	1.07	.77
CAL YR 1963: TOTAL	907,723											
MAY YR 1964: TOTAL	1,326,510		MEAN 2,487		MAX 6,570		MIN 950		CF5M .48		IN 6.54	
			MEAN 3,624		MAX 12,100		MIN 918		CF5M .70		IN 9.55	

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	3,680	3,790	2,990	2,490	1,990	1,820	1,840	4,620	14,800	8,840	4,530	2,530
2	3,680	3,830	2,960	2,480	1,960	1,840	1,840	4,930	14,800	8,360	4,480	2,520
3	3,730	3,780	2,930	2,470	1,950	1,840	1,840	5,250	14,800	8,240	4,420	2,480
4	3,780	3,780	2,920	2,450	1,940	1,840	1,840	5,540	14,700	8,130	4,320	2,470
5	3,790	3,620	2,890	2,430	1,940	1,830	1,840	5,880	14,600	7,990	4,210	2,340
6	3,840	3,580	2,860	2,410	1,930	1,820	1,880	6,190	14,600	7,830	4,240	2,380
7	3,910	3,550	2,850	2,390	1,920	1,820	1,940	6,390	14,400	7,600	4,150	2,320
8	3,910	3,500	2,820	2,380	1,900	1,810	1,940	6,730	14,200	7,490	4,070	2,300
9	3,930	3,470	2,810	2,360	1,890	1,800	1,950	7,100	14,000	7,260	3,960	2,270
10	3,950	3,440	2,790	2,350	1,920	1,790	1,960	7,390	13,900	7,100	3,880	2,220
11	3,960	3,410	2,780	2,340	1,900	1,780	2,050	7,650	13,500	6,960	3,780	2,230
12	3,960	3,410	2,770	2,320	1,900	1,760	2,060	7,900	13,300	6,890	3,740	2,240
13	3,980	3,420	2,740	2,310	1,900	1,760	2,070	8,180	13,100	6,820	3,680	2,210
14	4,000	3,410	2,710	2,300	1,880	1,750	2,110	8,450	12,900	6,730	3,560	2,180
15	4,000	3,400	2,700	2,270	1,890	1,750	2,170	8,950	12,500	6,570	3,470	2,130
16	4,020	3,280	2,700	2,260	1,890	1,760	2,220	9,460	12,100	6,500	3,410	2,450
17	4,000	3,260	2,680	2,240	1,870	1,780	2,240	9,910	11,800	6,390	3,310	2,400
18	3,910	3,250	2,670	2,230	1,870	1,780	2,300	10,300	11,500	6,260	3,280	2,470
19	3,910	3,240	2,650	2,220	1,880	1,800	2,350	10,800	11,300	6,150	3,220	2,480
20	4,000	3,220	2,640	2,210	1,870	1,790	2,440	11,300	11,000	6,010	3,140	2,490
21	4,030	3,190	2,630	2,190	1,870	1,780	2,560	11,600	10,700	5,860	3,090	2,540
22	4,030	3,160	2,610	2,130	1,840	1,780	2,700	12,100	10,700	5,730	3,020	2,580
23	4,020	3,130	2,600	2,130	1,880	1,780	2,850	12,600	10,200	5,570	2,950	2,650
24	4,000	3,130	2,580	2,110	1,830	1,780	3,030	13,100	9,940	5,380	2,880	2,680
25	3,980	3,120	2,570	2,100	1,820	1,780	3,220	13,400	9,680	5,250	2,850	2,740
26	3,960	3,090	2,560	2,070	1,820	1,770	3,420	13,700	9,460	5,130	2,790	2,790
27	3,930	3,060	2,540	2,070	1,820	1,780	3,650	13,900	9,210	4,990	2,810	2,860
28	3,880	3,030	2,540	2,060	1,810	1,780	3,880	14,200	8,970	4,870	2,740	2,910
29	3,860	3,020	2,530	2,050	-----	1,800	4,100	14,400	8,800	4,810	2,710	3,000
30	3,840	2,990	2,520	2,010	-----	1,800	4,370	14,500	8,610	4,740	2,670	3,190
31	3,810	-----	2,500	2,000	-----	1,820	-----	14,700	-----	4,620	2,600	-----
TOTAL	121,280	100,570	84,040	69,830	52,850	55,570	74,660	301,120	363,850	200,710	107,940	75,530
MEAN	3,912	3,252	2,711	2,253	1,888	1,793	2,489	9,714	12,130	6,475	3,482	2,518
MAX	4,030	3,830	2,990	2,490	1,990	1,900	4,370	14,400	14,800	8,840	4,530	3,190
MIN	3,680	3,200	2,500	2,000	1,810	1,750	1,840	4,620	12,500	6,010	3,020	2,220
CFSM	.76	.65	.52	.44	.37	.35	.48	1.88	2.35	1.25	.67	.45
IN.	.87	.72	.61	.50	.38	.40	.54	2.17	2.62	1.45	.78	.54
CAL YR 1964: TOTAL	1,510,700											
MAX YR 1964: TOTAL	1,607,950											
MEAN 4,125												
MEAN 4,800												
MIN 918												
MIN 1,750												
CFSM -.80												
CFSM .85												
IN 10.88												

5-1282. Vermilion Lake near Soudan, Minn.

Location.--Lat 47°49'52", long 92°16'20", in SW $\frac{1}{4}$ SE $\frac{1}{4}$  sec.20, T.62 N., R.15 W., on south shore of Vermilion Lake, at McKinley Park, 2 miles northwest of Soudan.

Records available.--October 1913 to July 1915, July 1941 to November 1942, June 1946 to September 1965 (fragmentary during 1947).

Gage.--Water-stage recorder. Datum of gage is 1,355.10 ft above mean sea level, datum of 1929. October 1913 to July 1915 staff gage 2 miles southwest of present gage at Tower at datum about 0.5 ft lower. July 1941 to November 1942 and June 1946 to June 1951 staff gage approximately 13 miles northwest at Vermilion Dam near Tower at same datum. All gage readings have been reduced to elevations above mean sea level, datum of 1929.

Extremes.--Maximum and minimum elevations, in feet, for the water years 1961-65 are contained in the following table:

Water year	Maximum		Minimum	
	Date	Elevation	Date	Elevation
1961	May 20, 1961.....	1,358.64	Oct. 27, 29, 1960.....	1,356.59
1962	May 31, 1962.....	1,358.84	Mar. 27, 1962.....	1,356.96
1963	June 19, 1963.....	1,358.02	Nov. 20, 1962.....	1,356.84
1964	May 19, 1964.....	1,358.55	Nov. 8, 1963.....	1,356.69
1965	May 21, 1965.....	1,358.78	Sept. 4, 1965.....	1,356.93

1913-15, 1941-42, 1946-65: Maximum elevation observed, 1,359.52 ft May 16, 1950; minimum observed, 1,356.02 ft Jan. 29, 1942.

Elevation on June 6, 1913, was 1,359.94 ft (determined from reference point set by local observer).

Remarks.--Records of chemical analyses for the water years 1961-62 and 1964-65 are published in reports of the Geological Survey.

Daily mean elevation, in feet, water years October 1960 to September 1965

Oct. 31, 1960.....	1,356.76	June 30, 1962.....	1,358.17	Feb. 29, 1964.....	1,356.92
Nov. 30.....	1,356.83	July 31.....	1,358.03	Mar. 31.....	1,356.91
Dec. 31.....	1,356.88	Aug. 31.....	1,357.52	Apr. 30.....	1,357.70
Jan. 31, 1961.....	1,356.87	Sept. 30.....	1,357.22	May 31.....	1,358.15
Feb. 28.....	1,356.92	Oct. 31.....	1,356.95	June 30.....	1,358.34
Mar. 31.....	1,357.43	Nov. 30.....	1,356.88	July 31.....	1,357.48
Apr. 30.....	1,358.33	Dec. 31.....	1,356.92	Aug. 31.....	1,357.22
May 31.....	1,358.31	Jan. 31, 1963.....	1,356.89	Sept. 30.....	1,357.19
June 30.....	1,357.40	Feb. 28.....	1,356.91	Oct. 31.....	1,357.10
July 31.....	1,357.06	Mar. 31.....	1,357.01	Nov. 30.....	1,357.05
Aug. 31.....	1,356.76	Apr. 30.....	1,357.57	Dec. 31.....	1,357.08
Sept. 30.....	1,357.27	May 31.....	1,357.67	Jan. 31, 1965.....	1,357.01
Oct. 31.....	1,357.29	June 30.....	1,357.80	Feb. 22.....	1,357.02
Nov. 30.....	1,357.16	July 31.....	1,357.57	Mar. 31.....	1,357.06
Dec. 30.....	1,357.16	Aug. 31.....	1,357.34	Apr. 30.....	1,358.18
Jan. 31, 1962.....	1,357.06	Sept. 30.....	1,357.03	May 31.....	1,358.58
Feb. 28.....	1,357.07	Oct. 31.....	1,356.86	June 30.....	1,358.00
Mar. 31.....	1,357.99	Nov. 30.....	1,356.90	July 31.....	1,357.49
Apr. 30.....	1,357.68	Dec. 31.....	1,356.92	Aug. 31.....	1,357.10
May 31.....	1,358.80	Jan. 31, 1964.....	1,356.96	Sept. 30.....	1,357.44

Note.--Elevations other than those shown above are available.

5-1285. Pike River near Embarrass, Minn.

Location--Lat 47°39'36", long 92°18'54", in NE 1/4 sec. 25, T.60 N., R.16 W., on left bank 75 ft downstream from bridge on County Road 373, 5.4 miles west of Embarrass, and 8.5 miles downstream from Sandy River.

Drainage area--115 sq mi.

Records available--October 1953 to December 1964 (discontinued).

Gage--Water-stage recorder. Datum of gage is 1,410.27 ft above mean sea level, datum of 1929.

Average discharge--11 years, 74.8 cfs.

Extremes--Maximum and minimum discharges for October 1960 to December 1964 are contained in the following table:

Water year	Maximum			Minimum		
	Date	Discharge (cfs)	Gage height (feet)	Date	Discharge (cfs)	Gage height (feet)
1961	Apr. 23, 1961	1,130	9.43	Aug. 25-28, 1961	3.3	3.08
1962	May 26, 1962	590	7.92	Feb. 10-14, 1962	a 4.1	-
1963	Apr. 6, 1963	381	7.18	Jan. 29 to Feb. 3	a .40	-
1964	May 9, 1964	716	8.34	Mar. 29-31, 1964	a 3.4	-
1965	Oct. 4, 1964	154	5.30	(b)	a 10	-

a Minimum daily.

b Dec. 21-25, 28-31, 1964.

1953-64: Maximum discharge, 1,750 cfs Apr. 17, 1954 (gage height, 10.28 ft); minimum daily, 0.40 cfs Jan. 29 to Feb. 3, 1963; minimum gage height, 3.08 ft Aug. 25-28, 1961.

Flood in May 1950 reached a stage of approximately 11.3 ft, from information by local residents (discharge, 2,400 cfs).

Remarks--Records good except those for winter periods, which are fair. Records of chemical analyses for the water years 1961-62 are published in reports of the Geological Survey.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	10	42	15	6.8	4.2	5.4	187	368	100	8.8	9.0	4.2
2	10	47	15	6.4	4.2	5.5	158	323	105	8.3	8.8	4.5
3	10	48	14	6.1	4.2	5.5	122	286	110	7.8	9.9	4.1
4	9.9	48	14	5.9	4.3	5.4	95	249	106	7.6	8.3	4.0
5	9.9	45	14	5.7	4.5	5.4	83	216	96	6.8	7.3	4.0
6	9.6	43	14	5.6	4.6	5.3	75	196	82	6.3	6.8	5.1
7	9.6	40	13	5.5	4.7	5.2	71	202	70	5.7	6.1	5.1
8	9.3	40	13	5.4	4.8	5.2	68	218	60	5.5	5.9	5.1
9	8.8	39	12	5.4	4.9	5.3	65	228	52	5.1	5.5	5.0
10	8.8	36	11	5.3	4.9	5.4	61	229	49	5.7	5.5	13
11	8.8	34	11	5.3	4.9	5.6	57	223	43	5.3	5.0	66
12	9.6	35	11	5.3	4.8	5.7	54	215	40	5.5	4.5	94
13	16	36	10	5.3	4.8	5.8	54	223	38	6.3	4.2	112
14	18	34	10	5.4	4.7	5.9	63	259	37	7.3	4.1	136
15	21	34	10	5.5	4.7	6.0	83	353	37	8.6	3.8	151
16	22	37	9.8	5.5	4.7	6.0	80	466	35	12	3.6	156
17	22	36	9.5	5.4	4.6	6.0	74	542	31	13	3.5	150
18	22	35	9.3	5.2	4.6	6.2	78	539	28	13	3.8	137
19	20	35	9.2	5.0	4.6	7.1	127	491	24	13	3.8	117
20	19	31	9.0	4.9	4.6	9.5	255	433	22	14	3.7	100
21	17	30	8.8	4.8	4.6	16	638	375	20	14	3.6	93
22	17	29	8.6	4.7	4.7	21	1,100	329	18	13	3.5	92
23	18	27	8.4	4.6	4.8	26	1,110	296	16	12	3.5	86
24	18	26	8.2	4.6	4.8	29	990	251	15	17	3.5	78
25	18	24	8.0	4.5	4.9	33	870	219	14	18	3.4	67
26	19	22	7.7	4.4	5.0	42	784	190	12	17	3.4	59
27	19	20	7.5	4.3	5.1	60	663	165	11	16	3.3	52
28	19	18	7.3	4.3	5.2	100	559	144	11	14	3.6	47
29	19	17	7.2	4.2	-----	155	481	126	9.3	12	4.0	44
30	22	16	7.1	4.2	-----	190	418	112	8.8	12	4.5	45
31	31	-----	7.0	4.2	-----	200	-----	100	-----	10	4.1	-----
TOTAL	491.3	1,004	319.6	159.7	131.4	989.4	9,524	8,566	1,300.1	320.6	153.5	1,936.1
MEAN	15.8	33.5	10.3	5.15	4.69	31.9	317	276	43.3	10.3	4.95	64.5
MAX	31	48	15	6.8	5.2	200	1,110	542	110	18	9.9	156
MIN	8.8	16	7.0	4.2	4.2	5.2	54	100	8.8	5.1	3.3	4.0
CFSM	-14	-29	-09	-04	-04	-28	2.76	2.40	-38	-09	-04	-56
IN.	-16	-32	-10	-05	-04	-32	3.08	2.77	-42	-10	-05	-63

CAL YR 1960: TOTAL	26,095.3	MEAN	71.3	MAX	568	MIN	6.3	CFSM	.62	IN	8.44
WAT YR 1961: TOTAL	24,895.7	MEAN	68.2	MAX	1,110	MIN	3.3	CFSM	.59	IN	8.05

## 5-1285. Pike River near Embarrass, Minn.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	46	66	24	10	4.7	4.5	35	497	315	77	60	16
2	44	69	24	10	4.7	4.6	31	486	287	66	57	15
3	43	93	24	9.9	4.6	4.7	30	449	259	62	54	14
4	43	90	25	9.8	4.5	4.8	32	407	234	58	56	14
5	45	112	25	9.7	4.4	4.9	36	371	219	55	57	14
6	42	105	25	9.5	4.4	5.0	46	337	211	51	74	13
7	39	94	25	9.2	4.3	5.2	52	306	198	73	84	12
8	37	88	24	8.9	4.3	5.5	60	281	195	181	77	11
9	40	80	24	8.6	4.2	5.8	70	260	163	210	70	23
10	51	76	23	8.4	4.1	6.0	60	250	145	216	64	34
11	71	69	21	8.2	4.1	6.4	54	244	141	211	63	48
12	95	66	20	8.1	4.1	6.6	52	250	139	186	80	50
13	112	65	19	8.0	4.1	7.1	50	284	130	152	85	51
14	120	65	18	7.9	4.1	7.6	46	320	116	118	80	48
15	120	60	17	7.8	4.2	8.8	47	356	102	93	78	44
16	115	55	17	7.6	4.2	9.2	49	392	93	75	70	41
17	108	52	16	7.4	4.3	10	61	420	89	63	63	37
18	102	48	15	7.1	4.4	12	92	427	85	51	58	32
19	92	45	15	6.7	4.4	13	127	427	83	42	52	29
20	83	41	15	6.4	4.4	14	153	432	74	40	46	25
21	77	39	14	6.3	4.4	15	176	425	68	46	42	24
22	70	38	14	6.2	4.3	16	205	412	66	52	38	23
23	66	37	14	6.1	4.3	17	232	437	62	58	34	21
24	64	36	14	6.1	4.3	18	244	500	62	70	30	24
25	73	35	14	6.0	4.3	19	249	540	58	86	27	25
26	82	32	13	6.0	4.3	21	251	578	51	74	24	25
27	102	30	12	5.8	4.4	25	269	540	46	73	22	26
28	81	27	12	5.6	4.5	30	298	481	42	96	19	22
29	79	25	11	5.4	-----	38	364	425	64	51	18	21
30	74	24	11	5.1	-----	50	449	376	81	63	16	20
31	70	-----	10	4.9	-----	41	-----	344	-----	65	16	-----
TOTAL	2,266	1,762	555	232.7	121.3	435.7	3,908	12,254	3,878	2,764	1,614	799
MEAN	73.1	58.7	17.9	7.51	4.33	14.1	130	395	129	52.1	52.1	26.6
MAX	120	112	25	10	4.7	50	449	578	315	216	85	51
MIN	37	24	10	4.9	4.1	4.5	30	244	42	40	16	11
CFSM	.64	.51	.16	.07	.04	.12	1.13	3.44	1.12	.78	.45	.23
IN.	.73	.57	.18	.08	.04	.14	1.26	3.96	1.25	.89	.52	.26

CAL YR 1961: TOTAL 27,663.8

MEAN 75.8

MAX 1,110

MIN 3.3

CFSM .66

IN 8.95

WAT YR 1962: TOTAL 30,589.7

MEAN 83.8

MAX 578

MIN 4.1

CFSM .73

IN 9.89

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	18	14	15	4.1	.40	1.5	245	110	109	57	54	34
2	18	14	16	4.2	.40	1.5	117	106	106	50	48	30
3	17	14	16	4.2	.40	1.5	303	106	136	46	42	27
4	16	14	16	4.3	.50	1.6	337	102	143	42	35	24
5	16	14	16	4.4	.50	1.6	365	95	140	36	30	21
6	15	13	15	4.4	.50	1.6	378	90	128	33	25	18
7	14	14	14	4.4	.50	1.6	364	87	115	29	21	17
8	14	14	12	4.2	.60	1.7	335	87	97	26	18	15
9	14	14	11	4.0	.60	1.7	287	87	102	24	15	13
10	15	14	10	3.6	.60	1.7	262	90	159	22	13	12
11	14	13	9.6	3.3	.60	1.7	223	95	214	22	10	11
12	14	14	9.0	3.0	.60	1.7	196	91	251	36	12	13
13	14	16	8.8	2.6	.70	1.7	164	97	275	51	13	12
14	14	16	8.8	2.4	.70	1.8	137	117	282	56	12	12
15	14	17	8.8	2.2	.80	1.8	124	132	270	59	11	11
16	14	17	8.8	1.9	.80	1.8	118	134	253	54	27	10
17	14	16	8.8	1.7	.90	1.9	129	137	234	52	60	10
18	13	16	8.7	1.6	.90	1.9	127	140	212	50	69	13
19	14	15	8.5	1.4	1.0	2.0	125	138	195	47	70	20
20	14	15	8.0	1.2	1.0	2.1	124	135	176	42	66	21
21	14	14	7.4	1.1	1.1	2.2	127	141	162	37	59	22
22	13	14	7.0	.90	1.1	2.4	121	141	149	33	60	22
23	14	13	6.5	.80	1.2	2.8	114	132	132	32	76	22
24	17	12	6.1	.70	1.2	4.4	105	122	111	33	71	22
25	16	11	5.7	.60	1.3	6.0	102	110	93	32	66	23
26	14	11	5.4	.50	1.3	10	106	99	94	29	59	23
27	15	12	5.1	.50	1.4	17	106	94	91	32	53	22
28	16	12	4.8	.50	1.4	26	106	106	83	47	50	22
29	15	12	4.6	.40	-----	65	109	121	72	59	46	21
30	15	13	4.2	.40	-----	120	113	122	62	62	42	20
31	15	-----	4.2	.40	-----	214	-----	114	-----	60	38	-----
TOTAL	460	418	289.8	69.90	23.00	504.2	5,721	3,478	4,657	1,290	1,271	563
MEAN	14.8	13.9	9.35	2.25	.82	16.3	191	112	155	41.6	41.0	18.8
MAX	18	17	16	4.4	1.4	214	378	141	282	62	76	34
MIN	13	11	6.2	.40	.40	1.5	102	87	62	22	10	10
CFSM	.13	.12	.08	.02	.007	.14	1.66	.98	1.35	.36	.36	.16
IN.	.15	.14	.09	.02	.007	.16	1.85	1.12	1.51	.42	.41	.18

CAL YR 1962: TOTAL 27,174.5

MEAN 74.5

MAX 578

MIN 4.1

CFSM .65

IN 8.79

WAT YR 1963: TOTAL 18,744.90

MEAN 51.4

MAX 378

MIN .40

CFSM .45

IN 6.06

## 5-1285. Pike River near Embarrass, Minn.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	18	15	23	5.6	4.7	4.1	3.5	316	65	250	7.4	36
2	18	13	23	5.6	4.8	4.3	4.0	321	59	217	7.9	39
3	16	13	22	5.7	4.8	4.5	7.0	318	52	186	7.9	46
4	15	13	22	5.7	4.9	4.5	10	311	48	153	7.1	45
5	14	12	21	5.8	5.0	4.5	13	321	43	126	6.6	41
6	14	12	21	5.6	5.0	4.4	16	353	43	104	6.2	41
7	14	12	21	5.4	4.9	4.3	17	461	73	91	5.4	72
8	20	12	22	5.3	4.8	4.2	17	644	103	90	5.0	116
9	16	13	21	5.2	4.8	4.2	19	708	150	83	5.2	135
10	13	14	18	5.1	4.7	4.2	24	672	176	74	6.9	161
11	11	14	16	5.0	4.7	4.2	50	588	176	64	8.8	171
12	9.9	15	14	5.0	4.6	4.3	80	494	158	57	9.6	166
13	9.6	15	12	4.8	4.6	4.5	145	414	133	49	7.9	148
14	9.6	15	11	4.8	4.5	4.6	220	360	114	42	7.6	121
15	9.6	15	10	4.8	4.5	4.7	266	318	104	35	7.6	97
16	9.3	14	9.5	4.8	4.5	4.6	278	276	88	30	7.9	85
17	9.3	15	9.0	4.8	4.5	4.4	283	237	79	26	7.1	79
18	9.6	15	8.5	4.8	4.5	4.1	290	209	93	24	6.6	72
19	13	15	8.0	4.9	4.5	4.0	285	199	112	20	5.9	65
20	16	15	7.5	4.9	4.4	4.0	279	191	122	18	5.4	66
21	14	15	7.3	5.0	4.3	3.9	266	179	117	18	6.6	67
22	18	24	7.0	5.1	4.3	3.9	282	164	105	17	8.8	64
23	20	26	6.8	5.1	4.3	3.9	303	152	158	14	8.8	91
24	22	28	6.6	5.0	4.2	3.9	328	155	292	13	9.9	123
25	22	29	6.5	5.0	4.2	3.8	324	154	384	12	11	132
26	21	28	6.3	4.9	4.1	3.7	321	143	445	12	10	133
27	20	27	6.0	4.8	4.1	3.6	284	126	427	12	10	142
28	19	26	5.8	4.8	4.0	3.5	274	108	378	12	13	141
29	18	25	5.7	4.7	4.0	3.4	284	96	328	11	18	132
30	17	23	5.6	4.7	-----	3.4	303	87	290	9.0	26	119
31	16	-----	5.6	4.7	-----	3.4	-----	75	-----	7.9	34	-----
TOTAL	471.9	528	388.7	157.4	131.2	127.0	5,275.5	9,150	4,915	1,876.9	296.1	2,946
MEAN	15.2	17.6	12.5	5.08	4.52	4.10	176	295	164	60.5	9.55	98.2
MAX	22	29	23	5.8	5.0	4.7	328	708	445	250	34	171
MIN	9.3	12	5.6	4.7	4.0	3.4	3.5	75	43	7.9	5.0	36
CFSM	.13	.15	.11	.04	.04	.04	1.53	2.57	1.42	.53	.08	.85
IN.	.15	.17	.13	.05	.04	.04	1.71	2.96	1.59	.61	.10	.95
CAL YR 1963: TOTAL	18,965.70			MEAN 52.0		MAX 378	MIN .40	CFSM .45	IN 6.13			
WAT YR 1964: TOTAL	26,263.7			MEAN 71.8		MAX 708	MIN 3.4	CFSM .62	IN 8.49			

DISCHARGE, IN CUBIC FEET PER SECOND, OCTOBER TO DECEMBER 1964

DAY	OCT.	NOV.	DEC.	DAY	OCT.	NOV.	DEC.	DAY	OCT.	NOV.	DEC.	DAY	OCT.	NOV.	DEC.
1	109	34	15	9	95	27	13	17	64	44	11	25	45	19	10
2	129	33	15	10	87	28	12	18	59	36	11	26	44	19	11
3	148	33	15	11	83	31	12	19	57	34	11	27	42	19	11
4	152	33	14	12	83	41	12	20	54	30	11	28	41	19	10
5	141	31	13	13	81	46	12	21	54	27	10	29	38	17	10
6	128	30	13	14	78	48	12	22	52	24	10	30	36	16	10
7	115	28	13	15	74	48	11	23	49	21	10	31	35	~	10
8	106	28	13	16	69	48	11	24	47	20	10				
TOTAL												2,395	912	362	
MEAN												77.3	30.4	11.7	
MAX												152	48	15	
MIN												35	16	10	
CFSM												.67	.26	.10	
IN.												.77	.29	.12	
CAL YR 1964: TOTAL	28,544.1			MEAN 78.0		MAX 708	MIN 3.4	CFSM .68	IN 9.23						
WAT YR 1965: TOTAL				MEAN		MAX	MIN	CFSM	IN						

5-1290. Vermilion River below Vermilion Lake, near Tower, Minn.

Location.--Lat 47°57'41", long 92°28'33", in SE 1/4 sec. 2, T.63 N., R.17 W., on left bank 200 ft downstream from dam at outlet of Vermilion Lake, 4.4 miles upstream from Twomile Creek, and 14.2 miles northwest of Tower.

Drainage area.--483 sq mi.

Records available.--May 1911 to September 1917, June 1928 to September 1965.

Gage.--Water-stage recorder. Datum of gage is 1,350.36 ft above mean sea level, datum of 1929. May 17, 1911, to Sept. 30, 1917, and July 9, 1931, to Apr. 11, 1939, staff gage at same site and datum. June 26, 1928, to July 8, 1931, staff gage at datum 0.05 ft higher.

Average discharge.--43 years, 299 cfs.

Extremes.--Maximum and minimum discharges for the water years 1961-65 are contained in the following table:

Water year	Maximum			Minimum		
	Date	Discharge (cfs)	Gage height (feet)	Date	Discharge (cfs)	Gage height (feet)
1961	May 21, 1961	1,160	3.08	Oct. 23, 1960	0.40	-1.42
1962	May 30, 1962	1,420	3.40	Mar. 27, 28, 1962	76	.41
1963	June 18, 1963	754	2.40	Nov. 21, 1962	18	-.33
1964	May 18, 1964	1,080	2.97	Nov. 23, 1963	6.5	-.66
1965	May 25, 1965	1,420	3.40	Feb. 28, Sept. 5	56	a .19

a Occurred Feb. 28, 1965.

1911-17, 1928-65: Maximum discharge, 2,710 cfs May 23, 1950 (gage height, 4.68 ft); no flow Oct. 25-29, 1955, caused by temporary storage behind new concrete dam at outlet of Vermilion Lake.

Remarks.--Records good except those for periods of no gage-height record and those for winter periods, which are fair.

Revisions (water years).--WSP 1508: 1913.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	26	6.7	32	48	50	61	105	811	862	268	120	41
2	12	7.8	30	47	50	62	109	822	838	218	120	57
3	18	7.4	31	48	50	62	112	928	816	221	119	35
4	24	8.8	32	48	50	62	115	828	806	221	109	37
5	12	12	40	48	49	63	119	828	794	208	104	31
6	10	9.6	45	50	49	63	119	833	772	194	106	33
7	14	18	45	59	48	64	120	833	767	192	92	30
8	15	13	46	60	47	64	120	811	734	180	82	36
9	12	11	46	62	47	64	120	794	704	172	82	32
10	8.8	17	46	59	48	64	120	822	689	167	67	86
11	9.1	15	47	59	48	64	123	844	669	166	59	125
12	13	21	47	60	49	64	136	811	649	169	45	131
13	16	18	48	58	49	64	136	856	524	169	54	141
14	16	21	50	58	49	65	141	904	599	164	40	149
15	16	19	48	59	50	65	170	979	564	159	34	157
16	12	11	48	59	51	65	199	1,050	539	157	40	167
17	7.1	17	48	57	52	65	225	1,080	524	155	38	174
18	7.4	20	48	57	53	66	232	1,090	484	160	35	174
19	5.4	21	48	56	53	66	243	1,090	444	152	31	182
20	6.2	20	47	55	54	66	282	1,080	430	149	30	180
21	7.1	21	47	56	55	66	403	1,120	430	152	30	180
22	7.2	14	46	55	56	67	504	1,120	394	143	26	169
23	2.9	18	46	54	57	68	564	1,100	374	136	27	167
24	7.2	18	47	53	58	69	639	1,060	350	139	25	164
25	7.4	20	44	53	59	71	699	1,020	346	146	18	164
26	5.2	17	43	52	60	74	740	1,000	342	151	16	160
27	7.8	15	45	53	61	78	778	979	314	152	16	144
28	5.2	21	45	52	61	82	794	941	303	147	17	139
29	6.9	27	45	52	-----	86	811	923	289	139	17	160
30	7.8	30	45	52	-----	92	811	904	300	138	30	144
31	7.6	-----	48	50	-----	100	-----	874	-----	133	30	-----
TOTAL	332.3	495.3	1,373	1,689	1,463	2,132	9,790	29,035	16,750	5,217	1,659	3,589
MEAN	10.7	16.5	44.3	54.5	52.3	68.8	326	937	558	168	53.5	120
MAX	26	30	50	62	61	100	811	1,120	862	268	120	182
MIN	2.9	6.7	30	47	47	61	105	794	289	133	16	30
CFSM	.02	.03	.09	.11	.11	.14	.68	1.94	1.16	.35	.11	.25
IN.	.03	.04	.11	.13	.11	.16	.75	2.24	1.29	.40	.13	.28

CAL YR 1960: TOTAL 79,483.6 MEAN 217 MAX 923 MIN 2.9 CFSM .45 IN 6.12  
 MAY YR 1961: TOTAL 73,524.6 MEAN 201 MAX 1,120 MIN 2.9 CFSM .42 IN 5.66

Note.--No gage-height record Mar. 1 to Apr. 1.

## 5-1290. Vermilion River below Vermilion Lake, near Tower, Minn.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	138	192	157	131	108	118	90	462	1,310	750	624	312
2	142	180	157	131	108	117	91	489	1,310	729	614	312
3	151	186	159	127	105	112	92	509	1,290	704	609	294
4	149	182	155	127	108	108	91	539	1,280	694	624	277
5	142	170	157	129	115	106	94	539	1,260	679	644	277
6	148	188	155	129	113	105	97	554	1,230	669	669	271
7	138	148	155	127	112	105	100	599	1,200	734	654	258
8	125	168	153	125	110	105	106	609	1,180	784	649	262
9	148	172	155	122	108	105	131	639	1,120	850	639	291
10	170	180	161	124	106	105	136	649	1,100	868	624	305
11	170	176	161	124	108	102	134	659	1,070	892	619	328
12	168	170	157	120	106	98	134	684	1,040	874	594	312
13	168	172	157	118	113	98	136	694	998	862	589	294
14	182	188	155	120	120	98	134	709	972	844	589	284
15	182	174	157	120	122	100	136	767	960	844	569	288
16	194	166	153	118	127	100	138	828	947	828	529	268
17	186	168	151	117	127	97	138	979	954	806	519	235
18	176	174	148	115	125	97	136	998	923	789	519	235
19	186	174	148	113	124	94	142	1,080	884	772	489	222
20	190	170	148	112	122	91	153	1,120	880	750	466	224
21	190	172	144	115	120	91	163	1,170	868	724	475	214
22	201	170	142	117	120	91	173	1,210	862	740	466	212
23	182	172	142	117	120	88	194	1,250	844	724	448	217
24	182	172	140	114	120	88	208	1,240	862	729	416	208
25	176	172	144	110	120	88	227	1,280	862	704	412	208
26	182	166	138	108	118	87	241	1,330	850	704	394	194
27	208	166	136	105	118	87	277	1,330	828	694	394	201
28	182	166	136	108	117	85	343	1,340	816	679	390	201
29	174	161	134	108	-----	88	385	1,340	767	679	368	190
30	176	161	133	108	-----	91	426	1,350	750	659	335	182
31	157	-----	131	108	-----	91	-----	1,350	-----	639	324	-----
TOTAL	5,263	5,175	4,619	3,666	3,250	3,036	5,051	28,276	30,219	23,397	16,254	7,576
MEAN	170	173	149	118	116	116	168	912	1,007	755	524	253
MAX	208	192	161	131	127	118	426	1,350	1,310	892	669	328
MIN	125	148	131	105	105	85	90	462	750	639	324	182
CFSM	.35	.36	.31	.24	.24	.20	.35	1.89	2.09	1.56	1.09	.52
IN.	.41	.40	.36	.28	.25	.23	.39	2.18	2.33	1.80	1.25	.58

CAL YR 1961: TOTAL 86,381 MEAN 237 MAX 1,120 MIN 16 CFSM .49 IN 6.65  
 WAT YR 1962: TOTAL 135,772 MEAN 372 MAX 1,350 MIN 85 CFSM .77 IN 10.45

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	174	71	66	64	60	67	103	381	470	484	339	212
2	174	67	60	64	63	67	134	368	494	457	332	208
3	170	73	71	64	64	67	176	343	509	457	294	203
4	166	50	60	65	65	68	201	343	534	439	308	201
5	165	73	61	64	64	71	219	347	519	421	294	194
6	161	68	61	64	64	68	232	343	524	390	280	184
7	159	55	62	63	66	68	241	351	519	385	271	178
8	153	73	64	63	66	68	262	343	514	355	271	170
9	149	70	63	62	68	68	271	347	544	347	258	166
10	155	64	61	61	70	70	280	351	584	347	246	161
11	138	73	60	61	72	74	288	351	574	377	246	157
12	142	64	62	59	74	82	294	360	594	385	235	159
13	144	64	62	58	74	87	298	351	609	368	224	161
14	140	66	63	58	72	84	302	351	614	347	214	161
15	148	60	63	58	70	82	305	360	604	347	212	142
16	103	59	64	59	71	85	324	364	609	347	249	133
17	115	60	62	59	71	88	316	360	609	316	246	134
18	113	60	63	59	71	91	324	343	624	305	246	129
19	96	68	62	58	71	91	335	347	624	294	230	133
20	102	73	62	60	68	91	332	377	619	288	227	129
21	96	46	63	59	68	94	324	360	619	284	230	118
22	91	47	63	59	68	96	332	372	619	280	241	124
23	83	58	66	59	70	90	328	381	589	277	249	125
24	79	58	67	59	70	90	335	385	569	265	252	117
25	79	58	66	59	67	85	343	385	584	265	238	106
26	94	60	67	59	63	85	347	381	564	252	235	106
27	82	60	67	58	61	85	351	394	549	277	224	100
28	79	60	68	58	65	88	355	426	544	320	230	100
29	79	58	65	58	-----	84	339	426	534	347	224	98
30	65	58	65	57	-----	87	343	430	514	355	222	105
31	72	-----	65	57	-----	96	-----	444	-----	335	214	-----
TOTAL	3,166	1,874	1,964	1,665	1,896	2,517	8,634	11,465	16,976	10,713	7,781	4,414
MEAN	121	62.5	63.4	60.2	67.7	81.2	288	370	566	346	251	147
MAX	174	73	71	65	74	96	355	444	624	484	339	212
MIN	65	46	51	57	60	67	103	343	470	252	212	98
CFSM	.25	.13	.13	.12	.14	.17	.60	.77	1.17	.72	.52	.30
IN.	.29	.14	.15	.14	.15	.19	.66	.88	1.31	.82	.60	.34

CAL YR 1962: TOTAL 128,319 MEAN 352 MAX 1,350 MIN 46 CFSM .73 IN 9.88  
 WAT YR 1963: TOTAL 73,865 MEAN 202 MAX 624 MIN 46 CFSM .42 IN 5.69

Note.--No gage-height record Jan. 13 to Feb. 11.

## 5-1290. Vermilion River below Vermilion Lake, near Tower, Minn.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	100	22	45	64	71	67	61	462	689	844	298	210
2	84	31	50	64	71	65	57	484	659	806	312	207
3	91	27	51	63	72	63	57	514	644	794	288	202
4	97	27	51	63	71	63	57	534	629	789	280	210
5	88	24	52	62	70	64	55	579	604	789	294	225
6	74	23	53	63	67	64	64	699	609	756	255	250
7	71	27	52	62	68	63	66	778	644	734	201	260
8	70	28	57	63	67	63	70	811	664	740	203	240
9	71	28	64	65	67	63	68	833	689	724	208	210
10	65	23	64	65	67	64	70	886	704	699	208	190
11	63	17	64	65	70	61	72	904	719	674	182	176
12	65	19	64	65	65	62	74	904	704	649	176	174
13	65	22	65	66	65	61	84	947	679	624	172	176
14	63	31	66	64	65	58	97	960	679	609	166	157
15	58	31	66	64	63	58	108	929	649	589	157	166
16	56	28	67	62	65	57	117	923	654	564	153	174
17	57	27	66	64	63	56	125	910	669	554	149	165
18	56	31	66	66	61	55	138	935	664	534	151	166
19	54	27	65	66	60	56	151	874	644	534	155	159
20	51	31	64	66	60	63	161	916	644	504	155	157
21	66	22	63	63	61	64	182	898	634	484	140	157
22	62	32	63	63	62	64	224	858	629	475	132	163
23	62	23	66	62	64	63	249	898	679	470	128	180
24	61	40	62	63	67	64	271	862	756	421	126	178
25	58	42	61	72	68	63	288	886	789	398	126	186
26	44	46	62	74	68	63	305	838	794	377	128	208
27	40	45	64	74	71	63	328	794	811	372	134	172
28	38	43	64	75	68	63	364	778	822	351	150	194
29	45	45	63	73	67	61	390	762	816	332	185	180
30	38	43	63	74	-----	62	434	734	844	332	200	205
31	28	-----	67	72	-----	60	-----	704	-----	320	210	-----
TOTAL	1,941	905	1,890	2,049	1,924	1,916	4,787	24,804	20,814	17,842	5,822	5,697
MEAN	62.6	30.2	61.0	66.1	66.3	61.8	160	800	694	576	188	190
MAX	100	46	67	75	72	67	434	960	844	844	312	260
MIN	28	17	62	60	55	56	462	604	629	320	126	174
CFSM	.13	.06	.13	.14	.14	.13	.33	1.66	1.44	1.19	.39	.39
IN.	.15	.07	.15	.16	.15	.15	.37	1.91	1.60	1.37	.45	.44
CAL YR 1963: TOTAL	70,997			MEAN 195	MAX 624	MIN 17		CFSM .40	IN 5.47			
WAT YR 1964: TOTAL	90,391			MEAN 247	MAX 960	MIN 17		CFSM .51	IN 6.96			

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	198	138	110	118	87	90	117	789	1,120	644	262	113
2	178	140	108	115	87	105	117	822	1,100	594	268	127
3	186	136	106	117	87	103	115	844	1,080	609	268	106
4	180	129	105	115	87	103	113	880	1,060	594	265	124
5	175	136	105	110	88	102	110	904	1,040	584	255	82
6	184	129	106	110	88	102	117	929	1,060	574	294	105
7	194	131	103	106	88	102	131	916	1,060	524	277	94
8	172	125	106	105	88	98	131	910	1,020	524	268	100
9	180	125	106	105	88	97	131	916	985	480	255	91
10	186	134	105	105	97	97	129	923	979	470	255	78
11	186	136	113	103	100	96	144	923	960	466	246	85
12	174	127	112	105	97	96	151	910	941	484	232	103
13	182	134	110	102	98	96	155	916	935	489	241	97
14	184	144	108	100	97	96	161	910	910	470	212	108
15	180	131	108	100	94	97	168	979	868	462	205	133
16	176	122	118	102	96	98	178	1,040	838	466	205	144
17	166	102	117	97	94	98	190	1,090	806	480	188	148
18	155	108	118	96	94	113	205	1,080	794	475	186	146
19	157	113	113	94	94	113	224	1,090	778	466	170	146
20	166	108	113	94	94	115	255	1,170	772	439	163	148
21	146	106	113	94	90	113	291	1,150	762	416	153	161
22	153	116	112	90	88	113	335	1,190	767	385	146	170
23	155	106	88	113	88	113	403	1,220	729	372	140	172
24	153	108	118	91	88	112	462	1,230	734	343	138	180
25	148	105	118	91	85	110	529	1,270	724	324	142	165
26	149	100	117	91	85	108	584	1,210	724	312	138	170
27	157	108	115	92	86	108	629	1,160	684	284	125	180
28	134	112	113	91	78	108	674	1,160	654	277	124	172
29	148	112	120	91	-----	110	719	1,160	639	277	129	186
30	142	110	118	90	-----	108	762	1,130	629	288	131	224
31	138	-----	118	90	-----	113	-----	1,130	-----	274	124	-----
TOTAL	5,177	3,628	3,465	3,098	2,529	3,233	8,430	31,951	26,162	13,846	6,205	4,058
MEAN	167	121	112	99.9	90.3	104	281	1,031	872	447	200	135
MAX	198	144	120	118	100	115	762	1,270	1,120	644	294	224
MIN	134	100	103	88	78	90	110	789	629	274	124	78
CFSM	.35	.25	.23	.21	.19	.22	.58	2.13	1.81	.92	.41	.28
IN.	.40	.28	.27	.24	.19	.25	.65	2.46	2.01	1.07	.48	.31
CAL YR 1964: TOTAL	97,925			MEAN 268	MAX 960	MIN 55		CFSM .55	IN 7.54			
WAT YR 1965: TOTAL	111,782			MEAN 306	MAX 1,270	MIN 78		CFSM .63	IN 8.61			

5-1294. Rainy Lake near Fort Frances, Ontario  
(Formerly published as Rainy Lake at Fort Frances)

(International gaging station)

Location (revised).--Lat 48°38'30", long 93°20'00", at Five Mile dock, approximately 5 miles north-east of town of Fort Frances.

Records available.--January 1910 to September 1917 and October 1934 to September 1965 in reports of the Geological Survey. August 1911 to September 1965 in reports of Water Resources Branch, Department of Northern Affairs and National Resources, Canada. Prior to October 1949 published as "at Ranier, Minn."

Gage.--Water-stage recorder. Datum of gage is at mean sea level (United States and Canadian Boundary Survey). January 1910 to December 1949 staff gage 3 miles northeast of Ranier, Minn., at same datum. January 1950 to October 1964 water-stage recorder on Government dock at Pither's Point in Fort Frances and supplementary gage in town pumping station, half a mile south, used during winter months, at present datum.

Extremes.--Maximum and minimum elevations, in feet, for the water years 1961-65 are contained in the following table:

Water year	Maximum		Minimum	
	Date	Elevation	Date	Elevation
1961	July 21, 1961.....	a 1,108.23	Apr. 12-14, 1961.....	b 1,105.32
1962	Aug. 8, 1962.....	a 1,108.55	Apr. 18, 1962.....	b 1,105.13
1963	July 28, 1963.....	1,108.35	May 3, 1963.....	1,105.05
1964	June 18, 1964.....	1,109.30	Apr. 11, 1964.....	1,103.99
1965	Oct. 1, 1964.....	1,108.47	Apr. 10, 1965.....	1,104.91

a Maximum daily.

b Minimum daily.

1910-17, 1934-65: Maximum elevation observed, 1,112.97 ft July 5, 1950; minimum observed, 1,101.26 ft Apr. 17, 1923, Apr. 2, 1930.

Cooperation.--This station is maintained by Canada under agreement with the United States.

Month-end elevation, in feet, water years, October 1960 to September 1965

Oct. 31, 1960.... 6.42	Jan. 31, 1962.... 7.49	Apr. 30, 1963.... 5.51	July 31, 1964.... 8.16
Nov. 30..... 6.48	Feb. 28..... 6.96	May 31..... 6.38	Aug. 31..... 8.53
Dec. 31..... 6.65	Mar. 31..... 5.85	June 30..... 8.13	Sept. 30..... 8.51
Jan. 31, 1961.... 6.68	Apr. 30..... 5.90	July 31..... 8.27	Oct. 31..... 8.06
Feb. 28..... 6.16	May 31..... 8.09	Aug. 31..... 8.10	Nov. 30..... 8.11
Mar. 31..... 5.46	June 30..... 8.23	Sept. 30..... 7.61	Dec. 31..... 7.57
Apr. 30..... 6.28	July 31..... 8.32	Oct. 31..... 6.78	Jan. 31, 1965.... 6.66
May 31..... 8.08	Aug. 31..... 8.17	Nov. 30..... 6.39	Feb. 28..... 5.87
June 30..... 8.15	Sept. 30..... 8.00	Dec. 31..... 6.20	Mar. 31..... 5.09
July 31..... 8.03	Oct. 31..... 7.45	Jan. 31, 1964.... 5.48	Apr. 30..... 5.39
Aug. 31..... 7.11	Nov. 30..... 7.10	Feb. 29..... 4.67	May 31..... 8.01
Sept. 30..... 7.80	Dec. 31..... 7.25	Mar. 31..... 4.17	June 30..... 8.00
Oct. 31..... 8.12	Jan. 31, 1963.... 6.77	Apr. 30..... 5.09	July 31..... 8.00
Nov. 30..... 8.35	Feb. 28..... 6.22	May 31..... 8.04	Aug. 31..... 7.65
Dec. 31..... 7.83	Mar. 31..... 5.24	June 30..... 8.08	Sept. 30..... 7.71

Note.--Add 1,100 ft to obtain elevation above mean sea level.

## 5-1305. Sturgeon River near Chisholm, Minn.

Location.--Lat 47°40'25", long 92°54'00", in NE¼NW¼ sec.20, T.60 N., R.20 W., on left bank 1,000 ft upstream from highway bridge, 0.6 mile downstream from East Branch Sturgeon River, and 1½ miles north of Chisholm.

Drainage area.--187 sq mi.

Records available.--August 1942 to September 1965. Monthly discharge only for August 1942, published in WSP 1308.

Gage.--Water-stage recorder. Datum of gage is 1,306.7 ft above mean sea level, datum of 1929. Prior to Aug. 24, 1944, staff gage at site 1,000 ft downstream at different datum.

Average discharge.--23 years, 116 cfs.

Extremes.--Maximums and minimums (discharge in cubic feet per second, gage height in feet).

Annual maximum discharge (\*) and peak discharges above base (500 cfs), water years 1961-65

Date	Time	Discharge	Gage height	Date	Time	Discharge	Gage height	Date	Time	Discharge	Gage height
Apr. 22, 1961	2100	* 1,380	4.43	May 25, 1962	0800	795	3.42	June 26, 1964	0600	830	3.52
May 17, 1961	0100	1,000	3.65	Apr. 3, 1963	1900	* 668	3.23	Apr. 21, 1965	2100	* 1,110	3.98
Apr. 30, 1962	2300	614	3.06	May 8, 1964	1200	* 1,230	4.22	May 18, 1965	1300	526	2.87
May 17, 1962	1800	* 809	3.45								

Annual minimum daily discharge, water years 1961-65

Water year	Date	Discharge	Gage height	Water year	Date	Discharge	Gage height
1961	Dec. 28, 1960,	7.8	a 0.12	1963	Feb. 1-2, 1963	7.2	c 0.08
	Feb. 4-6, 1961			1964	(d)	14	e .35
1962	Mar. 11-14, 1962	14	b .34	1965	Mar. 25 to Apr. 1	12	f .42

a Occurred Aug. 28, 1961.

b Occurred Feb. 3, 4, 6, 1962.

c Occurred Jan. 28 to Feb. 1, 1963.

d Feb. 12-15, 17, 18, Mar. 11-13, 1964.

e Occurred Mar. 11-13, 1964.

f Occurred Apr. 4, 1965.

1942-65: Maximum discharge, 3,630 cfs May 7, 1950 (gage height, 6.41 ft), from rating curve extended above 1,600 cfs on basis of slope-area measurement of peak flow; minimum daily, 6.0 cfs Feb. 18, 27, 1944; minimum gage height, 0.08 ft Jan. 28 to Feb. 1, 1963.

Remarks.--Records good except those for winter periods, which are fair. Records of chemical analyses for the water years 1961-63 are published in reports of the Geological Survey.

Revisions (water years).--WSP 1438: 1946.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	23	37	16	11	8.3	14	82	289	163	24	17	10
2	22	39	16	12	8.0	14	70	254	167	22	17	11
3	22	39	17	12	8.0	14	68	233	165	20	17	12
4	21	38	19	12	7.8	14	60	216	156	18	17	11
5	21	37	23	12	7.8	14	54	199	141	18	17	11
6	20	36	33	12	7.8	14	53	206	132	17	16	11
7	20	34	38	14	8.0	14	50	252	122	16	16	10
8	18	33	38	14	8.3	14	50	283	112	16	15	10
9	18	32	35	14	8.5	14	50	289	106	15	14	11
10	17	32	32	15	9.0	14	48	271	100	14	14	59
11	16	31	29	15	9.6	14	46	255	94	14	14	112
12	18	31	27	15	9.8	14	48	244	88	15	13	92
13	21	34	26	16	10	14	50	350	81	19	13	95
14	21	33	25	16	10	14	60	463	75	19	12	109
15	23	35	23	16	10	14	78	800	69	18	11	113
16	23	39	21	16	11	14	72	964	65	18	11	94
17	23	35	19	16	12	13	81	964	59	18	10	89
18	22	37	18	16	12	13	92	800	53	17	12	78
19	20	35	16	16	12	14	146	628	48	16	11	69
20	19	33	15	16	12	14	353	503	44	16	11	64
21	18	32	14	16	12	15	811	415	41	15	11	66
22	18	31	12	16	13	16	1,280	353	38	15	11	67
23	18	26	10	14	13	18	1,250	307	37	16	11	67
24	18	28	9.3	14	13	20	916	274	35	17	10	65
25	17	26	9.8	13	13	22	680	246	32	16	9.9	61
26	17	26	9.8	11	13	26	547	230	30	16	9.9	59
27	17	24	8.5	11	14	35	475	213	28	20	9.5	58
28	17	18	7.8	10	14	50	423	197	26	20	9.9	58
29	17	16	8.5	9.6	-----	70	378	188	24	19	9.7	58
30	16	16	9.6	9.0	-----	90	325	177	23	19	9.9	58
31	30	-----	11	8.5	-----	87	-----	167	-----	17	9.9	-----
TOTAL	618	943	596.3	418.1	294.9	727	8,696	11,230	2,354	540	389.7	1,688
MEAN	19.9	31.4	19.2	13.5	10.5	23.5	290	362	78.5	17.4	12.6	56.3
MAX	30	39	38	16	14	90	1,280	964	167	24	17	113
MIN	16	16	7.8	8.5	7.8	13	46	167	23	14	9.5	10
CFSM	.11	.17	.10	.07	.06	.13	1.55	1.94	.42	.09	.07	.30
IN.	.12	.19	.12	.08	.06	.14	1.73	2.23	.47	.11	.08	.34

CAL YR 1960: TOTAL 34,344.3 MEAN 93.8 MAX 705 MIN 7.8 CFSM .50 IN 6.83  
WAT YR 1961: TOTAL 28,495.0 MEAN 78.1 MAX 1,280 MIN 7.8 CFSM .42 IN 5.67

## 5-1305. Sturgeon River near Chisholm, Minn.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

OAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	57	67	33	19	16	15	33	595	366	123	119	51
2	55	66	34	19	16	15	34	535	345	113	104	49
3	56	76	34	19	16	15	37	465	314	107	100	55
4	57	67	36	19	16	15	42	401	293	104	103	58
5	56	79	30	19	16	15	56	352	263	103	117	58
6	55	71	30	19	16	15	84	304	251	100	186	58
7	52	69	29	18	16	15	113	271	238	174	190	55
8	50	58	29	18	16	15	140	257	220	212	188	55
9	60	56	28	18	16	15	134	248	208	212	167	75
10	67	52	28	18	16	15	130	243	202	241	142	140
11	84	54	27	18	15	14	123	238	300	220	138	195
12	100	57	26	18	16	14	103	355	294	176	167	212
13	110	58	26	17	16	14	98	430	246	142	169	246
14	112	54	25	17	16	14	91	469	215	119	163	233
15	109	57	25	17	16	15	91	580	193	103	148	200
16	104	52	25	17	16	15	91	668	133	92	134	161
17	100	50	25	17	16	15	104	793	136	85	123	130
18	94	49	25	16	16	15	156	768	188	76	110	110
19	86	46	24	16	16	15	210	723	188	70	104	100
20	80	43	24	16	16	15	248	683	176	88	95	92
21	75	41	24	15	16	16	277	628	163	97	88	81
22	72	40	24	16	16	16	311	604	154	95	80	76
23	72	41	23	16	16	16	324	693	144	95	76	74
24	70	37	23	16	16	17	328	768	142	94	74	75
25	76	41	22	16	16	17	328	788	134	97	69	74
26	81	40	21	16	15	18	314	723	124	95	64	74
27	81	33	21	16	15	19	334	628	113	85	61	72
28	79	36	20	16	15	22	423	526	106	79	59	69
29	78	34	20	16	-----	26	535	461	113	78	55	66
30	75	32	19	16	-----	30	595	415	126	121	53	62
31	71	-----	19	16	-----	32	-----	390	-----	126	51	-----
TOTAL	2,374	1,550	799	530	444	525	5,887	16,007	6,170	3,722	3,497	3,050
MEAN	76.6	51.9	25.8	17.1	15.9	16.9	196	516	236	120	113	102
MAX	112	79	36	19	16	32	595	793	366	241	190	246
MIN	50	32	19	15	15	14	33	103	106	70	51	49
CFSM	+41	+28	+14	+09	+08	+09	1.05	2.76	1.10	+64	+60	+54
IN*	+47	+31	+16	+11	+09	+10	1.17	3.18	1.23	+74	+70	+61

CAL YR 1961: TOTAL 31,066.7 MEAN 85.1 MAX 1,280 MIN 7.8 CFSM .46 IN 6.18

MAT YR 1962: TOTAL 44,567 MEAN 122 MAX 793 MIN 14 CFSM .65 IN 8.86

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963

OAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	60	53	54	28	7.2	9.4	56.2	146	218	69	80	60
2	59	51	54	28	7.2	9.3	590	138	290	66	70	56
3	57	52	55	28	7.3	9.2	643	140	352	61	64	55
4	56	51	61	28	7.4	9.1	628	136	345	56	57	51
5	56	49	59	28	7.5	9.0	623	128	307	51	51	50
6	54	42	51	28	7.8	8.8	535	123	257	51	47	49
7	53	40	48	28	8.0	8.7	442	121	218	52	45	48
8	54	40	41	28	8.3	8.6	369	121	193	50	43	46
9	55	39	37	28	8.7	8.5	314	115	260	48	41	43
10	55	39	33	27	9.1	8.4	260	123	408	45	37	42
11	55	40	30	25	9.1	8.3	228	130	427	46	36	42
12	54	42	28	21	9.2	8.2	205	124	397	63	50	43
13	54	46	27	19	9.4	8.1	186	142	348	80	70	42
14	50	50	27	18	9.4	8.0	174	174	283	84	67	42
15	57	53	28	14	9.7	8.0	163	190	238	76	59	41
16	59	55	29	12	10	7.9	167	190	208	70	90	40
17	57	57	31	11	10	7.9	176	186	183	67	113	40
18	57	57	32	10	10	8.0	176	181	163	65	104	43
19	56	54	34	9.5	10	8.2	176	176	154	61	89	46
20	55	51	32	9.1	10	8.4	178	169	148	58	76	44
21	56	45	30	8.7	10	8.8	174	172	138	54	66	44
22	57	41	30	8.5	10	9.2	163	183	150	50	71	44
23	58	42	29	8.3	10	10	152	176	112	46	86	43
24	59	44	29	8.1	10	12	142	161	101	42	82	43
25	57	46	28	7.9	9.8	15	136	146	97	41	71	45
26	56	47	28	7.8	9.7	21	136	132	103	43	65	46
27	55	51	29	7.7	9.6	43	138	172	98	62	62	43
28	57	53	29	7.6	9.5	82	134	268	88	100	63	43
29	57	53	29	7.5	-----	183	136	287	79	110	65	44
30	55	53	28	7.4	-----	317	144	266	70	103	65	44
31	54	-----	28	7.3	-----	427	-----	235	-----	91	64	-----
TOTAL	1,739	1,436	1,108	514.4	253.9	1,298.0	8,250	5,149	6,407	1,961	2,049	1,362
MEAN	56.1	47.9	35.7	16.6	9.07	41.9	275	166	214	63.3	66.1	45.4
MAX	60	57	61	28	10	427	643	287	427	110	113	60
MIN	53	39	27	7.3	7.2	7.9	134	115	70	41	36	40
CFSM	+30	+26	+19	+09	+05	+22	1.47	.89	1.14	.34	+35	+24
IN*	+35	+29	+22	+10	+05	+26	1.64	1.02	1.27	.39	+41	+27

CAL YR 1962: TOTAL 44,121 MEAN 121 MAX 793 MIN 14 CFSM .65 IN 8.77

MAT YR 1963: TOTAL 51,527.3 MEAN 86.4 MAX 643 MIN 7.2 CFSM .46 IN 6.27

## 5-1305. Sturgeon River near Chisholm, Minn.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	42	46	31	18	15	15	14	366	130	165	23	68
2	42	45	32	18	15	15	14	355	123	144	24	71
3	42	44	32	18	15	15	16	334	115	124	24	72
4	41	43	32	18	15	15	17	348	107	110	23	78
5	39	43	33	18	15	15	19	473	100	93	22	75
6	38	43	32	18	15	15	20	852	98	91	21	72
7	38	43	31	18	15	15	20	1,100	123	85	20	134
8	38	43	29	17	15	15	22	1,210	161	85	19	178
9	37	47	28	17	15	15	24	1,080	218	80	18	205
10	37	49	26	17	15	15	30	840	241	74	20	238
11	36	50	26	16	15	14	50	643	225	68	21	254
12	37	50	25	16	14	14	100	509	188	62	21	271
13	36	48	26	16	14	14	200	423	154	57	20	248
14	36	47	26	16	14	15	350	362	142	52	19	193
15	36	46	26	15	14	15	400	314	119	48	19	156
16	36	43	25	15	15	15	450	277	106	44	18	132
17	38	43	25	15	15	15	488	251	98	41	18	119
18	38	41	25	15	14	15	427	311	109	37	17	110
19	40	41	25	15	14	15	372	358	152	34	17	101
20	41	40	24	15	15	15	321	380	163	34	17	100
21	43	38	23	15	15	15	304	362	152	34	21	97
22	48	37	22	15	15	15	376	314	134	32	24	94
23	51	36	21	15	15	15	415	277	257	30	25	104
24	54	35	21	15	15	16	430	260	530	29	28	128
25	53	35	21	15	15	16	390	241	743	28	27	140
26	51	36	20	15	15	15	334	218	788	27	26	148
27	50	35	20	15	15	15	283	190	609	27	25	154
28	48	34	20	15	15	15	290	174	401	27	46	158
29	48	33	19	15	15	15	321	153	266	26	35	150
30	47	32	19	15	15	15	355	1507	198	25	65	140
31	47	-----	19	15	-----	15	-----	140	-----	24	68	-----
TOTAL	1,308	1,246	784	496	429	464	6,852	13,275	6,950	1,842	811	4,188
MEAN	42.2	41.5	25.3	16.0	14.8	15.0	228	428	232	59.4	26.2	140
MAX	54	50	33	18	15	16	488	1,210	788	165	68	271
MIN	36	32	19	15	14	14	14	140	98	24	17	68
CFSM	.23	.22	.14	.09	.08	.08	1.22	2.29	1.24	.32	.14	.75
IN.	.26	.25	.16	.10	.09	.09	1.36	2.64	1.38	.37	.16	.83

CAL YR 1963: TOTAL 30,582.3 MEAN 83.8 MAX 643 MIN 7-2 CFSM .45 IN 6.08  
WAT YR 1964: TOTAL 38,645 MEAN 106 MAX 1,210 MIN 14 CFSM .56 IN 7.69

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	132	74	42	30	20	18	12	505	257	67	25	23
2	136	75	40	30	20	18	13	488	246	80	26	22
3	138	75	39	29	20	18	13	473	246	72	35	21
4	138	76	38	29	20	18	14	446	254	67	19	21
5	134	78	37	29	20	18	15	412	268	61	33	21
6	126	78	36	29	19	17	16	397	314	54	50	21
7	119	78	35	29	19	17	17	376	348	50	52	26
8	113	76	34	29	19	17	19	362	446	46	47	25
9	107	75	33	28	18	17	23	368	355	45	41	25
10	103	75	33	27	18	17	27	334	314	41	36	24
11	101	85	33	26	18	17	35	314	268	38	34	22
12	101	92	32	26	18	17	70	283	228	37	31	30
13	103	98	32	26	18	17	115	266	200	44	28	41
14	101	98	31	26	18	16	205	248	176	41	26	52
15	100	98	31	25	18	16	350	297	158	38	22	97
16	97	97	31	26	18	16	461	423	144	37	24	100
17	94	95	31	26	18	15	585	465	132	40	28	101
18	92	91	30	26	18	15	814	513	119	40	28	104
19	94	79	29	26	18	15	928	496	115	36	25	104
20	92	72	29	26	18	14	1,030	476	126	32	24	103
21	89	66	29	26	18	13	1,080	449	136	31	22	100
22	88	62	29	25	18	13	1,100	423	132	30	21	121
23	85	60	28	25	18	12	1,030	415	121	28	20	121
24	84	58	28	25	18	12	918	408	107	26	20	126
25	81	55	28	24	18	12	819	408	97	22	19	119
26	80	50	28	23	18	12	718	390	86	23	19	110
27	79	48	28	22	18	12	653	369	79	22	20	106
28	78	46	28	21	18	12	604	352	75	20	20	95
29	78	45	29	21	-----	12	567	331	69	19	19	94
30	76	43	29	21	-----	12	530	304	65	20	21	257
31	75	-----	30	20	-----	12	-----	274	-----	25	24	-----
TOTAL	3,114	2,198	990	801	517	467	12,781	12,045	5,601	1,232	875	2,233
MEAN	100	73.3	31.9	25.8	18.5	15.1	426	389	187	39.7	28.2	74.4
MAX	138	98	42	30	20	18	1,100	513	366	80	52	257
MIN	75	43	28	20	18	12	12	248	195	19	19	119
CFSM	.54	.39	.17	.14	.10	.08	2.28	2.08	1.00	.21	.15	.40
IN.	.62	.44	.20	.16	.10	.09	2.54	2.40	1.11	.25	.17	.44

CAL YR 1964: TOTAL 41,609 MEAN 114 MAX 1,210 MIN 14 CFSM .61 IN 8.28  
WAT YR 1965: TOTAL 42,854 MEAN 117 MAX 1,100 MIN 12 CFSM .63 IN 8.52

5-1310. Dark River near Chisholm, Minn.

Location.--Lat 47°41'27", long 92°49'15", in SW $\frac{1}{4}$ SW $\frac{1}{4}$  sec.12, T.60 N., R.20 W., on right bank 50 ft downstream from remains of abandoned highway bridge,  $3\frac{1}{2}$  miles upstream from mouth, and  $12\frac{1}{4}$  miles northeast of Chisholm.

Drainage area.--50.6 sq mi.

Records available.--August 1942 to September 1961 (discontinued).

Gage.--Water-stage recorder. Datum of gage is 1,316.8 ft above mean sea level, datum of 1929 (surveyed by Topographic Division). Prior to Aug. 24, 1944, staff gage at site 50 ft upstream at same datum.

Average discharge.--19 years, 35.9 cfs.

Extremes.--Maximum discharge during water year 1961, 515 cfs Aug. 22 (gage height, 4.93 ft); minimum, 3.2 cfs Aug. 16, 17 (gage height, 0.87 ft).  
1942-61: Maximum discharge, 1,170 cfs May 7, 1950 (gage height, 7.10 ft); minimum, 0.3 cfs Aug. 3, 1956; minimum gage height, 0.87 ft Mar. 22, 23, 1949, Aug. 16, 17, 1961.

Remarks.--Records good except those for period of backwater from leaves and debris, which are fair. Records of chemical analyses for the water year 1961 are published in reports of the Geological Survey.

Revisions (water years).--WSP 1508: 1943(M), 1947-48(M), 1950.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	9.1	13	10	6.2	6.2	5.2	28	102	36	8.2	4.9	4.0
2	8.7	14	10	6.4	6.1	5.3	30	88	37	7.2	4.6	4.6
3	8.4	14	11	6.5	6.1	5.3	30	74	37	6.2	5.2	4.8
4	8.4	15	11	6.5	6.1	5.4	28	65	36	6.1	5.0	4.3
5	8.5	15	14	6.5	6.1	5.4	27	58	35	5.7	4.9	4.2
6	8.7	15	14	6.5	5.9	5.4	27	61	32	5.5	4.8	4.8
7	8.9	15	17	6.5	5.9	5.4	25	69	30	5.3	4.6	4.8
8	8.9	16	22	6.5	5.9	5.4	24	71	28	5.0	4.4	4.8
9	10	16	22	6.5	5.9	5.4	24	76	27	4.8	4.4	4.6
10	8.2	16	15	6.4	5.8	5.4	24	77	26	4.6	4.3	35
11	10	16	14	6.4	5.8	5.4	23	76	24	3.8	4.0	46
12	8.7	16	13	6.4	5.7	5.5	24	74	23	4.2	3.8	35
13	9.6	16	13	6.4	5.7	5.5	24	110	23	4.6	3.7	39
14	9.1	16	11	6.4	5.6	5.5	27	130	21	4.6	3.6	42
15	10	16	11	6.4	5.6	5.5	29	230	19	5.0	3.6	42
16	10	17	10	6.3	5.6	5.6	36	257	18	6.0	3.5	42
17	9.8	17	10	6.3	5.6	5.6	40	278	18	6.1	3.5	41
18	9.3	17	10	6.3	5.6	5.6	39	230	16	6.1	3.9	38
19	9.1	16	9.8	6.3	5.6	5.6	54	177	15	6.1	3.9	35
20	8.9	15	9.1	6.3	5.6	5.7	99	142	14	5.8	3.7	31
21	8.9	15	8.5	6.3	5.4	5.7	209	118	13	6.0	3.6	29
22	9.1	14	8.5	6.2	5.4	5.8	454	95	12	6.1	3.6	28
23	9.1	14	8.2	6.2	5.4	5.9	461	77	11	6.1	3.6	26
24	9.1	13	7.9	6.2	5.4	5.9	366	65	11	6.4	3.6	25
25	8.9	13	6.0	6.2	5.3	6.0	263	58	9.7	6.1	3.5	23
26	8.9	13	6.0	6.2	5.3	6.1	219	51	9.3	6.0	3.5	21
27	8.7	12	5.6	6.1	5.2	6.2	184	47	8.2	8.1	3.4	21
28	8.7	11	5.4	6.1	5.2	6.5	156	44	8.0	6.5	3.7	19
29	8.7	10	5.4	6.2	-----	6.9	136	40	7.5	5.7	3.8	18
30	11	10	5.7	6.2	-----	8.0	115	37	7.2	5.4	3.9	18
31	12	-----	5.9	6.2	-----	21	-----	35	-----	4.6	3.9	-----
TOTAL	285.4	436	330.0	196.1	159.0	193.1	3,225	3,112	611.9	177.9	124.4	694.9
MEAN	9.21	14.5	10.6	6.33	5.68	6.23	108	100	20.4	5.74	4.01	23.2
MAX	12	17	22	6.5	6.2	21	461	278	37	8.2	5.2	46
MIN	8.2	10	5.4	6.1	5.2	5.2	23	35	7.2	3.6	3.4	4.0
CFSM	1.18	.29	.21	.13	.11	.12	2.12	1.98	.40	.11	.08	.46
IN.	.21	.32	.24	.14	.12	.14	2.37	2.29	.45	.13	.09	.51
CAL YR 1960: TOTAL	11,482.5			MEAN 31.4		MAX 198	MIN 5.4	CFSM .62	IN 8.44			
WAT YR 1961: TOTAL	9,545.7			MEAN 26.2		MAX 461	MIN 3.4	CFSM .52	IN 7.02			

Note.--Backwater from leaves and debris Oct. 1 to Apr. 18.

5-1315. Little Fork River at Little Fork, Minn.

Location.--Lat 48°24', long 93°34', in NW $\frac{1}{4}$  sec. 9, T.68 N., R.25 W., on left bank 100 ft downstream from bridge on State Highway 65 at town of Little Fork,  $\frac{1}{2}$  miles upstream from Beaver Creek, and 18 miles upstream from mouth.

Drainage area.--1,730 sq mi, approximately.

Records available.--June to November 1909, April to November 1910, April 1911 to June 1917, September 1917, October 1917 to March 1919 (gage heights only), June 1928 to September 1965.

Gage.--Water-stage recorder. Datum of gage is 1,073.06 ft above mean sea level, datum of 1929. June 23, 1909, to Mar. 4, 1917, staff gage at same site and datum. Mar. 5 to Sept. 30, 1917, June 22, 1928, to June 21, 1936, chain gage and June 22, 1936, to July 20, 1937, wire-weight gage, at site 100 ft upstream at same datum.

Average discharge.--42 years (1911-16, 1928-65), 970 cfs.

Extremes.--Maximum and minimum discharges for the water years 1961-65 are contained in the following table:

Water year	Maximum			Minimum		
	Date	Discharge (cfs)	Gage height (feet)	Date	Discharge (cfs)	Gage height (feet)
1961	Apr. 23, 1961	9,120	22.00	Aug. 30, 1961	a 73	4.80
1962	July 10, 1962	13,500	27.05	Feb. 9-11, 1962	a 57	-
1963	Apr. 4, 1963	8,790	b 24.94	Feb. 9-22, 1963	a 15	-
1964	May 9, 1964	11,600	24.84	Mar. 11, 1964	a 74	-
1965	Apr. 22, 1965	11,400	c 25.05	Feb. 28 to Mar. 5	a 68	-

a Minimum daily.

b Backwater from ice.

c Maximum gage height for year, 29.81 ft Apr. 21, 1965, backwater from ice.

1909-17, 1928-65: Maximum discharge, 25,000 cfs Apr. 18, 1916, May 11, 1950 (gage height, 37.00 ft); minimum daily, 15 cfs Feb. 9-22, 1963.

Remarks.--Records good except those for winter periods, which are fair. Records of chemical analyses for the water years 1962-63 are published in reports of the Geological Survey.

Revisions (water years).--WSP 955: Drainage area. WSP 1508: 1913, 1916, 1928-32, 1934.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	148	222	228	126	68	75	1,350	3,180	1,150	203	99	105
2	147	256	233	124	67	76	1,200	2,810	1,160	189	118	132
3	143	268	239	122	66	78	1,040	2,500	1,130	185	145	121
4	140	290	246	121	66	80	880	2,240	1,130	167	158	114
5	141	298	252	119	65	80	760	2,050	1,080	163	162	109
6	138	308	260	118	65	81	660	1,930	1,010	168	148	105
7	129	310	265	117	66	82	570	2,060	937	162	137	107
8	126	315	268	115	66	82	520	2,510	851	143	132	107
9	120	315	270	114	66	83	470	2,750	838	119	121	112
10	114	310	268	112	67	84	440	2,680	884	94	118	126
11	114	300	265	110	68	85	420	2,510	845	88	119	168
12	114	290	260	109	69	86	391	2,350	796	83	118	220
13	116	280	252	106	69	88	383	2,440	758	81	108	1,430
14	143	270	244	105	68	90	365	3,870	734	82	104	1,610
15	150	265	236	104	68	92	409	5,150	681	90	100	1,720
16	155	260	226	101	68	95	536	7,970	607	95	98	2,000
17	157	257	214	97	68	98	616	9,060	555	103	94	1,860
18	158	252	206	95	68	102	838	8,400	513	104	104	1,620
19	160	250	200	93	68	106	985	6,880	469	125	103	1,360
20	164	248	188	91	68	112	2,360	5,490	429	124	95	1,140
21	157	248	178	88	68	124	5,460	4,480	385	114	91	996
22	162	248	172	85	68	140	8,520	3,710	359	112	93	884
23	165	248	166	84	69	170	9,080	3,110	329	111	94	806
24	167	249	158	81	69	205	8,510	2,660	308	108	90	774
25	171	249	152	79	70	270	7,580	2,330	285	104	89	734
26	167	245	145	77	71	340	6,870	2,050	265	98	88	675
27	167	240	140	75	72	430	5,870	1,810	254	98	84	625
28	165	232	134	73	73	600	4,970	1,630	242	98	80	585
29	165	230	131	72	-----	1,090	4,270	1,480	226	104	78	576
30	176	228	130	71	-----	1,400	3,660	1,330	218	106	74	585
31	182	-----	128	69	-----	1,500	-----	1,220	-----	102	83	-----
TOTAL	4,621	7,981	6,454	3,053	1,904	8,024	79,983	104,640	19,426	3,725	3,325	21,506
MEAN	149	266	208	98.5	68.0	259	2,666	3,375	648	120	107	717
MAX	182	315	270	126	73	1,500	9,080	9,060	1,160	203	162	2,000
MIN	114	222	128	69	65	75	365	1,220	218	81	74	105
CFSM	.09	.15	.12	.06	.04	.15	1.54	1.95	.37	.07	.06	.41
IN.	.10	.17	.14	.07	.04	.17	1.72	2.25	.42	.08	.07	.46
CAL YR 1960: TOTAL	245,204			MEAN 670		MAX 8,250	MIN 47	CFSM .39	IN 5.27			
WAT YR 1961: TOTAL	264,642			MEAN 725		MAX 9,080	MIN 65	CFSM .42	IN 5.69			

## 5-1315. Little Fork River at Little Fork, Minn.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	588	454	225	102	62	59	140	6,730	3,700	1,780	1,450	499
2	576	428	227	102	62	59	160	6,070	3,510	1,510	1,390	477
3	567	460	230	103	62	59	200	5,310	3,080	1,260	1,380	461
4	555	460	232	104	61	60	275	4,670	2,730	1,140	1,840	461
5	540	454	228	105	60	61	350	4,110	2,630	1,200	2,230	456
6	519	484	220	105	59	63	550	3,610	2,380	2,130	3,540	441
7	495	513	210	102	58	65	900	3,150	2,050	2,990	5,230	431
8	469	450	202	98	58	68	1,450	2,920	2,040	8,110	5,390	493
9	466	460	195	94	57	72	1,600	2,860	1,930	12,600	4,370	727
10	443	549	182	91	57	77	1,850	2,950	1,780	13,200	3,520	1,080
11	454	516	170	88	57	82	1,700	3,030	1,640	10,300	2,790	1,330
12	501	466	153	86	58	86	1,450	3,010	1,540	7,400	2,610	1,900
13	594	426	145	86	59	88	1,300	3,130	1,470	5,580	2,860	2,320
14	731	390	140	85	60	90	1,300	3,190	1,420	4,020	2,820	2,190
15	841	365	135	84	62	91	1,080	4,730	1,290	2,880	2,510	1,940
16	874	350	132	81	62	93	1,020	5,720	1,230	2,390	2,180	1,640
17	841	340	130	79	61	94	1,050	6,840	1,310	2,050	1,860	1,390
18	793	318	130	75	61	96	1,300	12,600	1,890	1,690	1,620	1,180
19	731	298	130	72	61	96	2,280	13,400	3,780	1,460	1,350	993
20	669	275	128	71	60	98	3,400	12,500	3,600	1,380	1,220	884
21	610	260	124	70	60	99	3,450	10,000	3,040	1,640	1,100	796
22	564	252	122	70	60	100	3,430	8,110	2,660	1,950	1,310	720
23	522	248	120	70	61	100	3,400	8,280	2,420	1,150	951	690
24	484	246	120	68	61	100	3,490	10,200	2,240	1,180	871	669
25	469	246	118	67	62	102	3,500	10,100	2,030	2,480	812	672
26	449	240	116	66	62	105	3,500	9,020	1,790	2,660	765	653
27	446	235	114	62	65	107	3,750	7,490	1,590	2,700	700	628
28	451	230	110	64	60	109	5,680	6,400	1,380	2,120	668	604
29	484	227	107	63	-----	112	6,930	5,490	1,360	1,800	629	573
30	486	225	105	62	-----	118	7,060	4,410	1,740	1,550	573	555
31	478	-----	103	62	-----	125	-----	4,070	-----	1,430	521	-----
TOTAL	17,670	10,865	4,803	2,540	1,685	2,734	67,395	194,900	65,350	105,740	60,670	27,870
MEAN	570	362	155	81.9	60.2	88.2	2,147	6,287	2,178	3,410	1,957	929
MAX	874	549	232	105	62	125	7,060	13,400	3,780	13,200	5,300	2,320
MIN	443	225	103	62	57	59	140	2,860	1,230	1,140	521	431
CFSM	.33	.21	.19	.05	.03	.05	1.30	3.63	1.26	1.97	1.13	.54
IN.	.38	.23	.10	.05	.04	.06	1.45	4.19	1.40	2.27	1.30	.60

CAL YR 1961: TOTAL 278,924

MEAN 764

MAX 9,080

MIN 65

CFSM .44

IN 6.00

WAT YR 1962: TOTAL 562,182

MEAN 1,540

MAX 13,400

MIN 57

CFSM .89

IN 12.09

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	537	339	305	118	24	20	600	1,290	3,890	855	1,780	628
2	510	336	312	115	22	21	1,700	1,270	4,470	782	1,450	573
3	484	329	320	113	20	21	3,450	1,240	4,460	754	1,170	525
4	463	329	310	112	19	22	7,600	1,200	4,780	696	957	478
5	449	290	285	111	18	22	6,700	1,150	4,610	619	784	434
6	415	275	263	111	17	23	5,300	1,100	4,000	585	684	401
7	396	315	252	111	16	24	4,580	1,050	3,270	561	555	364
8	390	310	235	111	16	25	3,610	1,040	2,710	498	481	336
9	380	310	220	109	15	27	3,000	1,040	2,300	454	423	310
10	377	315	210	107	15	28	2,550	1,040	2,110	423	385	289
11	369	320	208	105	15	30	2,150	1,020	3,220	537	352	276
12	364	320	205	99	15	32	1,840	971	4,650	858	327	269
13	354	317	200	93	15	35	1,630	975	4,560	894	327	265
14	352	327	200	89	15	39	1,470	1,160	4,000	854	354	285
15	352	327	200	85	15	43	1,360	1,620	3,360	822	349	296
16	352	320	200	80	15	47	1,290	1,890	2,800	780	384	312
17	354	311	200	76	15	52	1,370	1,900	2,340	749	538	305
18	352	300	200	70	15	57	1,470	1,800	2,000	650	714	317
19	352	285	195	68	15	62	1,480	1,630	1,770	693	1,030	298
20	352	272	188	63	15	67	1,520	1,490	1,720	752	1,050	283
21	346	263	180	59	15	70	1,530	1,440	1,710	527	920	294
22	350	254	175	55	15	72	1,500	1,460	1,650	515	784	329
23	346	250	170	50	16	76	1,430	1,490	1,520	466	740	327
24	352	270	160	46	16	81	1,330	1,430	1,370	406	743	310
25	344	300	155	44	16	88	1,220	1,310	1,200	375	784	301
26	342	340	150	40	17	100	1,190	1,180	1,110	350	774	289
27	336	367	137	37	18	115	1,170	1,230	1,170	350	706	274
28	354	329	138	34	19	135	1,150	3,460	1,050	483	672	269
29	354	312	130	32	-----	160	1,190	4,300	1,000	1,070	659	265
30	352	308	125	30	-----	195	1,280	4,120	930	1,720	641	257
31	344	-----	122	27	-----	275	-----	3,740	-----	1,960	644	-----
TOTAL	11,774	9,240	6,358	2,400	464	2,064	67,660	51,036	79,666	22,018	22,161	10,159
MEAN	380	308	205	77.4	16.6	66.6	2,185	1,646	2,655	710	715	339
MAX	537	367	320	118	24	275	7,600	4,300	4,780	1,960	1,780	628
MIN	336	250	122	27	15	20	600	971	930	350	327	257
CFSM	.22	.18	.12	.04	.01	.04	1.30	.95	1.53	.41	.41	.20
IN.	.25	.20	.14	.05	.01	.04	1.45	1.10	1.71	.47	.48	.22

CAL YR 1962: TOTAL 556,216

MEAN 1,524

MAX 13,400

MIN 57

CFSM .88

IN 11.96

WAT YR 1963: TOTAL 284,994

MEAN 781

MAX 7,600

MIN 15

CFSM .45

IN 6.13

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965												
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	1,060	369	300	154	80	68	100	5,180	2,650	616	369	185
2	1,060	362	152	80	80	68	110	4,940	2,450	597	187	187
3	1,030	359	272	150	80	68	110	4,900	2,340	1,090	469	192
4	982	354	264	148	78	68	120	4,810	2,290	1,140	481	209
5	947	352	258	145	78	68	130	4,540	2,320	1,050	597	203
6	861	342	255	145	78	70	140	4,320	2,440	904	588	196
7	828	339	252	142	75	70	150	4,050	2,830	743	1,230	189
8	800	334	250	140	75	70	175	3,740	3,390	628	1,830	187
9	758	334	250	135	75	70	220	3,440	3,480	552	1,940	203
10	718	332	245	130	75	72	300	3,180	3,180	495	1,150	203
11	681	352	242	128	75	75	500	2,990	2,810	443	894	203
12	650	393	245	125	75	75	900	2,890	2,470	412	718	211
13	604	454	230	120	75	80	1,400	2,730	2,160	415	591	216
14	576	516	230	115	75	80	2,000	2,520	1,910	416	498	250
15	558	552	225	110	75	82	3,000	3,050	1,690	534	423	418
16	540	564	220	110	75	82	4,500	4,600	1,500	576	354	709
17	522	558	215	105	75	82	5,500	6,310	1,330	604	315	1,100
18	510	531	210	105	75	80	6,500	6,230	1,090	693	280	1,310
19	486	465	205	102	75	80	8,000	5,700	920	819	269	1,340
20	472	400	200	100	73	80	9,100	5,120	868	897	259	1,300
21	466	430	195	98	73	80	10,300	4,740	878	822	267	1,210
22	460	410	194	95	73	80	10,800	4,840	891	734	254	1,240
23	446	400	190	95	73	80	9,850	4,480	914	641	224	1,690
24	440	410	184	92	73	80	9,010	4,200	858	558	152	1,940
25	434	420	180	90	70	82	8,350	4,290	777	486	180	2,030
26	426	400	176	90	70	82	7,570	4,090	715	426	184	1,960
27	415	370	172	85	68	85	6,880	3,720	662	372	267	1,750
28	407	350	168	85	68	85	6,360	3,430	659	309	1,540	209
29	393	330	164	85	-----	90	5,860	3,210	650	301	216	1,880
30	380	310	162	80	-----	95	5,480	3,050	622	294	203	1,720
31	372	-----	158	80	-----	98	-----	2,870	-----	301	189	-----
TOTAL	19,282	12,092	6,795	3,536	2,090	2,425	123,415	128,150	51,744	18,893	16,110	25,471
MEAN	622	403	219	114	74.6	81.4	4,114	4,134	1,725	609	520	849
MAX	1,060	564	300	154	80	98	10,800	6,310	3,480	1,140	1,940	2,030
MIN	372	310	158	80	68	68	100	2,520	622	294	180	185
CFSM	.36	.23	.13	.07	.04	.05	2.38	2.39	1.00	.35	.30	.49
IN.	.41	.26	.15	.08	.04	.05	2.65	2.75	1.11	.41	.35	.55
CAL YR 1964: TOTAL 400,660 MEAN 1,095												
WYR 1965: TOTAL 410,003 MEAN 1,123												
MAX 11,300 MIN 74												
MEAN 10,800 MIN 68												
CFSM .63 IN 8.6L												
CFSM .65 IN 8.81												

5-1320. Big Fork River at Big Falls, Minn.

Location.--Lat 48°12', long 93°48', in sec.35, T.155 N., R.25 W., on left bank at village of Big Falls, 700 ft downstream from falls, 0.3 mile downstream from bridge on U.S. Highway 71, and 4½ miles upstream from Sturgeon River.

Drainage area.--1,460 sq mi, approximately.

Records available.--August to November 1909, April to November 1910, April 1911 to September 1912 (gauge heights and discharge measurements only), June 1928 to September 1965.

Gage.--Water-stage recorder. Datum of gage is 1,144.71 ft above mean sea level, datum of 1929. Prior to June 10, 1911, staff gage at railroad bridge about 0.4 mile upstream at different datum. June 10, 1911, to Dec. 17, 1937, staff or chain gage at site 200 ft upstream at same datum.

Average discharge.--37 years (1928-1965), 637 cfs.

Extremes.--Maximum and minimum discharges for the water years 1961-65 are contained in the following table:

Water year	Maximum			Minimum		
	Date	Discharge (cfs)	Gage height (feet)	Date	Discharge (cfs)	Gage height (feet)
1961	May 17, 1961	4,290	8.02	Aug. 11, 27, 1961	a 54	2.70
1962	May 25, 1962	9,560	12.63	Feb. 17-20, 1962	a 60	-
1963	June 3, 1963	3,840	b 7.61	Feb. 18-24, 1963	a 45	-
1964	May 8, 1964	4,840	8.52	Mar. 5-7, 1964	a 62	-
1965	Apr. 21, 1965	7,510	10.85	Mar. 23, 24, 1965	a 78	-

a Minimum daily.

b Maximum gage height for year, 8.06 ft Apr. 4, 1963, backwater from ice.

1909-12, 1928-65: Maximum discharge, 14,800 cfs May 8, 9, 1950; maximum gage height, 17.08 ft May 8, 1950; minimum discharge recorded, 7 cfs Aug. 7, 1939.

Remarks.--Records good except those for winter periods, which are fair. Records of chemical analyses for the water years 1962-63 are published in reports of the Geological Survey.

Revisions (water years).--WSP 1308: 1935(M).

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	265	316	250	165	78	72	370	1,550	837	138	243	89
2	256	321	250	160	76	72	340	1,400	900	128	206	102
3	248	344	260	155	75	74	330	1,280	956	118	172	94
4	243	340	270	150	75	74	321	1,180	921	112	145	89
5	239	340	275	148	75	75	316	1,120	830	99	131	89
6	243	330	280	145	76	76	311	1,100	746	92	118	89
7	235	321	280	142	77	77	340	1,220	648	86	105	89
8	243	316	275	140	78	77	349	1,320	570	76	94	89
9	248	316	270	140	79	78	359	1,360	546	74	84	92
10	243	265	260	140	79	80	364	1,350	515	74	89	97
11	243	201	250	140	79	81	394	1,280	463	74	84	124
12	243	243	245	140	78	82	326	1,200	426	72	79	128
13	252	270	240	140	77	82	340	1,500	410	72	76	142
14	256	316	230	135	77	84	369	2,330	379	74	72	197
15	256	369	228	130	77	89	311	3,200	354	76	74	222
16	261	354	220	130	76	91	316	4,150	326	84	72	222
17	270	330	215	125	77	92	420	4,240	297	92	74	302
18	293	256	210	117	78	94	426	3,950	274	102	84	297
19	284	243	205	113	79	92	364	3,430	256	118	84	279
20	274	316	200	110	80	92	778	2,900	239	105	81	256
21	279	321	195	105	80	92	1,720	2,480	235	99	79	252
22	279	354	190	102	80	93	2,220	2,160	231	97	81	256
23	279	316	185	98	78	100	2,140	1,900	231	94	84	265
24	279	239	180	95	76	105	2,010	1,680	227	97	86	307
25	274	261	180	92	74	115	2,070	1,520	227	94	84	307
26	270	307	180	90	73	130	2,100	1,380	222	92	81	297
27	265	293	175	86	72	190	2,070	1,240	193	94	69	288
28	261	270	175	85	72	300	2,000	1,110	176	99	89	284
29	261	260	170	83	-----	390	1,880	1,020	172	265	76	279
30	270	250	170	81	-----	405	1,700	935	153	359	79	288
31	293	-----	170	79	-----	390	-----	865	-----	274	76	-----
TOTAL	8,105	8,978	6,883	3,761	2,151	3,944	27,354	57,350	12,960	3,530	3,051	5,911
MEAN	261	299	222	121	76.8	127	912	1,850	432	114	98.4	197
MAX	293	369	280	165	80	405	2,220	4,240	956	359	243	307
MIN	235	201	170	79	72	72	311	865	153	72	69	89
CFSM	18	20	15	108	105	109	62	1,27	30	108	107	13
IN-	21	23	18	10	105	110	70	1,46	33	109	108	15

CAL YR 1960: TOTAL 152,390 MEAN 416 MAX 3,040 MIN 110 CFSM .29 IN 3.88  
 WAT YR 1961: TOTAL 143,978 MEAN 394 MAX 4,240 MIN 69 CFSM .27 IN 3.67

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963												
DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	596	558	503	178	70	47	190	1,170	3,410	515	394	364
2	590	552	469	173	67	48	380	1,130	3,680	475	344	340
3	583	527	469	173	62	48	750	1,100	3,810	452	307	311
4	576	521	469	173	60	49	1,740	1,080	3,590	415	270	297
5	576	460	452	172	58	50	3,200	1,030	3,110	374	243	27
6	576	450	425	172	56	50	3,000	963	2,560	349	218	256
7	570	470	390	171	55	51	2,690	907	2,120	326	197	235
8	570	460	290	170	55	51	2,200	921	1,800	311	185	227
9	576	440	268	168	54	52	1,890	942	1,580	311	172	206
10	596	455	252	163	51	52	1,760	914	1,560	297	164	218
11	602	510	240	155	50	52	1,650	872	1,680	316	157	201
12	609	527	238	148	49	53	1,530	844	1,690	364	157	248
13	609	503	235	140	49	54	1,400	851	1,580	431	185	311
14	602	498	234	130	48	55	1,300	956	1,440	452	214	284
15	602	498	232	122	47	56	1,200	1,090	1,310	480	201	270
16	602	498	232	118	46	56	1,160	1,170	1,200	447	206	265
17	602	490	235	112	46	57	1,220	1,170	1,090	404	279	252
18	609	460	232	107	45	58	1,320	1,110	998	354	302	252
19	622	470	230	104	45	59	1,390	1,050	1,100	384	244	284
20	616	440	225	101	45	61	1,330	1,000	1,250	311	252	239
21	609	400	220	97	45	62	1,250	977	1,150	288	235	239
22	602	320	215	94	45	65	9,190	970	1,020	265	218	231
23	602	260	210	92	45	67	1,120	956	998	243	261	243
24	602	245	208	90	45	70	1,030	907	799	222	307	222
25	602	300	200	86	46	72	998	851	720	210	293	218
26	596	360	198	84	46	74	1,030	804	746	185	265	210
27	563	192	180	80	46	75	1,050	810	746	210	256	210
28	564	915	188	77	47	78	1,050	2,820	674	458	210	265
29	558	527	183	76	47	105	1,080	3,570	622	515	344	210
30	558	533	180	74	47	130	1,140	3,760	564	458	364	210
31	558	533	179	73	47	165	1,140	3,440	564	458	369	210
TOTAL	18,318	13,712	8,493	3,672	1,423	2,047	42,238	40,445	48,498	11,194	7,908	7,489
MEAN	591	457	274	125	50.8	66.0	1,408	1,305	1,617	361	255	250
MAX	622	558	503	178	70	165	3,200	3,760	3,810	515	394	364
MIN	558	245	179	73	45	47	190	804	564	185	157	201
CFSM	.40	.31	.19	.09	.03	.05	.96	.89	1.11	.25	.17	.17
IN.	.47	.35	.22	.10	.04	.05	1.08	1.03	1.24	.29	.20	.19
CAL YR 1962:	TOTAL 410,134											
WAT YR 1963:	TOTAL 205,637											
			MEAN	1,124		MAX	9,410	MIN	60	CFSM	.77	IN 10.45
			MEAN	563		MAX	3,810	MIN	45	CFSM	.39	IN 5.24

## 5-1320. Big Fork River at Big Falls, Minn.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	206	252	200	126	93	66	100	2,700	570	706	145	1,480
2	201	239	198	127	92	66	103	2,580	527	602	134	1,520
3	193	239	197	127	90	64	105	2,420	498	552	134	1,440
4	193	239	197	127	89	63	111	2,520	463	533	131	1,250
5	193	235	195	127	88	62	117	3,430	436	509	124	1,080
6	197	227	193	125	88	62	120	4,360	431	475	121	942
7	227	188	122	87	62	128	4,720	432	492	431	115	844
8	210	227	181	121	87	63	134	4,750	552	394	112	778
9	201	235	174	119	86	64	145	4,350	914	404	108	746
10	201	239	169	118	85	65	153	3,750	1,350	420	108	732
11	206	248	165	117	83	67	165	3,170	1,200	420	108	680
12	193	256	158	115	81	70	185	2,730	1,080	410	108	622
13	197	261	156	114	81	73	210	2,380	956	374	112	564
14	218	261	152	112	80	75	250	2,120	830	335	112	564
15	222	261	148	111	79	78	320	1,900	720	307	112	458
16	222	248	146	110	78	79	400	1,760	622	274	108	426
17	222	235	142	110	77	80	550	1,630	552	270	105	410
18	222	235	140	109	75	81	760	1,550	552	256	102	394
19	222	222	138	109	74	81	1,030	1,490	687	214	99	374
20	231	200	136	110	73	81	1,740	1,420	810	252	97	364
21	245	201	135	111	72	82	1,830	1,350	830	227	121	359
22	239	203	134	110	71	82	2,630	1,250	772	214	153	354
23	252	209	134	109	70	85	3,060	1,180	935	189	176	374
24	279	219	134	108	68	86	3,070	1,120	1,610	176	189	441
25	270	228	134	107	67	89	2,890	1,060	2,060	189	197	475
26	270	230	132	106	65	91	2,590	963	2,000	172	210	503
27	270	226	132	104	65	93	2,270	879	1,740	164	227	583
28	270	220	131	102	66	94	2,230	804	1,440	161	384	622
29	274	212	130	100	67	95	2,590	746	1,100	161	865	628
30	265	203	127	99	-----	96	2,710	674	872	161	1,140	628
31	256	-----	124	95	-----	97	-----	616	-----	153	1,410	-----
TOTAL	7,057	6,937	4,820	3,507	2,277	2,392	32,696	66,332	27,601	10,105	7,367	20,635
MEAN	228	231	155	113	78.5	77.2	1,090	2,140	920	326	238	688
MAX	279	261	200	127	93	97	3,070	4,750	2,060	706	1,410	1,520
MIN	193	200	124	95	65	62	100	616	431	153	97	354
CFSM	.16	.16	.11	.08	.05	.05	.75	1.47	.63	.22	.16	.47
IN.	.18	.18	.12	.09	.06	.06	.83	1.69	.70	.26	.19	.53
CAL YR 1963: TOTAL	183,928	MEAN 504	MAX 3,810	MIN 45	CFSM .35	IN 4.69						
WAT YR 1964: TOTAL	191,726	MEAN 524	MAX 4,750	MIN 62	CFSM .36	IN 4.88						

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	616	354	232	158	102	84	90	2,460	2,020	552	265	265
2	602	354	230	158	100	84	92	2,390	1,890	540	243	261
3	576	360	225	158	98	85	96	2,400	1,860	540	235	248
4	558	369	222	156	97	86	96	2,350	1,880	509	239	239
5	546	374	217	156	97	88	98	2,270	1,880	492	239	243
6	540	374	210	155	95	88	100	2,260	1,960	463	284	239
7	521	384	210	155	95	90	105	2,240	2,290	436	441	235
8	498	384	207	152	95	90	110	2,170	2,620	404	558	231
9	475	384	205	148	93	92	115	2,060	2,650	379	521	231
10	458	384	203	143	93	92	120	2,140	2,420	359	452	231
11	436	399	200	140	92	94	130	2,260	2,220	344	399	227
12	426	452	200	140	92	94	160	2,350	1,970	302	349	227
13	410	469	197	135	90	94	350	2,260	1,710	354	311	227
14	404	498	194	132	90	94	500	2,100	1,490	452	279	239
15	404	515	190	130	90	94	800	2,780	1,320	546	256	293
16	399	509	188	130	90	92	1,100	4,780	1,170	583	231	307
17	389	480	185	127	88	88	1,800	5,750	1,070	583	239	452
18	379	475	183	125	88	85	2,500	5,560	977	590	239	503
19	374	360	180	123	88	83	3,700	4,880	907	564	243	527
20	374	350	180	123	88	82	5,100	4,000	886	515	239	540
21	379	305	177	123	87	80	5,890	3,610	886	463	206	540
22	384	290	175	122	86	79	4,910	3,430	872	431	193	590
23	384	280	172	122	84	78	4,250	3,130	817	394	193	758
24	384	275	170	120	82	78	3,860	3,010	746	364	189	942
25	384	272	170	120	82	80	3,560	3,010	680	335	176	1,030
26	380	265	165	117	82	80	3,290	2,880	622	311	180	1,030
27	375	252	162	115	83	82	3,100	2,660	583	284	193	963
28	370	245	160	110	83	84	2,880	2,560	590	256	193	893
29	365	238	160	108	-----	86	2,730	2,460	583	243	218	851
30	360	235	160	105	-----	86	2,580	2,310	593	248	261	991
31	358	-----	160	102	-----	88	-----	2,150	-----	270	270	-----
TOTAL	13,508	10,885	5,889	4,108	2,530	2,680	54,214	90,670	42,152	13,106	8,534	14,553
MEAN	436	363	190	133	90.4	86.5	1,807	2,925	1,405	423	275	485
MAX	616	515	232	158	102	94	5,890	5,750	2,650	590	558	1,030
MIN	358	235	160	102	82	78	90	2,060	583	243	176	227
CFSM	.30	.25	.13	.09	.06	.06	1.24	2.00	.96	.29	.19	.33
IN.	.34	.28	.15	.10	.06	.07	1.28	2.31	1.07	.33	.22	.37
CAL YR 1964: TOTAL	203,194	MEAN 555	MAX 4,750	MIN 62	CFSM .38	IN 5.18						
WAT YR 1965: TOTAL	262,829	MEAN 720	MAX 5,890	MIN 78	CFSM .49	IN 6.69						

5-1335. Rainy River at Manitou Rapids, Minn.

(International gaging station)

Location.--Lat 48°38'04", long 93°54'47", in sec.36, T.160 N., R.26 W., on left bank at Manitou Rapids, 3½ miles east of Manitou Post Office and 4 miles west of Indus.

Drainage area.--19,400 sq mi, approximately.

Records available.--July 1928 to September 1965. Monthly discharge only for some periods, published in WSP 1308. October 1911 to October 1924 (gage heights only) at site near Birchdale in files of Corps of Engineers. Published as "near Birchdale" 1932-34.

Gage.--Water-stage recorder. Datum of gage is 1,062.48 ft above mean sea level, datum of 1929. Prior to Nov. 10, 1934, chain gage at site near Birchdale 7 miles downstream at different datum.

Average discharge.--37 years, 12,000 cfs.

Extremes.--Maximum and minimum discharges for the water years 1961-65 are contained in the following table:

Water year	Maximum			Minimum		
	Date	Discharge (cfs)	Gage height (feet)	Date	Discharge (cfs)	Gage height (feet)
1961	May 18, 1961	25,400	10.65	Jan. 16, 1961	a 2,830	-
1962	May 26, 1962	55,000	17.67	Nov. 12, 1961	5,880	3.15
1963	June 28, 1963	29,500	11.88	Dec. 26, 1962	a 4,100	-
1964	June 26, 1964	47,600	16.10	Nov. 25, 1963	4,130	2.00
1965	June 10, 1965	37,900	13.92	Sept. 7, 1965	3,800	1.74

a Minimum daily.

1928-65: Maximum discharge, 71,600 cfs May 12, 1950 (gage height, 21.04 ft); minimum daily, 928 cfs Dec. 26, 1929.

Remarks.--Records good except those for winter periods, which are fair. Diurnal fluctuation caused by powerplant at International Falls. Some regulation at low and medium flows by Rainy and Namanagan Lakes.

Cooperation.--This station is maintained by the United States under agreement with Canada.

Revisions (water years).--WSP 1055: 1944.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	8,530	6,530	6,250	5,600	6,400	7,150	9,780	16,700	13,100	8,350	7,940	7,440
2	8,160	6,140	5,990	5,180	7,220	6,540	9,430	15,000	15,600	5,760	8,080	8,120
3	5,160	5,250	5,980	6,200	7,790	6,500	9,330	14,200	19,300	5,060	8,660	5,810
4	6,050	5,030	4,000	6,120	7,200	6,770	8,930	14,600	20,500	4,100	8,750	4,180
5	7,940	5,480	3,450	6,250	6,300	7,990	8,510	14,400	20,600	3,900	8,840	3,710
6	8,530	4,500	6,500	6,450	7,150	6,310	8,160	14,000	20,400	6,380	7,860	6,770
7	8,290	4,310	7,700	6,650	7,660	6,940	8,260	14,100	20,000	8,160	5,840	7,120
8	8,040	6,490	7,400	4,180	7,790	6,290	8,440	14,700	19,600	8,180	5,350	7,680
9	6,030	7,160	6,800	4,400	7,470	6,320	8,100	15,500	19,400	7,160	7,500	7,780
10	4,100	7,000	6,700	5,500	7,460	7,320	8,350	15,800	19,500	4,740	8,490	7,680
11	5,700	6,590	4,800	6,190	7,750	7,130	8,510	15,500	19,500	4,500	8,750	5,330
12	6,720	6,570	3,960	6,180	7,160	5,630	8,750	15,300	19,400	6,720	8,570	5,570
13	7,200	4,840	6,300	6,110	6,740	7,280	8,710	15,400	19,100	7,920	8,000	8,730
14	7,280	4,210	7,180	6,220	7,650	7,230	8,530	16,200	19,200	8,000	7,020	10,900
15	6,590	4,290	6,780	4,000	7,470	6,810	8,490	18,500	19,000	7,300	7,960	11,600
16	4,780	5,720	7,120	2,830	7,810	6,850	9,360	21,200	18,900	7,200	8,660	12,000
17	4,460	6,100	6,790	6,700	7,940	6,670	9,940	24,300	18,100	5,570	8,330	11,500
18	6,280	5,670	4,000	6,850	7,530	6,810	10,600	25,300	13,200	5,300	8,880	8,100
19	7,740	5,760	3,000	6,300	7,390	7,560	11,400	24,300	10,600	7,800	8,950	6,960
20	7,700	5,690	5,300	5,900	6,500	7,810	12,000	22,500	10,100	8,790	8,550	9,500
21	8,350	4,580	6,120	6,690	7,100	7,580	14,700	20,700	10,400	8,930	7,080	10,600
22	8,330	5,840	5,070	7,320	6,330	7,210	18,800	19,300	9,660	9,080	5,060	11,100
23	5,790	6,700	6,040	7,820	7,580	6,970	20,600	19,100	8,950	9,180	6,960	11,000
24	4,160	6,300	6,400	7,000	7,670	8,250	19,100	16,900	8,790	9,430	7,860	10,500
25	5,860	4,720	5,210	6,070	6,930	8,770	20,700	16,100	8,060	8,060	8,310	8,270
26	7,460	4,720	4,700	6,200	6,680	9,640	20,900	16,800	6,140	8,310	8,270	8,620
27	7,920	4,260	5,100	6,500	6,390	10,700	20,600	16,700	7,000	9,080	7,900	9,980
28	7,940	4,450	6,400	7,600	7,090	10,400	19,800	16,200	7,940	8,930	5,880	10,600
29	7,760	5,960	7,030	5,440	-----	10,600	18,700	15,700	8,770	8,900	4,360	10,700
30	5,960	6,800	6,190	5,100	-----	10,400	17,700	14,200	8,950	8,970	6,460	11,000
31	4,420	-----	6,810	7,000	-----	10,300	-----	12,800	-----	9,500	7,100	-----
TOTAL	209,230	167,660	181,070	184,850	202,150	238,730	375,120	531,000	439,760	229,260	236,400	258,850
MEAN	6,749	5,389	5,841	5,963	7,220	7,701	12,500	17,130	14,660	7,395	7,626	8,628
MAX	8,530	7,160	7,700	7,820	7,940	10,700	20,900	25,300	20,600	9,500	8,950	12,000
MIN	4,100	4,210	3,000	2,830	6,300	5,630	8,100	12,800	6,140	3,900	4,360	3,710
CFSM	.35	.29	.30	.31	.37	.40	.64	.88	.76	.38	.39	.44
IN.	.40	.32	.35	.35	.39	.46	.72	1.02	.84	.44	.45	.50
CAL YR 1960: TOTAL	3,276,920			MEAN 8,953	MAX 22,400	MIN 3,000	CFSM .46	IN 6.28				
WAT YR 1961: TOTAL	3,254,080			MEAN 8,915	MAX 25,300	MIN 2,830	CFSM .46	IN 6.24				

## 5-1335. Rainy River at Manitou Rapids, Minn.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	10,700	10,000	9,000	11,300	8,800	11,300	10,600	25,800	39,900	26,200	16,800	19,600
2	11,000	8,860	9,900	11,000	8,600	12,300	9,430	25,300	39,700	24,300	16,700	20,100
3	11,100	8,790	9,850	11,000	8,700	12,400	9,870	23,900	36,800	23,900	16,500	19,400
4	11,400	8,880	8,900	10,000	9,800	12,400	10,600	22,400	37,700	24,400	16,600	19,100
5	11,600	7,420	8,000	8,800	8,300	11,400	11,100	20,800	36,700	24,800	17,200	17,500
6	11,600	7,560	9,200	10,200	7,900	12,000	11,900	19,800	35,800	25,200	19,100	15,400
7	11,400	9,080	10,000	9,700	8,300	12,400	12,000	18,200	35,100	28,300	26,500	13,400
8	10,500	9,320	9,800	9,400	9,000	12,400	12,200	17,700	34,700	35,700	30,600	12,900
9	9,020	9,180	9,800	9,300	9,300	12,400	11,300	17,500	34,100	42,000	30,900	13,400
10	8,380	8,970	9,400	10,200	9,200	12,300	12,200	17,500	33,600	49,900	31,100	13,200
11	10,100	8,490	8,600	10,000	9,100	12,500	12,300	17,600	33,200	51,600	30,900	20,100
12	10,900	6,400	9,000	10,200	8,200	11,000	12,100	17,900	32,800	48,100	30,100	25,100
13	11,100	7,000	9,500	10,500	9,000	11,800	12,000	17,700	32,000	43,600	30,400	27,100
14	11,300	7,600	9,800	8,900	9,800	12,200	11,800	17,700	30,400	40,200	30,800	26,900
15	10,800	7,160	10,200	9,000	9,000	12,300	11,500	20,100	29,400	36,700	30,400	23,600
16	11,600	7,500	10,400	8,600	10,200	12,400	11,500	22,000	27,000	34,500	29,600	21,400
17	12,000	7,800	10,500	8,800	10,200	12,400	11,100	26,300	26,200	32,900	28,800	20,200
18	12,400	7,900	10,000	8,600	10,000	12,500	12,800	37,300	26,400	31,600	28,000	19,600
19	12,200	7,760	9,500	8,400	9,200	11,000	14,300	46,500	31,900	28,400	27,300	17,000
20	11,200	7,880	10,300	8,400	9,600	11,100	15,500	51,000	34,600	26,900	26,200	15,600
21	10,200	9,020	10,600	7,700	10,400	11,000	17,700	50,100	35,800	25,000	22,300	14,100
22	8,820	8,880	10,700	7,500	10,700	11,000	18,900	46,900	35,200	25,200	20,400	13,100
23	8,990	9,230	10,800	8,100	10,400	10,700	19,000	47,500	34,600	25,400	20,000	12,600
24	10,700	9,250	10,800	8,700	10,600	10,600	19,200	50,700	33,800	24,000	19,900	11,700
25	10,900	9,500	11,000	8,400	10,700	10,600	19,100	54,100	33,200	23,300	19,700	12,200
26	10,400	9,710	11,200	8,500	10,300	9,360	18,700	54,800	32,600	23,100	19,100	12,600
27	10,300	9,270	11,400	8,600	10,700	9,870	18,700	52,700	31,800	22,600	17,600	12,800
28	10,500	8,230	7,200	11,000	10,500	10,500	19,400	51,900	31,100	28,300	24,900	12,800
29	9,060	9,540	9,600	7,500	10,600	10,600	22,700	45,400	28,500	18,200	18,700	12,700
30	8,930	9,250	10,300	8,000	-----	10,700	24,500	43,600	27,800	17,000	18,700	12,500
31	9,540	-----	10,900	8,400	-----	10,700	-----	40,600	-----	16,900	18,700	-----
TOTAL	328,340	256,080	309,450	281,500	266,800	356,130	434,400	1,018,330	993,800	919,900	727,800	507,700
MEAN	10,590	8,536	9,982	9,081	9,259	11,490	14,020	32,850	33,130	29,670	23,440	16,920
MAX	12,400	10,000	11,400	11,300	11,000	12,500	24,500	54,800	39,900	51,600	31,100	27,100
MIN	8,380	6,400	8,000	7,500	7,900	9,360	9,430	17,500	26,200	16,900	16,500	11,700
CFSM	.55	.44	.51	.47	.49	.59	.75	1.69	1.71	1.53	1.21	.87
IN.	.63	.49	.59	.54	.51	.68	.83	1.95	1.91	1.76	1.40	.97

CAL YR 1961: TOTAL 3,589,990 MEAN 9,836 MAX 25,300 MIN 2,830 CFSM .51 IN 6.88

WAT YR 1962: TOTAL 6,400,200 MEAN 17,530 MAX 54,800 MIN 6,400 CFSM .90 IN 12.27

M Expressed in thousands.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	11,300	9,960	8,900	6,800	8,500	8,700	6,800	10,500	17,800	28,700	25,100	12,000
2	11,800	10,100	8,600	8,200	8,850	8,800	11,000	17,800	17,800	28,300	24,900	10,400
3	11,800	9,730	5,540	8,000	8,800	8,600	12,000	11,200	16,200	27,600	25,500	9,660
4	11,700	9,150	7,440	9,000	7,950	8,600	16,000	10,400	18,500	24,400	23,900	11,000
5	11,700	5,490	8,640	9,000	8,100	8,600	21,000	9,410	19,900	23,500	22,600	11,600
6	11,600	7,760	8,770	7,600	8,650	9,200	20,600	7,120	19,900	22,600	22,500	11,600
7	11,300	9,110	8,790	7,000	8,550	9,500	18,300	8,100	18,800	22,300	20,600	11,600
8	9,910	9,340	8,710	8,400	8,700	9,600	12,500	8,770	17,800	21,600	17,800	11,300
9	10,600	9,180	8,060	8,800	8,750	9,500	13,600	9,150	16,300	20,800	17,800	8,380
10	11,300	9,080	6,750	9,000	8,650	9,300	13,400	9,430	13,700	16,600	17,800	9,820
11	11,100	6,900	5,200	9,000	7,500	9,000	12,900	9,040	15,600	14,800	17,500	10,900
12	11,000	4,830	8,500	9,000	8,050	9,500	12,300	8,950	21,400	15,900	16,700	13,800
13	10,700	5,620	8,600	8,800	8,600	9,600	11,900	6,840	24,200	19,000	17,200	11,100
14	10,400	7,980	8,600	7,600	8,600	9,600	9,890	8,860	25,000	20,200	17,500	11,000
15	8,820	9,410	8,500	8,200	8,600	9,600	7,640	10,000	24,800	19,600	17,500	10,900
16	9,130	9,540	8,350	8,700	8,300	9,700	7,550	10,400	23,900	19,800	17,800	9,960
17	10,300	9,730	4,800	8,700	8,000	9,700	10,000	10,900	21,800	19,700	18,300	10,400
18	10,300	9,040	6,900	8,700	5,500	9,500	11,400	11,100	21,300	19,400	18,400	11,400
19	10,100	9,320	8,290	8,700	6,500	9,400	11,400	10,400	22,200	19,200	17,400	11,600
20	10,000	7,200	8,350	8,200	8,000	9,500	10,800	7,880	23,200	19,400	17,100	11,600
21	9,840	9,360	8,200	7,600	8,400	9,400	10,300	9,410	27,400	19,300	13,700	11,300
22	6,160	9,200	8,100	7,150	8,600	9,400	7,700	10,200	29,100	18,100	12,300	10,200
23	7,700	7,160	6,400	8,000	8,600	9,500	8,380	10,200	29,800	18,600	11,900	7,440
24	9,150	8,200	4,600	8,700	8,500	9,600	9,940	10,200	25,200	18,500	11,800	10,500
25	9,800	8,460	4,200	8,700	7,800	7,600	10,000	9,820	27,900	18,300	12,000	10,100
26	9,980	5,220	4,100	8,800	8,300	7,900	9,890	9,340	28,100	18,300	10,200	10,600
27	9,840	7,160	6,600	8,450	8,700	7,800	10,200	6,880	29,100	18,100	10,700	10,600
28	9,450	8,770	8,350	7,000	8,700	7,400	10,400	9,380	29,400	18,500	11,800	10,500
29	6,010	9,110	8,550	7,800	-----	7,400	7,340	13,600	29,300	19,200	12,100	9,800
30	7,820	9,110	8,500	8,400	-----	7,400	8,970	15,800	29,100	23,100	12,300	6,450
31	9,500	-----	7,400	8,400	-----	7,500	-----	16,500	-----	24,900	12,300	-----
TOTAL	310,110	246,220	230,920	255,200	230,550	276,000	341,910	310,780	686,500	638,300	524,300	315,520
MEAN	10,000	8,207	7,449	8,232	8,234	8,903	11,400	10,030	22,880	20,590	16,910	10,520
MAX	11,800	10,100	8,900	9,000	8,850	9,700	21,000	16,500	29,400	28,700	25,100	13,800
MIN	6,010	4,830	4,100	6,800	5,500	7,400	6,800	6,840	13,700	14,800	10,200	6,450
CFSM	.52	.42	.38	.42	.42	.46	.59	.52	1.18	1.06	.87	.54
IN.	.59	.47	.44	.49	.44	.53	.66	.60	1.32	1.22	1.01	.60

CAL YR 1962: TOTAL 6,293,580 MEAN 17,240 MAX 54,800 MIN 4,100 CFSM .89 IN 12.06

WAT YR 1963: TOTAL 4,366,310 MEAN 11,960 MAX 29,400 MIN 4,100 CFSM .62 IN 8.37

## 5-1335. Rainy River at Manitou Rapids, Minn.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	7,640	9,590	7,700	8,350	8,800	8,000	7,800	17,300	20,200	38,200	16,400	27,800
2	9,680	9,410	5,500	7,000	8,800	7,300	7,200	17,700	17,800	37,000	17,100	32,700
3	10,400	8,600	8,100	8,400	7,700	7,600	7,100	16,700	16,600	36,000	16,900	34,700
4	10,300	6,000	8,300	8,400	8,600	8,100	7,000	15,000	16,300	35,200	17,200	34,100
5	9,960	7,840	8,700	8,400	8,600	8,300	6,500	17,600	16,100	34,400	17,200	33,100
6	9,480	8,950	8,800	7,400	8,600	8,400	4,940	21,700	16,000	33,900	16,900	32,000
7	6,070	9,130	9,000	8,200	8,600	8,300	5,970	25,500	16,100	33,300	17,100	31,100
8	7,460	8,660	8,800	8,800	8,600	8,300	6,430	28,600	16,200	33,000	17,200	30,200
9	9,610	8,380	8,850	9,100	8,600	7,100	5,790	39,300	24,900	32,800	17,100	29,900
10	9,910	7,280	8,800	9,000	7,400	6,900	5,770	29,700	38,000	33,100	16,900	29,200
11	9,870	5,560	8,800	8,650	7,900	7,600	6,340	27,300	43,600	33,600	15,400	26,100
12	9,020	7,280	8,800	8,100	8,400	7,800	7,000	24,800	43,800	33,200	15,000	20,900
13	7,740	8,820	8,550	7,200	7,700	7,900	6,490	23,500	42,300	32,400	13,500	18,700
14	5,010	9,270	8,850	8,200	8,700	7,900	9,430	21,900	40,700	31,900	12,000	17,400
15	6,450	9,340	8,850	8,600	8,700	8,000	11,600	19,400	39,100	31,500	11,300	14,800
16	8,930	9,220	5,100	8,700	8,600	5,500	13,200	17,800	38,000	31,000	11,300	13,700
17	9,180	8,140	8,900	8,900	6,800	5,500	14,300	16,400	36,900	30,600	11,300	13,200
18	9,290	8,860	8,500	9,000	8,700	7,400	15,400	14,800	36,500	30,400	11,600	13,000
19	9,290	6,960	8,500	9,000	8,500	8,200	15,800	15,400	37,100	30,300	12,500	12,800
20	8,750	8,310	8,400	7,400	8,900	8,400	15,000	15,700	37,800	30,500	12,900	12,600
21	5,540	8,600	8,500	8,700	9,100	8,000	16,600	15,900	38,700	30,300	13,000	12,200
22	7,420	7,900	8,400	8,900	8,900	7,900	17,000	15,900	37,700	30,300	13,000	11,600
23	9,320	8,680	7,600	8,900	8,600	5,500	18,500	18,000	39,700	29,200	13,500	11,600
24	9,540	7,820	6,200	8,900	6,600	5,700	19,300	18,600	42,700	27,500	12,900	12,100
25	9,430	4,720	6,200	8,800	8,200	6,300	18,600	18,800	45,700	25,500	12,500	12,800
26	9,110	7,220	6,400	8,800	8,100	7,200	16,500	20,500	47,500	24,000	11,800	13,400
27	9,020	8,460	8,000	8,100	7,800	7,800	14,300	21,400	46,700	21,800	11,700	14,400
28	6,600	8,140	8,500	8,600	7,640	7,500	14,900	21,300	44,600	20,700	12,600	14,100
29	8,490	6,400	8,600	8,700	7,800	6,400	15,500	21,100	42,200	18,100	16,200	16,900
30	9,520	7,640	7,000	8,700	-----	5,200	16,800	20,800	39,900	16,800	19,200	21,000
31	9,680	-----	8,300	8,700	-----	6,000	-----	20,500	-----	16,100	21,600	-----
TOTAL	267,710	238,030	246,100	262,500	239,940	224,500	347,100	629,900	1,020,400	922,400	455,100	618,100
MEAN	8,636	7,934	7,939	8,468	8,274	7,242	11,170	20,320	34,010	29,750	14,680	20,600
MAX	10,400	9,590	9,000	9,100	9,100	8,400	19,300	30,300	47,500	38,200	21,600	34,700
MIN	5,010	4,720	5,100	7,000	6,600	5,200	4,940	14,800	16,000	16,100	11,300	11,600
CFSM	.65	.61	.61	.64	.63	.57	1.05	1.75	1.53	1.76	.76	1.06
IN.	.51	.46	.47	.50	.46	.43	.67	1.21	1.96	1.77	.87	1.18

CAL YR 1963: TOTAL 4,330,900

MEAN 11,870

MAX 29,400

MIN 4,720

CFSM .61

IN 8.30

WAT YR 1964: TOTAL 5,471,780

MEAN 14,950

MAX 47,500

MIN 4,720

CFSM .77

IN 10.49

M Expressed in thousands.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	22,800	15,000	13,000	12,300	10,300	10,300	11,000	24,600	32,100	19,100	11,500	9,660
2	24,900	15,000	13,000	12,400	10,400	10,200	10,900	24,300	31,500	19,200	10,700	10,200
3	25,900	15,000	12,900	12,600	10,200	9,800	10,800	24,500	31,700	19,100	11,300	10,100
4	26,000	15,100	12,900	12,700	10,100	9,700	10,700	24,400	32,400	18,600	11,700	10,100
5	25,600	15,000	12,800	12,600	9,900	9,700	10,700	22,500	34,000	18,400	11,700	9,410
6	23,800	13,800	12,900	12,300	10,000	9,900	10,800	21,300	34,800	18,600	11,700	5,520
7	22,600	13,600	12,900	12,000	10,500	10,200	11,000	21,200	35,600	18,700	11,800	4,120
8	22,300	13,200	13,000	11,900	10,700	10,100	11,300	20,900	36,700	18,600	12,500	7,480
9	22,100	13,300	13,000	12,000	10,400	9,800	11,700	20,400	37,800	18,300	12,400	9,320
10	21,900	13,800	13,100	12,200	10,100	9,600	12,100	19,900	37,500	18,200	12,600	9,900
11	21,600	12,800	13,100	12,200	10,000	9,700	12,200	19,800	36,400	18,000	12,300	9,730
12	21,200	12,000	13,100	12,300	10,200	10,100	12,400	19,900	35,200	17,600	12,000	8,970
13	18,500	12,100	13,000	12,300	10,400	10,300	12,700	19,600	34,000	17,800	11,700	5,720
14	16,500	12,200	12,900	12,400	10,600	10,400	13,200	18,900	33,000	18,000	11,500	8,750
15	15,900	12,100	12,800	12,400	10,600	10,400	14,200	19,100	32,300	17,900	10,900	11,000
16	15,800	12,000	12,700	12,500	10,600	10,400	16,000	21,300	31,600	15,900	7,520	11,200
17	15,800	12,100	12,700	12,600	10,500	10,300	19,200	24,500	30,800	15,100	9,870	12,100
18	15,500	12,400	12,700	12,800	10,400	9,600	21,500	26,900	29,000	14,800	10,600	13,600
19	15,300	12,000	12,700	12,200	10,400	9,000	24,500	27,500	26,200	14,200	10,900	14,000
20	15,400	11,100	12,600	10,800	10,400	9,900	28,400	26,600	25,200	14,800	11,100	13,400
21	15,500	11,000	12,600	10,500	10,500	10,800	31,000	27,500	24,600	15,100	11,100	13,800
22	15,500	11,700	12,600	10,400	10,600	11,000	33,800	27,200	24,400	15,000	10,400	14,200
23	15,500	11,500	12,700	10,500	10,700	10,800	33,200	26,700	24,300	14,800	7,240	15,000
24	15,400	11,300	12,600	10,700	10,600	10,600	28,800	26,800	24,300	14,600	7,780	15,800
25	15,400	12,000	12,600	10,400	10,500	10,500	26,300	31,100	24,200	14,300	10,200	16,300
26	15,500	12,800	12,300	10,100	10,400	10,600	25,200	32,400	23,900	13,700	10,600	16,600
27	15,000	13,200	12,400	10,000	10,400	10,700	24,700	33,700	23,600	12,700	11,800	16,500
28	14,800	13,600	12,500	10,000	10,400	10,800	25,500	33,900	23,300	12,200	10,800	15,700
29	15,000	13,400	12,600	10,100	-----	10,800	25,400	33,500	20,600	11,700	10,000	15,300
30	15,000	13,000	12,600	10,300	-----	10,900	25,100	32,900	19,500	11,800	6,000	15,900
31	15,000	-----	12,500	10,200	-----	11,000	-----	32,500	-----	11,700	8,530	-----
TOTAL	577,000	387,100	395,600	358,700	290,800	317,900	564,000	786,300	890,500	498,800	329,940	349,280
MEAN	18,610	12,900	12,760	11,570	10,390	10,250	18,800	25,360	29,680	16,090	10,640	11,640
MAX	26,000	15,100	13,100	12,800	10,700	11,000	33,800	33,900	37,800	19,200	12,600	16,600
MIN	14,800	11,000	12,300	10,000	9,900	9,000	10,700	18,900	19,500	11,700	6,000	4,120
CFSM	.96	.67	.66	.60	.54	.53	.97	1.31	1.53	.83	.55	.60
IN.	1.11	.74	.76	.69	.56	.61	1.08	1.51	1.71	.96	.63	.67

CAL YR 1964: TOTAL 6,079,640

MEAN 16,610

MAX 47,500

MIN 4,120

CFSM .86

IN 16.65

WAT YR 1965: TOTAL 5,745,920

MEAN 15,740

MAX 37,800

MIN 4,120

CFSM .81

IN 11.01

5-1342. Rapid River near Baudette, Minn.

Location.--Lat 48°32'10", long 94°33'45", in NE $\frac{1}{4}$  sec.1, T.158 N., R.31 W., on left bank 20 ft (revised) upstream from bridge on State Highway 72, 1.2 miles downstream from North Branch Rapid River, and 12 miles south of Baudette.

Drainage area.--543 sq mi.

Records available.--October 1956 to September 1965.

Gage.--Water-stage recorder. Datum of gage is 1,093.92 ft above mean sea level, datum of 1929 (State Highway Department bench mark).

Average discharge.--9 years, 297 cfs.

Extremes.--Maximum and minimum discharges for the water years 1961-65 are contained in the following table:

Water year	Maximum			Minimum		
	Date	Discharge (cfs)	Gage height (feet)	Date	Discharge (cfs)	Gage height (feet)
1961	Apr. 21, 1961	1,540	a 7.44	Aug. 13, 1961	0.10	1.18
1962	May 24, 1962	5,160	17.15	Feb. 10-24, 1962	b 6.0	-
1963	June 5, 1963	1,740	8.49	(c)	b 3.4	-
1964	May 9, 1964	3,480	13.15	Feb. 22-28, 1964	b 4.1	-
1965	Apr. 16, 1965	4,450	d 14.90	Jan. 30 to Feb. 3	b 2.5	-

a Maximum gage height for year, 7.82 ft Mar. 27, 1961, backwater from ice.

b Minimum daily.

c Feb. 8-12, Feb. 27 to Mar. 5, 1963.

d Maximum gage height for year, 16.12 ft Apr. 15, 1965, backwater from ice.

1956-65: Maximum discharge, 5,160 cfs May 24, 1962 (gage height, 17.13 ft); minimum, 0.10 cfs Aug. 13, 1961 (gage height, 1.18 ft).

Flood of May 11, 1950, reached a stage of 21.1 ft, from information by local residents and State Highway Department (discharge, about 7,000 cfs, revised).

Remarks.--Records good except for periods of shifting control, no gage-height record, and those for winter periods, which are fair. Records of chemical analyses for the water years 1962-63 are published in reports of the Geological Survey.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	86	112	58	41	7.7	7.4	640	544	102	3.1	4.1	.30
2	82	154	61	40	7.4	7.3	540	495	111	2.7	3.5	1.1
3	77	170	65	39	7.2	7.3	450	454	109	2.7	2.5	.80
4	72	177	72	38	7.2	7.3	400	419	95	2.7	2.2	.40
5	66	178	78	37	7.1	7.2	350	403	83	2.5	1.7	.30
6	63	174	87	36	7.1	7.2	320	387	73	2.4	1.0	.20
7	57	168	92	35	7.0	7.2	290	495	63	2.0	1.0	.30
8	53	158	90	35	7.0	7.2	270	565	58	1.7	1.2	2.0
9	52	148	87	34	7.0	7.2	270	579	48	1.6	2.4	2.0
10	48	141	84	33	7.1	7.2	270	554	49	1.6	2.0	2.7
11	44	141	82	33	7.2	7.2	250	546	40	1.6	1.6	5.8
12	46	142	80	32	7.2	7.3	225	490	33	1.4	.60	5.8
13	49	143	78	31	7.3	7.3	205	476	28	1.7	.50	16
14	56	145	77	30	7.4	7.3	190	479	26	2.2	.60	24
15	58	149	75	29	7.4	7.5	170	460	20	2.0	.60	34
16	60	150	74	28	7.5	7.6	155	436	18	2.7	.50	38
17	60	150	71	26	7.5	7.8	202	400	16	4.1	.80	42
18	54	149	68	24	7.4	8.3	261	360	12	4.3	1.8	45
19	52	118	66	22	7.4	8.8	622	328	10	5.4	1.4	35
20	49	106	64	20	7.4	9.5	1,060	304	9.2	3.8	1.0	32
21	46	106	61	18	7.4	12	1,310	287	8.3	3.7	.90	36
22	45	88	59	16	7.4	20	1,290	266	7.2	5.1	1.1	58
23	45	82	56	15	7.4	40	1,140	248	6.5	4.5	.90	88
24	45	76	54	13	7.4	100	987	226	6.5	4.5	.80	42
25	45	70	51	12	7.4	200	876	206	6.5	4.7	.50	41
26	45	64	49	11	7.4	500	803	182	5.1	5.8	.30	36
27	45	61	47	10	7.4	1,180	745	163	4.5	4.5	.20	83
28	46	60	46	9.5	7.4	1,130	692	148	3.8	3.7	.20	81
29	48	59	44	9.0	-----	1,050	654	130	3.3	3.3	.20	85
30	55	58	43	8.5	-----	940	595	122	3.1	2.5	.20	73
31	78	-----	42	8.0	-----	800	-----	108	-----	2.2	.20	-----
TOTAL	1,727	3,697	2,061	773.0	204.7	6,123.1	16,232	11,260	1,058.0	96.7	36.50	910.70
MEAN	55.7	123	66.5	24.9	7.31	198	561	363	35.3	3.12	1.18	30.4
MAX	86	178	92	41	7.7	1,180	1,310	579	111	5.8	4.1	88
MIN	44	58	42	8.0	7.0	7.2	155	108	3.1	1.4	.20	.20
CFSM	.10	.23	.12	.05	.01	.36	1.00	.67	.06	.006	.002	.06
IN.	.12	.25	.14	.05	.01	.42	1.11	.77	.07	.007	.002	.06

CAL YR 1960: TOTAL 52,935.3

MEAN 145

MAX 820

MIN 3.3

CFSM .27

IN 3.63

WAT YR 1961: TOTAL 44,179.70

MEAN 121

MAX 1,310

MIN .20

CFSM .22

IN 3.03

## 5-1342. Rapid River near Baudette, Minn.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	88	54	21	9.0	6.5	6.1	11	794	2,380	513	715	536
2	83	50	21	9.1	6.4	6.1	11	747	2,220	474	645	485
3	77	46	21	9.1	6.4	6.1	12	706	2,090	471	878	477
4	74	45	22	9.2	6.4	6.1	13	668	1,820	541	776	699
5	74	43	22	9.0	6.2	6.1	14	616	1,610	893	1,080	474
6	72	41	21	8.8	6.1	6.1	16	578	1,460	836	2,570	433
7	67	40	20	8.6	6.1	6.1	30	547	1,340	965	2,720	484
8	65	40	20	8.4	6.1	6.1	120	578	1,290	1,500	2,630	590
9	63	39	18	8.2	6.1	6.1	230	671	1,470	1,550	2,550	1,810
10	58	39	17	8.1	6.0	6.2	280	764	1,810	1,330	2,470	2,020
11	65	38	17	7.8	6.0	6.2	290	812	1,990	1,190	2,280	2,070
12	73	39	16	7.7	6.0	6.2	245	827	1,900	1,000	2,130	1,830
13	83	38	15	7.6	6.0	6.2	205	830	1,700	812	1,960	1,734
14	98	38	14	7.4	6.0	6.2	178	1,050	1,460	665	1,710	1,280
15	102	37	14	7.3	6.0	6.3	160	1,300	1,240	576	1,490	1,070
16	95	37	13	7.2	6.0	6.4	150	1,460	1,280	519	1,340	914
17	91	36	13	7.1	6.0	6.6	200	2,170	1,670	477	1,190	809
18	87	33	12	7.1	6.0	6.7	330	2,600	1,710	457	1,040	723
19	80	32	12	7.0	6.0	6.9	573	2,780	1,510	425	941	648
20	74	31	11	7.0	6.0	7.1	990	2,980	1,300	457	857	584
21	70	29	11	7.0	6.0	7.2	1,240	2,950	1,150	812	773	536
22	68	28	11	6.9	6.0	7.4	1,230	2,800	1,210	1,160	800	497
23	63	27	11	6.8	6.0	7.6	1,440	4,270	1,150	1,470	1,020	466
24	60	25	10	6.8	6.0	7.8	1,100	5,090	1,010	1,710	1,240	440
25	60	24	10	6.7	6.1	8.2	1,050	4,950	908	1,760	1,150	434
26	61	24	10	6.7	6.1	8.5	996	4,670	806	1,530	962	408
27	60	23	9.6	6.6	6.1	8.8	938	3,860	712	1,180	862	384
28	60	22	9.2	6.5	6.1	9.0	890	3,220	616	1,050	752	357
29	57	22	9.1	6.5	-----	9.3	854	2,720	587	1,010	686	336
30	57	21	9.0	6.5	-----	10	827	2,370	576	896	616	318
31	55	-----	9.0	6.5	-----	10	-----	2,290	-----	806	567	-----
TOTAL	2,240	1,041	448.9	234.2	170.7	219.7	14,323	62,668	41,975	29,035	41,380	23,646
MEAN	72.3	34.7	14.5	7.55	6.10	7.09	477	2,022	1,399	937	1,335	788
MAX	102	54	22	9.2	6.5	10	1,240	5,090	2,380	1,760	2,720	2,070
MIN	55	21	9.0	6.5	6.0	6.1	11	547	576	425	567	318
CFSM	+13	+06	+03	+01	+01	+01	-----	3.72	2.58	1.42	2.46	1.45
IN.	-15	-07	-03	-02	-01	-02	-----	4.29	2.87	1.99	2.83	1.62

CAL YR 1961: TOTAL 40,424.60 MEAN 111 MAX 1,310 MIN .20 CFSM .20 IN 2.77  
 WAT YR 1962: TOTAL 217,381.5 MEAN 596 MAX 5,090 MIN 6.0 CFSM 1.10 IN 14.89

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	299	174	264	25	6.1	3.4	540	561	1,070	596	155	30
2	284	172	276	24	5.8	3.4	640	516	1,380	467	141	28
3	269	172	279	24	5.5	3.4	732	477	1,340	368	125	24
4	257	159	282	23	5.2	3.5	767	436	1,600	305	108	21
5	245	137	213	23	5.0	3.5	1,080	392	1,730	252	91	20
6	240	160	146	23	4.9	3.5	1,100	354	1,610	222	77	19
7	233	161	155	23	4.7	3.5	974	336	1,410	192	70	17
8	233	190	155	22	4.6	3.4	1,010	344	1,180	170	62	16
9	247	200	142	22	4.5	3.4	1,140	336	1,000	150	56	15
10	264	188	112	21	4.3	3.4	1,080	382	1,160	125	51	15
11	262	209	95	19	4.2	3.4	962	414	1,190	176	42	12
12	252	204	85	18	4.1	3.4	872	395	1,090	1,060	38	10
13	240	222	74	16	4.1	3.5	785	449	971	1,290	40	9.7
14	235	235	67	15	4.0	3.6	706	587	878	1,110	40	8.6
15	235	242	64	14	4.0	3.6	648	576	776	923	38	8.3
16	233	247	64	13	3.9	3.7	830	573	689	752	51	8.0
17	222	213	60	12	3.9	3.7	1,200	779	604	602	53	8.3
18	217	204	59	11	3.8	3.7	1,140	848	567	499	55	22
19	204	222	58	10	3.7	3.7	1,040	896	905	441	52	29
20	204	217	55	9.6	3.7	3.8	959	887	1,030	480	44	33
21	190	206	52	9.1	3.7	3.8	857	899	848	455	37	26
22	200	143	47	8.6	3.6	3.9	764	893	694	382	33	24
23	217	162	43	8.3	3.6	4.0	686	818	584	305	30	22
24	217	175	40	8.0	3.5	4.0	628	738	448	247	29	21
25	202	185	37	7.6	3.5	5.0	584	677	527	213	28	20
26	192	188	35	7.3	3.5	6.0	561	610	1,040	182	27	20
27	188	190	32	7.0	3.4	15	547	590	1,110	172	25	19
28	188	196	30	6.7	3.4	35	530	614	965	165	25	19
29	188	226	28	6.5	-----	80	564	581	839	170	25	19
30	184	252	27	6.3	-----	220	590	539	718	157	33	19
31	178	-----	26	6.2	-----	400	-----	519	-----	165	33	-----
TOTAL	7,019	5,851	3,102	449.2	118.2	847.6	24,510	18,016	29,993	12,793	1,714	562.9
MEAN	226	195	100	14.5	4.22	27.3	817	581	1,000	413	55.3	18.8
MAX	299	252	282	25	6.1	4.0	1,200	899	1,730	1,290	155	33
MIN	178	137	26	6.2	3.4	3.4	530	336	488	125	25	8.0
CFSM	-.42	-.36	-.18	-.03	-.008	-.05	1.50	1.07	1.84	-.76	-10	-.03
IN.	-.48	-.40	-.21	-.03	-.008	-.06	1.68	1.23	2.05	-.88	-.12	-.04

CAL YR 1962: TOTAL 229,623.6 MEAN 629 MAX 5,090 MIN 6.0 CFSM 1.16 IN 15.73  
 WAT YR 1963: TOTAL 104,975.9 MEAN 288 MAX 1,730 MIN 3.4 CFSM .53 IN 7.19

## 5-1342. Rapid River near Baudette, Minn.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	18	8.9	6.0	5.0	4.2	4.3	5.0	1,300	315	869	87	210
2	17	9.4	6.0	5.0	4.2	4.3	6.0	1,330	242	755	120	230
3	16	9.4	6.0	5.0	4.2	4.5	8.0	1,310	174	648	153	240
4	14	9.4	6.0	5.0	4.2	4.5	10	1,420	155	550	252	250
5	14	10	7.0	5.0	4.3	4.3	18	1,760	165	457	274	265
6	13	10	7.0	5.0	4.5	4.3	25	2,630	180	395	198	270
7	12	9.7	7.0	5.0	4.5	4.3	31	3,060	178	325	120	270
8	15	10	6.0	4.5	4.5	4.3	38	3,360	247	274	98	275
9	11	12	6.0	4.5	4.5	4.2	48	3,370	1,490	307	80	280
10	11	13	5.5	4.5	4.3	4.2	60	2,950	2,520	368	70	295
11	10	14	5.5	4.5	4.3	4.2	70	2,490	2,820	352	65	305
12	10	15	5.5	4.5	4.3	4.2	100	2,080	3,000	299	67	320
13	10	16	5.5	4.5	4.3	4.2	300	1,790	2,870	254	71	315
14	19	16	5.5	4.5	4.3	4.5	500	1,560	2,760	209	64	285
15	16	14	5.0	4.5	4.3	5.0	1,000	1,400	2,730	174	53	255
16	12	14	5.0	4.5	4.2	6.0	1,300	1,270	2,460	144	48	230
17	10	14	5.0	4.5	4.2	6.0	1,650	1,150	2,140	152	44	205
18	8.9	14	5.0	4.5	4.2	5.5	1,280	1,100	1,810	186	40	190
19	8.6	13	5.0	4.5	4.2	5.3	1,000	1,170	1,780	196	38	185
20	8.3	14	5.0	4.5	4.2	5.0	872	1,110	2,050	186	78	180
21	8.9	13	5.0	5.0	4.2	5.0	941	1,060	2,290	178	91	180
22	10	11	5.0	5.0	4.1	5.5	1,570	999	2,210	170	97	184
23	12	10	5.5	5.0	4.1	5.5	1,690	935	2,200	152	103	365
24	14	9.0	5.5	4.5	4.1	6.0	1,530	869	2,130	139	108	782
25	12	9.0	5.0	4.5	4.1	6.0	1,340	809	2,110	127	110	1,010
26	11	9.0	5.0	4.5	4.1	5.5	1,220	750	2,000	109	125	1,210
27	10	9.0	5.0	4.3	4.1	5.5	1,130	692	1,710	93	160	1,640
28	10	8.0	4.5	4.3	4.1	5.5	1,140	619	1,420	91	180	1,880
29	10	7.0	4.5	4.3	4.2	5.0	1,320	550	1,190	95	175	1,980
30	9.7	6.0	4.5	4.2	---	5.0	1,320	474	1,010	95	175	1,970
31	9.2	---	5.0	4.2	---	5.0	---	392	---	100	180	---
TOTAL	370.6	336.8	169.0	143.3	123.0	152.6	21,522.0	45,759	48,406	8,449	3,524	16,256
MEAN	12.0	11.2	5.45	4.62	4.24	4.92	717	1,476	1,614	273	114	542
MAX	19	16	7.0	5.0	4.5	6.0	1,690	3,370	3,000	869	274	1,980
MIN	8.3	6.0	4.5	4.2	4.1	4.2	5.0	392	155	91	38	180
CFSM	.02	.02	.01	.009	.008	.009	1.32	2.72	2.97	.50	.21	1.00
IN.	.03	.02	.01	.01	.008	.01	1.47	3.13	3.32	.58	.24	1.11

CAL YR 1963: TOTAL 89,880.3 MEAN 246 MAX 1,730 MIN 3.4 CFSM .45 IN 6.16  
 WAT YR 1964: TOTAL 145,211.3 MEAN 397 MAX 3,370 MIN 4.1 CFSM .73 IN 9.95

Note.--Shifting-control method used Oct. 1 to Nov. 16, May 28 to Sept. 30. No gage-height record Aug. 21 to Sept. 21.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	1,850	294	85	23	2.5	3.8	7.3	1,150	968	430	143	215
2	1,940	272	80	22	2.5	4.0	7.8	1,100	1,030	494	125	192
3	1,950	257	75	20	2.5	4.1	10	1,270	1,450	555	125	170
4	1,920	242	72	19	2.6	4.2	17	1,270	1,680	550	144	152
5	1,810	231	70	17	2.6	4.3	21	1,360	1,700	455	129	134
6	1,670	211	68	16	2.7	4.8	26	1,500	1,870	344	114	137
7	1,510	200	68	14	2.7	5.4	35	1,440	2,080	302	106	159
8	1,390	188	66	13	2.8	5.8	80	1,290	2,340	238	106	198
9	1,340	176	66	11	2.8	6.2	150	1,220	2,290	211	100	192
10	1,320	165	66	10	2.9	6.4	350	1,430	1,930	182	91	180
11	1,300	165	64	9.0	2.9	6.4	600	1,710	1,620	172	82	153
12	1,260	209	62	8.0	3.0	6.5	1,100	1,580	1,360	425	73	152
13	1,110	279	62	7.4	3.0	6.6	1,750	1,400	1,140	962	63	209
14	1,020	323	60	6.8	3.0	6.6	2,500	1,220	956	1,270	54	310
15	953	346	56	6.2	3.1	6.6	3,150	1,380	845	1,220	46	747
16	887	328	52	5.6	3.1	6.5	3,550	1,750	744	1,110	42	1,000
17	824	282	50	5.2	3.1	6.4	3,880	1,680	671	1,170	41	1,110
18	758	238	46	5.0	3.2	6.4	3,640	1,590	499	1,010	42	1,190
19	703	185	43	4.8	3.2	6.3	3,360	1,460	446	818	44	1,150
20	660	160	41	4.6	3.3	6.2	2,850	1,350	438	634	43	1,030
21	616	135	39	4.3	3.2	6.2	2,410	1,340	417	561	37	914
22	573	120	37	3.9	3.2	6.2	1,950	1,330	392	488	30	893
23	544	115	35	3.6	3.2	6.3	1,740	1,320	368	398	27	1,140
24	513	110	33	3.4	3.2	6.3	1,570	1,240	349	323	24	1,350
25	480	108	32	3.1	3.3	6.3	1,480	1,220	336	286	31	1,430
26	455	103	31	3.0	3.4	6.4	1,360	1,160	328	224	73	1,420
27	457	100	31	2.8	3.5	6.6	1,280	1,088	289	196	170	1,330
28	449	97	30	2.7	3.6	6.7	1,220	1,080	268	182	250	1,210
29	408	92	28	2.6	---	6.8	1,170	1,070	368	152	252	1,140
30	368	88	26	2.5	---	7.0	1,140	1,040	363	137	238	1,330
31	328	---	24	2.5	---	7.1	---	974	---	150	235	---
TOTAL	31,366	5,819	1,598	262.0	84.1	185.4	42,404.1	41,004	29,635	15,649	3,080	20,937
MEAN	1,012	194	51.5	8.45	3.00	5.98	1,413	1,323	988	505	99.4	698
MAX	1,950	346	85	23	3.6	7.1	3,880	1,750	2,340	1,270	252	1,430
MIN	328	88	24	2.5	2.5	3.8	7.3	974	289	137	24	134
CFSM	1.86	.36	.09	.02	.006	.01	2.60	2.44	1.82	.93	.18	1.29
IN.	2.15	.40	.11	.02	.006	.01	2.90	2.81	2.03	1.07	.21	1.43

CAL YR 1964: TOTAL 183,117.9 MEAN 500 MAX 3,370 MIN 4.1 CFSM .92 IN 12.54  
 WAT YR 1965: TOTAL 192,023.6 MEAN 526 MAX 3,880 MIN 2.5 CFSM .97 IN 13.15

Note.--Shifting-control method used Oct. 1 to Nov. 18.

Location.--Lat 48°52'00", long 95°21'20", in SE $\frac{1}{4}$ NE $\frac{1}{4}$  sec.12, T.162 N., R.37 W., on upstream handrail of bridge near center of span, half a mile upstream from Bulldog Run and 2 $\frac{1}{2}$  miles south of Warroad.

Records available.--March 1946 to September 1965. Monthly discharge only for some periods, published in WSP 1308.

Average discharge.--19 years, 38.2 cfs.

Extremes.--Maximum and minimum discharges for the water years 1961-65 are contained in the following table:

Water year	Maximum			Minimum		
	Date	Discharge (cfs)	Gage height (feet)	Date	Discharge (cfs)	Gage height (feet)
1961	Apr. 22, 1961	93	a 4.58	Long periods	0	-
1962	Aug. 7, 1962	1,460	b 9.61	Mar. 15-24, 1962	c 1.8	-
1965	Apr. 10, 1965	507	d 7.58	Sept. 11, 1965	c 1.0	-
1964	Sept. 26, 1964	851	e 9.28	Oct. 5, 4, 1965	c 3.0	-
1965	Apr. 15, 1965	1,790	3.95	Oct. 27, 26, 1965	c 2.0	1.69

d Maximum gage height for year, 7.74 ft Apr. 5, 1963 (from floodmark), backwater from ice.

1946-65: Maximum discharge, 1,780 cfs Apr. 15, 1965 (gage height, 9.95 ft); no flow Mar. 28, 1947, Aug. 20-29, 1953, Sept. 11-16, 19-22, 1960, June 25 to Sept. 2, 1961.

Revisions (water years).--WSP 1308: 1949(M). WSP 1508: 1947(M).

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1960 TO SEPTEMBER 1961

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	.30	2.1	1.5	.90	.70	.50	20	57	7.8	0	0	0
2	.40	2.2	1.5	.90	.60	.50	18	51	8.6	0	0	0
3	.30	2.1	1.5	.90	.60	.50	16	46	8.2	0	0	.10
4	.60	2.0	1.5	.90	.60	.50	14	42	7.2	0	0	.90
5	.60	1.9	1.4	.90	.60	.50	14	37	6.0	0	0	.50
6	.70	1.8	1.4	1.0	.60	.50	13	38	5.2	0	0	.10
7	.70	1.8	1.4	1.0	.60	.50	13	40	3.9	0	0	.10
8	.80	1.4	1.2	1.0	.60	.50	14	42	3.8	0	0	.20
9	.90	1.4	1.2	1.0	.60	.50	16	41	3.0	0	0	1.2
10	1.0	1.4	1.2	1.0	.60	.50	14	38	2.7	0	0	1.9
11	1.0	1.4	1.2	1.0	.60	.50	13	35	2.4	0	0	2.1
12	1.4	1.6	1.2	1.0	.60	.50	12	31	1.8	0	0	3.2
13	1.3	1.6	1.2	1.0	.60	.50	12	29	1.6	0	0	5.9
14	1.2	1.8	1.3	1.0	.60	.50	12	25	1.5	0	0	5.5
15	1.8	1.8	1.3	1.0	.50	.50	12	24	1.2	0	0	3.1
16	1.7	1.8	1.3	1.0	.50	.50	13	24	1.0	0	0	3.3
17	1.5	1.8	1.2	1.0	.50	.50	13	22	.60	0	0	6.2
18	1.2	1.8	1.2	1.0	.50	.60	14	20	.60	0	0	8.6
19	1.2	1.8	1.0	1.0	.50	.60	20	17	.30	0	0	7.6
20	1.0	1.8	1.0	1.0	.50	1.5	40	16	.20	0	0	5.2
21	1.1	1.8	1.0	.90	.50	3.0	70	16	.10	0	0	2.3
22	1.5	2.0	.90	.90	.50	10	90	14	.10	0	0	4.8
23	2.0	2.0	.90	.90	.50	14	80	12	.20	0	0	12
24	2.1	2.0	.90	.90	.50	30	70	11	.10	0	0	12
25	1.9	2.0	.90	.90	.50	35	65	9.4	0	0	0	9.9
26	2.0	2.0	.90	.90	.50	35	60	9.2	0	0	0	8.4
27	1.7	1.8	.90	.90	.50	35	63	6.4	0	0	0	6.4
28	1.3	1.8	.90	.80	.50	25	66	6.0	0	0	0	4.5
29	1.4	1.6	.90	.70	-----	30	65	5.5	0	0	0	3.9
30	1.5	1.6	.90	.70	-----	25	.62	5.3	0	0	0	4.6
31	2.8	-----	.90	.70	-----	22	-----	5.0	-----	0	0	-----
TOTAL	38.90	53.9	35.70	28.70	15.50	275.20	1,004	774.8	68.10	0	0	124.50
MEAN	1.25	1.80	1.15	.93	.55	8.88	33.5	25.0	2.27	0	0	4.15
MAX	2.8	2.2	1.5	1.0	.70	35	90	57	8.6	0	0	12
MIN	.30	1.4	.90	.70	.50	.50	12	5.0	0	0	0	0
CFSM	.01	.02	.01	.008	.005	.08	.30	.23	.02	0	0	.04
IN.	.01	.02	.01	.01	.005	.09	.34	.26	.02	0	0	.04
CAL YR 1960:	TOTAL	4,602.20		MEAN	12.6							
WAT YR 1961:	TOTAL	2,619.30		MEAN	6.63							
						MAX 224	MIN 0	CFSM .11	IN 1.56			
						MAX 90	MIN 0	CFSM .06	IN .82			

## 5-1395. Warroad River near Warroad, Minn.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1961 TO SEPTEMBER 1962

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	5.2	4.5	3.3	2.2	2.1	2.0	4.0	115	238	45	15	24
2	5.0	5.0	3.2	2.0	2.1	2.0	5.0	108	231	42	39	22
3	4.2	5.3	3.1	2.0	2.1	2.0	5.5	91	224	37	27	21
4	4.6	6.2	3.4	2.0	2.1	2.0	7.0	79	176	36	23	20
5	4.8	7.0	3.4	2.0	2.1	2.0	7.5	71	146	35	58	46
6	5.2	7.4	3.4	2.0	2.1	1.9	12	59	128	32	375	35
7	5.0	8.2	3.2	2.0	2.1	1.9	50	53	115	34	1,270	27
8	4.8	7.8	3.2	2.0	2.1	1.9	80	43	166	35	885	29
9	5.2	7.4	3.2	2.0	2.1	1.9	95	55	270	36	604	51
10	5.9	6.2	3.2	2.0	2.1	1.9	70	79	550	34	437	101
11	7.6	7.0	3.0	2.0	2.1	1.9	60	91	855	29	325	138
12	8.4	7.4	3.0	2.0	2.1	1.9	50	96	840	23	246	152
13	9.7	7.8	3.0	2.0	2.1	1.9	45	90	684	19	209	144
14	9.0	9.2	3.0	2.0	2.1	1.9	45	95	514	15	164	122
15	8.4	8.6	3.0	2.0	2.1	1.8	50	120	410	14	124	97
16	7.6	7.0	2.8	2.0	2.1	1.8	50	134	328	12	110	76
17	8.0	8.0	2.8	2.0	2.1	1.8	60	178	389	11	69	68
18	7.6	8.0	2.8	2.0	2.1	1.8	160	225	397	11	59	70
19	7.8	7.5	2.8	2.0	2.1	1.8	200	265	332	8.4	52	63
20	7.0	7.0	2.8	2.0	2.1	1.8	220	293	228	8.6	41	47
21	6.2	6.0	2.6	2.0	2.1	1.8	328	340	170	13	36	37
22	5.5	5.5	2.6	2.0	2.1	1.8	357	328	141	24	29	32
23	5.3	5.5	2.6	2.0	2.1	1.8	352	357	141	24	28	28
24	5.5	5.0	2.6	2.0	2.1	1.8	297	536	160	36	41	26
25	5.7	5.0	2.4	2.0	2.1	1.9	257	592	143	55	70	25
26	5.3	5.0	2.4	2.0	2.1	1.9	228	480	117	40	56	22
27	4.8	4.0	2.4	2.1	2.1	1.9	193	397	91	32	38	22
28	4.3	3.5	2.4	2.1	2.1	2.0	165	344	72	27	30	22
29	4.2	3.3	2.2	2.1	-----	3.0	156	281	59	26	24	21
30	4.3	3.4	2.2	2.1	-----	4.0	130	245	93	22	39	18
31	4.5	-----	2.2	2.1	-----	4.0	-----	237	-----	15	30	-----
TOTAL	186.6	188.7	88.2	62.7	58.8	63.8	3,739.0	6,477	8,368	831.0	5,553	1,606
MEAN	6.02	6.29	2.85	2.02	2.10	2.06	125	209	279	26.8	179	53.5
MAX	9.7	9.7	4.4	2.4	2.1	2.0	357	592	855	55	1,270	179
MIN	4.2	3.3	2.2	2.0	2.1	1.8	40	43	53	8.4	1.5	18
CFSM	.05	.06	.03	.02	.02	.02	1.13	1.90	2.54	.24	1.63	.49
IN.	.06	.06	.03	.02	.02	.02	1.26	2.19	2.83	.28	1.88	.54

CAL YR 1961: TOTAL 2,754.30 MEAN 7.55 MAX 90 MIN 0 CFSM .07 IN .93

WAT YR 1962: TOTAL 27,222.8 MEAN 74.6 MAX 1,270 MIN 1.8 CFSM .68 IN 9.20

Note.--Shifting-control method used Oct. 1 to Nov. 15, June 20 to Sept. 30.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1962 TO SEPTEMBER 1963

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	18	11	4.0	1.6	.80	.90	65	57	121	92	59	1.3
2	16	11	38	1.4	.80	.90	70	53	148	65	81	1.4
3	15	11	38	1.4	.80	.90	48	202	48	68	1.5	
4	17	11	34	1.6	.80	.90	130	42	281	33	43	1.8
5	15	9.9	32	1.6	.80	.90	350	36	270	28	25	1.5
6	14	9.5	28	1.4	.80	.90	323	32	214	23	20	1.0
7	15	9.9	26	1.6	.80	.90	380	31	156	19	17	1.1
8	14	11	25	1.4	.80	.90	494	31	113	16	13	1.2
9	13	13	18	1.2	.80	1.0	497	30	95	13	12	1.4
10	13	13	12	1.2	.80	1.2	487	29	100	12	10	.30
11	13	13	11	1.0	.80	1.4	375	34	125	11	7.3	.10
12	13	14	10	.80	.80	1.2	305	33	146	11	6.5	.30
13	12	13	8.0	.80	.80	1.4	254	42	150	12	6.4	.50
14	14	12	8.0	.80	.80	1.4	207	52	143	11	6.5	.50
15	13	11	7.5	.80	.80	1.4	165	80	127	13	6.7	.50
16	12	11	7.0	.80	.90	1.2	153	79	115	12	8.1	.60
17	12	11	6.5	.80	.90	1.4	148	81	97	13	6.7	.50
18	12	11	5.0	.80	.90	1.2	168	105	80	15	5.4	.50
19	12	11	4.8	.80	.90	1.5	164	116	78	18	6.7	.40
20	12	12	4.8	.80	.90	1.5	142	135	95	20	6.5	.40
21	11	12	4.0	.80	.90	2.0	124	143	89	18	4.3	.40
22	12	13	3.6	.80	.90	3.0	107	143	77	17	3.1	.50
23	10	14	3.6	.80	.90	5.0	87	139	67	16	2.8	.50
24	11	14	3.0	.60	.90	25	79	124	67	17	2.7	.50
25	13	14	2.5	.60	.90	20	73	107	101	16	2.4	.50
26	12	14	2.5	.60	.90	60	70	90	187	13	1.8	.50
27	11	16	2.0	.60	.90	100	64	79	263	12	1.8	.60
28	12	20	2.0	.60	.90	90	58	73	280	12	2.0	.60
29	12	28	1.8	.80	-----	85	60	69	163	12	1.2	.50
30	11	40	1.6	.80	-----	70	53	58	122	14	1.3	.50
31	11	-----	1.4	.80	-----	70	-----	56	-----	17	1.2	-----
TOTAL	401	414.3	391.6	30.40	23.70	553.00	5,737	2,227	4,272	649	439.4	21.90
MEAN	12.9	13.8	12.6	.98	.85	17.8	191	71.8	142	20.9	14.2	.73
MAX	40	40	40	1.6	.90	100	497	163	281	92	141	1.8
MIN	10	9.5	1.4	.60	.80	.90	58	29	67	11	1.2	.10
CFSM	.12	.13	.11	.009	.008	.16	1.74	.65	1.29	.19	.13	.007
IN.	.14	.14	.13	.01	.008	.19	1.94	.75	1.44	.22	.15	.007

CAL YR 1962: TOTAL 27,966.2 MEAN 76.6 MAX 1,270 MIN 1.4 CFSM .70 IN 9.46

WAT YR 1963: TOTAL 15,160.30 MEAN 41.5 MAX 497 MIN .10 CFSM .38 IN 5.13

Note.--Shifting-control method used Oct. 1 to Nov. 13, July 6 to Sept. 30.

## 5-1895. Warroad River near Warroad, Minn.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1963 TO SEPTEMBER 1964

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	.40	4.8	1.8	1.6	1.0	.60	1.0	186	23	59	9.2	34
2	.40	4.2	1.8	1.6	1.0	.60	1.0	170	20	47	16	42
3	.30	2.7	1.8	1.5	1.0	.60	1.0	158	17	39	9.2	66
4	.30	1.9	1.8	1.5	1.0	.60	1.2	160	14	32	16.5	81
5	.50	1.8	2.0	1.5	1.0	.60	1.5	165	14	27	194	66
6	.70	1.9	2.2	1.5	1.0	.60	2.0	202	14	24	99	58
7	.60	1.3	2.2	1.5	1.0	.60	2.2	214	15	21	47	54
8	.80	1.4	2.2	1.4	1.0	.70	2.2	234	20	20	34	41
9	1.1	1.2	2.0	1.4	1.0	.70	2.0	212	60	23	27	36
10	1.0	1.2	2.0	1.4	1.0	.70	7.0	176	132	24	20	44
11	1.0	1.2	1.8	1.4	.80	.70	45	156	214	20	19	66
12	1.3	1.3	1.8	1.4	.80	.70	50	136	323	16	18	63
13	1.7	1.2	1.7	1.4	.80	.70	65	110	361	16	17	98
14	2.0	1.4	1.7	1.4	.80	.70	100	93	416	14	23	42
15	1.9	2.0	1.7	1.4	.80	.70	180	86	366	11	16	39
16	2.1	1.8	1.7	1.4	.80	.80	225	83	310	13	15	33
17	2.2	1.8	1.7	1.4	.80	.80	264	75	252	18	13	33
18	2.6	1.7	1.7	1.3	.80	.80	338	83	225	26	11	35
19	2.5	1.6	1.7	1.3	.60	.80	310	97	199	21	10	30
20	2.1	1.7	1.7	1.3	.60	.80	259	124	271	19	9.7	28
21	2.2	1.8	1.7	1.3	.60	.80	227	138	390	21	7.4	27
22	2.0	2.3	1.7	1.3	.60	.80	205	108	397	23	8.6	26
23	1.7	2.4	1.7	1.2	.60	.80	210	87	359	24	9.4	39
24	.90	2.0	1.7	1.2	.60	.80	216	75	318	32	11	116
25	.80	2.1	1.6	1.2	.60	.80	189	63	298	25	16	159
26	.90	1.8	1.6	1.2	.60	.80	163	54	280	17	15	279
27	1.0	1.8	1.6	1.2	.60	.80	132	42	238	14	11	436
28	1.2	1.8	1.6	1.2	.60	.80	134	38	164	12	12	775
29	2.8	1.8	1.6	1.2	.60	.80	138	36	107	10	13	713
30	15	1.8	1.6	1.2	-----	.80	153	32	75	9.0	17	701
31	8.4	-----	1.6	1.2	-----	.80	-----	26	-----	8.6	28	-----
TOTAL	62.40	57.7	55.0	42.0	23.00	22.60	3,624.1	3,616	5,892	685.6	1,003.3	4,220
MEAN	2.01	1.92	1.77	1.35	.79	.73	121	117	196	22.1	32.4	141
MAX	15	4.8	2.2	1.6	1.0	.80	338	234	416	59	194	775
MIN	.30	1.2	1.6	1.2	.60	.60	45	14	26	16	8.6	26
CFSM	.02	.02	.02	.01	.007	.007	1.10	1.06	1.79	.20	.29	1.28
IN.	.02	.02	.02	.01	.008	.008	1.23	1.22	1.99	.23	.34	1.43
CAL YR 1963: TOTAL	14,128.50			MEAN 38.7		MAX 497	MIN .10		CFSM .35	IN 4.78		
WAT YR 1964: TOTAL	19,303.70			MEAN 52.7		MAX 775	MIN .30		CFSM .48	IN 6.53		

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1964 TO SEPTEMBER 1965

DAY	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	652	72	9.0	6.3	4.1	4.4	4.3	131	95	41	8.2	1.7
2	430	103	8.8	6.3	4.1	4.5	4.7	122	96	54	9.0	1.5
3	400	134	8.6	6.2	4.0	4.6	5.2	118	106	55	8.0	1.3
4	364	133	8.4	6.2	4.0	4.6	5.8	122	148	59	7.2	1.4
5	336	117	8.3	6.2	4.0	4.6	6.3	133	171	49	6.2	1.5
6	301	110	8.1	6.0	4.0	4.7	6.7	155	174	42	5.5	2.1
7	274	98	8.0	5.8	4.0	4.7	7.5	245	188	30	6.2	2.6
8	214	82	8.0	5.6	4.0	4.7	9.5	248	224	24	9.0	3.1
9	197	77	7.9	5.4	4.0	4.8	20	215	255	21	17	3.3
10	177	76	7.9	5.3	4.0	4.8	55	212	245	20	13	4.0
11	143	71	7.8	5.1	4.1	4.8	140	219	214	20	9.0	3.2
12	124	100	7.6	5.0	4.2	4.8	400	246	171	19	7.4	3.6
13	108	117	7.4	4.8	4.2	4.8	759	221	136	30	5.0	3.3
14	95	103	7.3	4.7	4.3	4.8	868	196	108	41	4.3	4.5
15	84	89	7.2	4.6	4.4	4.8	1,530	175	79	36	3.5	7.0
16	73	70	7.1	4.5	4.5	4.6	1,290	174	58	26	2.7	12
17	68	54	7.0	4.4	4.6	4.4	1,010	176	56	21	2.5	18
18	59	42	7.0	4.4	4.6	4.2	862	175	55	19	2.6	22
19	51	34	6.8	4.4	4.6	4.0	701	172	50	18	2.2	26
20	46	27	6.7	4.4	4.6	3.9	540	167	46	19	1.6	24
21	44	24	6.7	4.5	4.5	3.7	461	163	36	18	1.4	20
22	42	22	6.6	4.6	4.5	3.6	400	153	34	16	1.3	16
23	38	19	6.6	4.6	4.6	3.5	362	140	33	15	1.2	21
24	36	17	6.5	4.6	4.4	3.5	323	129	32	14	.90	36
25	38	15	6.5	4.5	4.3	3.5	288	121	30	12	.80	39
26	35	14	6.4	4.5	4.3	3.5	262	119	26	9.4	.60	52
27	31	12	6.4	4.4	4.3	3.5	217	112	29	9.0	.20	48
28	31	11	6.4	4.3	4.4	3.6	184	109	63	8.8	.20	46
29	29	10	6.4	4.2	-----	3.7	159	107	52	8.4	1.1	44
30	30	9.2	6.4	4.2	-----	3.8	140	108	45	7.2	1.2	49
31	55	-----	6.3	4.2	-----	4.0	-----	101	-----	7.6	1.5	-----
TOTAL	4,607	1,862.2	226.1	154.2	119.4	131.4	11,021.0	4,984	3,055	769.4	140.30	517.1
MEAN	149	62.1	7.29	4.97	4.26	4.26	367	161	102	24.8	4.53	17.2
MAX	652	134	9.0	6.3	4.6	4.8	1,530	248	255	59	17	52
MIN	29	9.2	6.3	4.2	4.0	3.5	4.3	101	26	7.2	.20	1.3
CFSM	1.35	.56	.07	.05	.04	.04	3.34	1.46	.93	.23	.04	.16
IN.	1.56	.63	.08	.05	.04	.04	3.73	1.69	1.03	.26	.05	.17
CAL YR 1964: TOTAL	25,823.90			MEAN 70.6		MAX 775	MIN .60		CFSM .64	IN 8.73		
WAT YR 1965: TOTAL	27,587.10			MEAN 75.6		MAX 1,530	MIN .20		CFSM .69	IN 9.33		

REVISIONS AND CORRECTIONS TO RECORDS FOR STATIONS DISCONTINUED  
PRIOR TO OCTOBER 1, 1960

5-1055. Roseau River near Roseau, Minn.

Revisions (water years).--WSP 925 and 1308: 1941 (Maximum elevation, 1,036.89 ft Apr. 9, 1941).

As the number of streams on which streamflow information is likely to be desired far exceeds the number of stream-gaging stations feasible to operate at one time, the Geological Survey collects limited streamflow data at sites other than stream-gaging stations. When limited streamflow data are collected on a systematic basis over a period of years for use in hydrologic analyses, the site at which the data are collected is called a partial-record station. Data collected at these partial-record stations are usable in low-flow or flood-flow analyses, depending on the type of data collected.

Records collected at partial-record stations are ordinarily presented in two tables. The first is a table of discharge measurements at low-flow partial-record stations, and the second is a table of annual maximum stage and discharge at crest-stage stations; however, no records at low-flow partial-record stations are available for the water years 1961-65.

## CREST-STAGE PARTIAL-RECORD STATIONS

The following table contains annual maximum discharges for crest-stage stations. A crest-stage gage is a device which will register the peak stage occurring between inspections of the gage. A stage-discharge relation for each gage is developed from discharge measurements made by indirect measurements of peak flow or by current meter. The date of the maximum discharge is not always certain but is usually determined by comparison with nearby continuous-record stations, weather records, or local inquiry. Only the maximum discharge for each water year is given. Information on some lower floods may have been obtained but is not published herein. The years given in the period of record represent water years for which the annual maximum has been determined.

Annual maximum discharge at crest-stage partial-record stations during water years 1961-65

Station No.	Station name	Location	Drainage area (sq mi)	Period of record	Annual maximum		
					Date	Gage height (feet)	Discharge (cfs)
Red River of the North basin							
5-0476	West Branch Mustinka River near Graceville, Minn.	NW¼ sec.22, T.125 N., R.46 W., at culverts on county highway, 4.1 miles north of Graceville.	-	1964-65	4-13-64 7- 6-65	8.25 8.80	- -
5-0477	West Branch Mustinka River tributary near Graceville, Minn.	NE¼ sec.28, T.125 N., R.45 W., at culvert on county highway, 0.6 mile northeast of Graceville.	-	1964-65	4-13-64 9-30-65	8.76 6.99	- -
5-0492	Eighteenmile Creek near Wheaton, Minn.	On W½ of line between secs.24 and 25, T.127 N., R.47 W., at culvert on County Highway 67, 1.4 miles upstream from mouth and 2.0 miles southwest of Wheaton.	-	1965	6- 1-65	9.30	701
5-0518	Silver Lake tributary near Lidgerwood, N. Dak.	At west line of sec.15, T.130 N., R.52 W., at culvert on county highway just off State Highway 11, 2 miles west of Lidgerwood.	0.61	1958-65	5-12-58 6- 1-59 1961 1962 1963 1964 1965	1.59 2.06 1.28 3.03 1.74 2.05 2.45	a 2.1 a 7.5 - 22' 3.8 7.5 12
5-0519	Wild Rice River tributary near Mantador, N. Dak.	On east line of sec.9, T.131 N., R.51 W., at bridge on county highway, 4½ miles west of Mantador.	b 6	1958-65	3- -61 5- -62 3-23-63 3-13-64 4- 3-65	(c) (c) d 3.63 d 4.40 d 4.47	b 1 3 1.5 2.9 4.1
5-0560.2	Mauvais Coulee tributary near Bisbee, N. Dak.	SE¼ sec.11, T.158 N., R.68 W., at bridge on county highway, 7½ miles south of Bisbee.	2.83	1955-65	1961 4- 6-62 5- -63 4- 8-64 5- 5-65	- - 2.55 2.66 2.84	0 b 50 b 10 13 30
5-0560.4	Mauvais Coulee tributary No. 2 near Cando, N. Dak.	SW¼ sec.23, T.158 N., R.68 W., at culvert on State Highway 17, 9 miles west of Cando.	8.48	1955-65	1961 4- 4-62 6- -63 9- -64 4-11-65	- - 3.30 2.77 d 3.5	0 25 150 90 90
5-0560.6	Mauvais Coulee tributary No. 3 near Cando, N. Dak.	NW¼ sec.5, T.157 N., R.66 W., at bridge on U.S. Highway 281, 2½ miles south of Cando.	60.2	1955-65	1961 4- 6-62 1963 4- 7-64 4-13-65	- 6.80 2.18 d 3.90 d 5.56	0 750 25 52 220
5-0560.8	Mauvais Coulee tributary No. 4 near Bisbee, N. Dak.	SW¼ sec.21, T.158 N., R.68 W., at culvert on State Highway 17, 10 miles southwest of Bisbee.	24.4	1955-65	1961 4- 4-62 1963 4- -64 4-11-65	- - 3.23 3.5 4.0	0 b 50 10 40 130
5-0569	Sheyenne River tributary near Cooperstown, N. Dak.	At corner of secs. 23, 24, 25, T.146 N., R.58 W., on bridge on county highway, 1.4 miles north of State Highway 7 and 5 miles east of Cooperstown.	15.2	1959-65	4- -59 3- 3-61 4- -62 7-11-63 6- -64 4-11-65	a 2.49 d 3.86 5.94 3.95 6.35 7.90	e 49 b 35 350 140 354 700
5-0569.5	Sheyenne River tributary No. 2 near Cooperstown, N. Dak.	At east line of sec.27, T.146 N., R.58 W., at culvert on county highway, 0.1 mile south of State Highway 7 and 4 miles east of Cooperstown.	.08	1959-65	1961 6- -62 7-11-63 6- -64 7- -65	3.55 d 3.90 5.91 5.37 7.95	1.1 2 30 21 59

Annual maximum discharge at crest-stage partial-record stations during water years 1961-65--Continued

Station No.	Station name	Location	Drainage (sq mi)	Period of record	Annual maximum		
					Date	Gage height (feet)	Discharge (cfs)
Red River of the North basin--Continued							
5-0598	Swan Creek near Absaraka, N. Dak.	At north line of sec.3, T.140 N., R.53 W., at bridge on county highway, 1½ miles east of Absaraka.	b 22	1955-65	6-10-59 2.13 3- 2-61 2.31 4- 2-62 d 3.77 1963 d 2.58 6- -84 d 2.55 4- -85 d 4.46	e 53 28 130 50 8 250	
5-0598.5	Swan Creek tributary near Ayr, N. Dak.	NE¼ sec.4, T.140 N., R.54 W., at culvert on county highway, 4½ miles south of Ayr.	b 2	1955-65	1955 e 1.86 6-22-57 2.60 7- -58 1.78 3- 2-61 2.19 4- -62 3.66 4- -63 2.57 4-15-64 2.45 4- -65 4.98	a 8 a 85 a 1.1 3.8 32 8 6.5 73	
5-0599	Swan Creek near Casselton, N. Dak.	NW¼ sec.28, T.140 N., R.52 W., at bridge on county highway, 2.6 miles northwest of Casselton.	b 30	1955-62, 1964-65	6-10-59 7.38 3- 9-61 4.4 4- 4-62 4.57 4- -64 d 3.1 4- -65 d 8.2	e 210 8 340 150 550	
5-0599.5	Swan Creek tributary near Casselton, N. Dak.	Near center of sec.2, T.139 N., R.52 W., at culverts on State Highway 18, 1 mile south of Casselton.	b 2.5	1955-65	6-22-57e 5.35 7- 3-58e 5.00 6-10-59 6.00 3- -61 3.35 7- -62 6.47 1963 5.32 6- -64 4.46 4- -65 6.98	e 15 e 12 e 100 3 115 70 30 200	
5-0608	Buffalo River near Callaway, Minn.	SW¼SW¼ sec.17, T.141 N., R.41 W., at culvert on U.S. Highway 59, 2.7 miles north of Callaway.	49.9	1960-65	4- 4-61 d 13.57 6- 8-62 13.35 4- 3-63 d 12.04 4-13-64 d 13.73 4-10-65 d 16.12	127 370 43 237 245	
5-0612	Whisky Creek at Barnesville, Minn.	NE¼NW¼ sec.29, T.137 N., R.45 W., at culvert on State Highway 34, 0.7 mile upstream from Blue Eagle Lake and 1.0 mile northeast of Barnesville.	25.3	1961-64	3-13-61 d 5.75 6- 8-62 6.52 6- 1-63 6.07 4-15-64 4.83	40 292 236 117	
5-0613.9	Hay Creek near Downer, Minn.	NW¼SW¼ sec.28, T.138 N., R.45 W., at culvert on county highway, 4.9 miles east of Downer.	-	1961-62	5-14-61 8.22 6- 8-62 11.64	5 50	
5-0614	Hay Creek above Downer, Minn.	NW¼NW¼ sec.30, T.138 N., R.45 W., at culvert on county road, 3.1 miles east of Downer.	5.81	1961-65	3- 3-61 6.96 6-8-62 13.46 5-26-63 7.78 4-15-64 6.90 4-10-65 7.47	21 382 69 41 103	
5-0622.8	Wild Rice River tributary near Bagley, Minn.	SW¼NW¼ sec.21, T.146 N., R.37 W., at culvert on State Highway 92, 5.0 miles south of Bagley.	3.34	1961-65	4-18-61 d 7.12 5-23-62 7.94 5-27-63 8.34 5- 5-64 8.32 4-11-65 d 10.30	5 29 37 36 67	
5-0624.7	Marsh River tributary near Mahanomen, Minn.	SE¼SW¼ sec.36, T.145 N., R.43 W., at culvert on State Highway 31, a quarter of a mile upstream from mouth and 5½ miles west of Mahanomen.	6.57	1961-65	3-17-61 d 10.55 6-8-62 10.27 5-28-63 (c) 4-17-64 d 12.52 4-10-65 d 12.90	6 116 e 15 140 241	
5-0627	Wild Rice River tributary near Twin Valley, Minn.	SW¼SE¼ sec.12, T.144 N., R.45 W., at culvert on State Highway 31, 1¼ miles upstream from mouth and 4¼ miles northwest of Twin Valley.	2.25	1961-65	5-14-61 10.63 6-8-62 12.39 5-28-63 10.83 4-21-64 11.25 6-19-65 12.66	6.4 107 12 23 135	
5-0628	Coon Creek near Twin Valley, Minn.	NE¼NE¼ sec.26, T.144 N., R.45 W., at bridge on County Highway 28, 1.1 miles upstream from mouth, and 4.0 miles west of Twin Valley.	32.1	1962-65	6- 8-62 12.68 5-28-63 11.35 6-19-64 11.83 4-10-65 d 13.21	896 415 565 745	
5-0632	South Branch Wild Rice River near Ogema, Minn.	SE¼SE¼ sec.11, T.142 N., R.42 W., at culvert on county highway, 2 miles northwest of Ogema.	6.50	1963-65	6- 2-63 8.21 4-17-64 8.87 4-10-65 d 9.87	70 83 83	
5-0736	South Branch Battle River at Northome, Minn.	NE¼ sec.25, T.151 N., R.29 W., at culvert on U.S. Highway 71, three-quarters of a mile west of Northome and 3 miles upstream from Battle Lake.	3.19	1960-65	5-29-60 12.68 5-14-61 14.83 5-23-62 14.45 5-27-63 14.25 4-13-64 d 13.92 4-15-65 d 15.13	a 5.7 99 68 56 34 27	
5-0737.5	South Branch Corman River tributary near Blackduck, Minn.	NW¼NW¼ sec.32, T.150 N., R.30 W., at culvert on County Highway 304, 3 miles upstream from mouth and 3¼ miles north of Blackduck.	4.45	1960-65	5-14-61 13.24 5-23-62 16.54 5-27-63 15.87 4-13-64 d 12.59 5-15-65 12.91	51 346 182 20 37	
5-0738	Perry Creek near Shooks, Minn.	NW¼SW¼ sec.30, T.151 N., R.30 W., at culvert on State Highway 72, 5 miles west of Shooks.	2.41	1960-65	5-14-61 6.54 5-23-62 7.38 5-27-63 7.10 6-23-64 5.93 5-15-65 6.23	30 61 50 13 21	

Annual maximum discharge at crest-stage partial-record stations during water years 1961-65--Continued

Station No.	Station name	Location	Drainage area (sq mi)	Period of record	Annual maximum		
					Date	Gage height (feet)	Discharge (cfs)
Red River of the North basin--Continued							
5-0766	Red Lake River tributary near Thief River Falls, Minn.	SW $\frac{1}{4}$ SE $\frac{1}{4}$ sec.8, T.153 N., R.43 W., at culvert on County Highway 7, 0.5 mile upstream from mouth and 3.1 miles south of Thief River Falls.	-	1962-65	6- 8-62 4- 4-63 9-26-64 4-11-65	6.20 7.29 d 7.39	36 81 77 >150
5-0781	Lost River at Gonvick, Minn.	NE $\frac{1}{4}$ NE $\frac{1}{4}$ sec.16, T.149 N., R.38 W., at culvert on county highway, half a mile south of Gonvick and 3 miles downstream from Pine Lake.	30.9	1960-65	4-26-60 5-15-61 6- 8-62 6- 9-63 4-21-64 4-19-65	e 6.48 d 7.42 9.06 7.67 d 7.54 8.34	a 50 25 255 121 110 178
5-0781.8	Lost River tributary near Clearbrook, Minn.	NW $\frac{1}{4}$ sec.13, T.148 N., R.38 W., at culvert on county highway, 3 $\frac{1}{2}$ miles south of Clearbrook.	1.79	1960-65	4- 6-60 5-26-61 5-23-62 5-27-63 4-21-64 4-11-65	8.56 d 7.79 14.35 11.04 8.04 12.19	a 42 5.4 132 81 21 98
5-0782	Lost River tributary at Clearbrook, Minn.	SW $\frac{1}{4}$ NW $\frac{1}{4}$ sec.29, T.149 N., R.37 W., at culvert on county highway at north edge of Clearbrook, three-quarters of a mile upstream from mouth.	3.05	1960-65	4- 6-60e 4-26-61 5-23-62 5-27-63 4-13-64 4-11-65	d 8.60 8.40 15.85 10.57 9.89 12.99	a 18 20 147 56 45 89
5-0784	Clearwater River tributary near Plummer, Minn.	SE $\frac{1}{4}$ SE $\frac{1}{4}$ sec.22, T.151 N., R.43 W., at culvert on county highway, 1 $\frac{1}{2}$ miles upstream from mouth and 5 $\frac{1}{2}$ miles southwest of Plummer.	1.17	1961-65	3-24-61 5-23-62 7-12-63 7-10-64 4-11-65	6.10 8.46 6.59 8.33 11.23	10 106 20 96 177
5-0826	English Coulee tributary near Grand Forks, N. Dak.	SE $\frac{1}{4}$ SE $\frac{1}{4}$ sec.4, T.151 N., R.51 W., at bridge on county highway at Powell, 7 miles west of Grand Forks.	4.68	1955-65	4- 1-55 9- -57 7- -58 3- -59 4- -60 3-10-61 4-16-62 4- -63 6-12-64 4-12-65	d 4.92 4.52 d 1.45 d 4.66 d 4.17 d 4.07 3.60 d 2.44 2.96 3.84	e 90 e 112 e 1.5 e 40 e 65 1 68 15 34 84
5-0826.8	Saltwater Coulee tributary near Emerado, N. Dak.	At west line of sec.19, T.151 N., R.52 W., at bridge on county highway, 2 $\frac{1}{2}$ miles south of Emerado.	22.0	1955-65	1955 9- -57 3-25-59 4- 5-60 3-19-61 4- 6-62 4- -63 6-12-64 4-12-65	d 4.93 e 3.65 d 6.65 2.18 d 1.10 d 4.16 2.78 3.26 6.00	e 70 e 150 e 7 e 156 1 280 246 111 -
5-0827	Saltwater Coulee near Emerado, N. Dak.	NW $\frac{1}{4}$ NW $\frac{1}{4}$ sec.1, T.151 N., R.52 W., at bridge on county highway, 0.1 mile south of U.S. Highway 2 and 5 $\frac{1}{2}$ miles east of Emerado.	e 110	1955-65	9- -57 7- -58 3- -59 4- 5-60 3- -61 4- 6-62 4- 6-63 6-12-64 4-12-65	d 5.52 d 1.66 d 2.85 d 4.94 d 1.99 d 7.68 2.89 d 3.59 d 6.90	e 240 e 11 e 70 e 223 19 430 73 100 380
5-0829	Freshwater Coulee near Emerado, N. Dak.	SW $\frac{1}{4}$ sec.31, T.152 N., R.51 W., at bridge on U.S. Highway 2, 6 $\frac{1}{2}$ miles east of Emerado.	31.0	1955-65	4- -55 4- 1-56 9- -57 7- -58e 4- -60 3-19-61 4-15-62 4- -63 6-12-64 1965	d 4.19 d 5.28 5.00 e 1.84 d 3.90 d 2.37 d 4.24 d 2.38 3.38 5.00	a 500 a 650 a 1,180 a 15 e 330 28 520 46 259 1,180
5-0892	North Branch Park River at Gardar, N. Dak.	At west line of sec.16, T.159 N., R.56 W., at bridge on county highway at northwest corner of Gardar.	34.7	1955-65	4- -55 4- 5-56 3- -57 3-21-58 4-15-60 3-24-61 4-18-62 6- 6-63 6-12-64 4-12-65	d 5.52 d 5.86 d 2.90 d 2.36 d 4.37 d 6.62 4.53 1.36 2.57 d 4.90	e 1,000 e 1,180 e 80 e 5 e 740 1.0 826 75 288 700
5-0897	Cart Creek at Crystal, N. Dak.	At east line of sec.13, T.159 N., R.55 W., at bridge on county highway, 0.6 mile south of post office at Crystal.	74.0	1955-65	4- -55 4-19-56 3- -57 4- 7-60 3- -61 4-18-62 6- 3-63 6-19-64 4-11-65	d 9.15 10.40 3.87 9.67 d 2.10 d 9.89 4.87 9.86 10.10	e 1,200 e 2,950 e 120 e 860 1 2,200 290 2,150 2,420

Annual maximum discharge at crest-stage partial-record stations during water years 1961-65--Continued

Station No.	Station name	Location	Drainage area (sq mi)	Period of record	Annual maximum		
					Date	Gage height (feet)	Discharge (cfs)
Red River of the North basin--Continued							
5-0898	Cart Creek tributary near Crystal, N. Dak.	At east line of sec.23, T.159 N., R.55 W., at culvert on county highway, 1.6 miles southwest of Crystal.	3.77	1955-65	3- -55 3- -57 3-31-59 4- -60 3- -61 4-18-61 6- 1-63 6- -64 4-11-65	d 3.51 d 3.27 3.18 5.72 d 2.96 6.36 3.50 d 4.52 6.22	e 38 a 22 e 29 e 96 3 113 38 54 109
5-1134.5	Long Creek tributary No. 2 near Crosby, N. Dak.	At east line of sec. 7, T.163 N., R.97 W., at culverts on county highway, 3.4 miles north of junction of State Highways 5 and 42 at Crosby.	6.69	1960-65	3-14-61 3-26-62 6- -63 4- -64 4- -65	d 3.77 3.90 4.9 4.5 4.50	8 23 40 32 30
5-1135.2	Long Creek tributary near Crosby, N. Dak.	At north line of sec.30, T.162 N., R.97 W., at culverts on county highway, 0.5 mile west of State Highway 42 and 5 miles south of Crosby.	.35	1960-65	7- -60 9- -61 3-26-62 7-24-63 4- -64 6- -65	5.08 d 6.14 d 3.18 4.4 3.6 4.13	a 28 5 6 24 10 20
5-1161	Souris River tributary near Burlington, N. Dak.	SW $\frac{1}{4}$ sec.25, T.156 N., R.84 W., at culverts on county highway, 1.8 miles north of Burlington.	.13	1959-65	1959 2-22-61 1962 6- -63 4- -64 7- -65	- d 3.30 4.18 4.01 4.08 4.89	a 0 5 11 29 9 16
5-1162	Des Lacs River tributary near Donnybrook, N. Dak.	NE $\frac{1}{4}$ SW $\frac{1}{4}$ sec.24, T.158 N., R.87 W., at culvert in Minneapolis, St. Paul and Sault Ste. Marie Railroad, 1.8 miles southeast of Donnybrook.	3.82	1956-65	3-13-61 1962 8- -63 3-31-64 4- -65	d 2.46 - 6.40 d 3.67 3.01	2 0 135 15 19
5-1163	Fuller Coulee at Foxholm, N. Dak.	NE $\frac{1}{4}$ SW $\frac{1}{4}$ sec.2, T.156 N., R.85 W., at culvert on U.S. Highway 52, 0.4 mile southwest of Foxholm.	e 12.8	1955-65	3-29-55 3-20-57 3-28-58 8- -59 3- -61 3- -62 6- -63 3-31-64 6- -65	d 4.73 d 1.76 3.06 2.29 d 1.72 2.00 3.51 3.49 3.21	e 140 e 16 e 75 e 45 3 33 92 92 81
5-1172	Souris River tributary No. 2 near Burlington, N. Dak.	NW $\frac{1}{4}$ SW $\frac{1}{4}$ sec.17, T.155 N., R.83 W., at culvert on county highway, 2.6 miles southeast of Burlington.	2.04	1960-65	3-26-60 3-13-61 3-21-62 6- -63 6- -64 6- -65	5.87 - 3.11 7.42 3.21 4.00	e 45 - 14 60 15 24
5-1233	Oak Creek tributary near Bottineau, N. Dak.	On section line 0.4 mile west of corner of secs. 28, 29, 32, 33, T.162 N., R.75 W., on State Highway 5, 1.5 miles east of Bottineau.	b 3.1	1955, 1959-65	3- -61 1962 6- -63 4- 3-64 7- -65	d 8.70 11.31 9.78 d 9.80 9.86	.4 250 100 5 110
5-1233.5	Oak Creek tributary No. 5 near Bottineau, N. Dak.	At south line of sec.26, T.162 N., R.75 W., at culvert on county highway, 1 mile north of State Highway 5 and 4.5 miles east of Bottineau.	.73	1959-65	3-20-61 1962 1963 4- 1-64 7- -65	d 2.13 5.11 3.40 d 3.96 2.45	.4 88 60 15 40
5-1235.2	Egg Creek near Glenburn, N. Dak.	SW $\frac{1}{4}$ SW $\frac{1}{4}$ sec.21, T.158 N., R.83 W., at culvert on county highway, 8 $\frac{1}{2}$ miles west of Glenburn.	20.9	1955-65	3-29-55 4- -56 5- -59e 3- -61 3-21-62 6- 4-63 3- -64 1965	3.96 4.59 1.79 d 1.76 d 2.23 1.50 d 1.74 3.39	e 60 e 75 e 7.5 .5 1.1 .5 46
5-1235.4	Egg Creek near Ruthville, N. Dak.	SW $\frac{1}{4}$ NW $\frac{1}{4}$ sec.8, T.157 N., R.82 W., at bridge on U.S. Highway 83, 4.7 miles north of Ruthville.	108	1955-65	4- -56 7-13-57 3-14-59 3-26-60 9- -61 3-25-62 6- -63 6- -64 7- -65	1.53 1.73 d 2.02 d 2.39 d 1.34 d 2.27 d 2.62 d 2.38 3.17	e 88 e 133 e 190 e 260 16 100 430 180 290
5-1235.6	Egg Creek tributary near Deering, N. Dak.	SE $\frac{1}{4}$ sec.32, T.157 N., R.81 W., at culvert on county highway, 5 miles southwest of Deering.	4.25	1955-65	1961 3- -62 6- -63 3-31-64 1965	- d 3.01 d 2.77 2.42 2.82	0 .8 25 1.0 2

Annual maximum discharge at crest-stage partial-record stations during water years 1961-65--Continued

Station No.	Station name	Location	Drainage area (sq mi)	Period of record	Annual maximum		
					Date	Gage height (feet)	Discharge (cfs)
Red River of the North basin--Continued							
5-1235.8	Egg Creek near Deering, N. Dak.	SE $\frac{1}{4}$ sec.7, T.156 N., R.81 W., at culvert on county highway, 5 miles southwest of Deering.	132	1955-65	4- 1-55	5.08	e 107
					1956	3.84	e 70
					8-12-57	1.12	e 2.7
					3-26-58	3.29	e 54
					3-18-59	3.12	e 49
					3-26-60	5.37	e 116
					3- -61	1.2	3.4
					3- -62	2.98	44
					6- -63	5.42	118
					1964	3.02	46
	1965	3.74	67				
Lake of the Woods basin							
5-1287	Pike River tributary near Wahlsten, Minn.	SW $\frac{1}{4}$ SW $\frac{1}{4}$ sec.32, T.61 N., R.15 W., at culvert on State Highway 155, 1.2 miles south of Wahlsten and 2.7 miles upstream from mouth.		1961-65	5-15-61 7- 8-62 6-10-63 6-23-64 4-26-65	a 8.06 6.37 5.73 6.71 6.35	60 23 8.2 39 26
5-1297.1	Johnson Creek near Britt, Minn.	NW $\frac{1}{4}$ NE $\frac{1}{4}$ sec.28, T.60 N., R.18 W., at culvert adjacent to U.S. Highway 53, 0.6 mile downstream from Sand Lake and 5.9 miles west of Britt.		1961-64	4-21-61 5-23-62 6-10-63 5- 6-64	7.60 7.22 6.75 7.63	28 22 13 29
5-1303	Borlin Creek near Chisholm, Minn.	SE $\frac{1}{4}$ SE $\frac{1}{4}$ sec.9, T.59 N., R.20 W., at culvert on State Highway 73, 1.2 miles upstream from mouth and 7.8 miles north of Chisholm.	13.7	1959-65	4-23-61 6-11-62 4- 3-63 5- 6-64 9-30-65	15.21 11.82 12.00 12.21 12.18	223 117 83 146 143

a Not previously published.

b Approximately.

c Peak stage did not reach bottom of gage.

d Backwater from ice, vegetation, or debris.

e Revised.

## Sheyenne River seepage investigation

A series of discharge measurements was made during the period Sept. 13, 1963, to Nov. 19, 1963, to study the gain or loss of the Sheyenne River from mile 147.5 downstream from Lisbon to 73.6 upstream from Kindred, N. Dak. Each series of measurements was made in as short a period as possible to minimize the effects of changing stage. There are no diversions through the reach. Surface runoff was minimum and the only significant inflow was from an unnamed tributary at mile 96.5.

Discharge through the reach is controlled by Baldhill Dam; however the release throughout the period was relatively constant and the only measurement affected by changing stage were those made at mile 147.5 and 141.6 on Nov. 19.

The series of measurements indicated an average increase in discharge of 28.8 cfs between Lisbon and Kindred.

Measuring conditions are generally good. There was a minimum effect from fluctuation in stage and the overall investigation is rated good.

River mile	Stream	Location	Date	Discharge, in cubic feet per second	
				Main stream	Tributary
147.5	Sheyenne River	NW $\frac{1}{4}$ sec.2, T.133 N., R.55 W., about 400 ft upstream from bridge.	9-13-63 10- 1-63 10-15-63 10-29-63 11-19-63	8.60 8.02 11.0 17.0 21.4	- - - - -
141.6	....do.....	On line between secs.29 and 30, T.134 N., R.54 W., 100 ft upstream from bridge.	9-13-63 10- 1-63 10-15-63 10-29-63 11-19-63	10.3 8.96 13.2 19.3 18.6	- - - - -
134.9	....do.....	On line between secs.8 and 17, T.134 N., R.54 W.	9-13-63 10- 1-63 10-15-63 10-29-63 11-19-63	11.1 9.31 11.4 21.3 16.2	- - - - -
131.5	....do.....	On line between secs.29 and 32, T.135 N., R.54 W., 100 ft downstream from bridge.	9-13-63 10- 1-63 10-15-63 10-29-63 11-19-63	11.7 9.20 13.9 21.8 19.2	- - - - -
125.9	....do.....	NW $\frac{1}{4}$ sec.16, T.135 N., R.54 W., about 75 ft downstream from bridge.	9-13-63 10- 1-63 10-15-63 10-29-63 11-19-63	11.6 8.56 15.0 21.1 18.2	- - - - -
114.0	....do.....	On line between secs.7 and 8, T.135 N., R.53 W., 20 ft upstream from bridge.	9-13-63 10- 1-63 10-15-63 10-29-63 11-19-63	16.6 12.5 18.6 27.9 24.5	- - - - -
104.0	....do.....	NW $\frac{1}{4}$ sec.11, T.135 N., R.53 W., on last downstream bridge in Ransom County.	9-13-63 10- 1-63 10-15-63 10-29-63 11-19-63	21.9 18.8 24.1 26.7 30.8	- - - - -
97.4	....do.....	On line between secs.5 and 16, T.135 N., R.52 W., about a quarter of a mile downstream from bridge.	9-13-63 10- 1-63 10-15-63 10-29-63 11-19-63	24.1 21.1 28.3 33.1 27.5	- - - - -
96.5	Unnamed tributary.	SW $\frac{1}{4}$ NW $\frac{1}{4}$ sec.8, T.135 N., R.52 W., about half a mile downstream from county highway bridge.	10- 1-63 10-15-63 10-29-63 11-19-63	- - - -	1.86 2.44 2.13 2.27
91.8	Sheyenne River	On line between secs.3 and 4, T.135 N., R.52 W., at bridge.	9-13-63 10- 1-63 10-15-63 11-19-63	29.8 26.2 32.9 33.0	- - - -
87.6	....do.....	On line between secs.35 and 36, T.136 N., R.52 W., 20 ft downstream from bridge.	9-13-63 10- 1-63 10-15-63 10-30-63 11-19-63	31.5 25.8 34.9 39.5 38.3	- - - - -
81.1	....do.....	N $\frac{1}{2}$ sec.29, T.136 N., R.51 W., at bridge.	9-13-63 10- 1-63 10-15-63 10-30-63 11-20-63	34.2 29.5 37.8 46.2 39.1	- - - - -
77.3	....do.....	On line between secs.22 and 23, T.136 N., R.51 W., at bridge.	9-13-63 10- 1-63 10-15-63 10-30-63 11-20-63	36.6 26.6 35.9 43.4 39.4	- - - - -
73.6	....do.....	SW corner of sec.7, T.136 N., R.50 W., 25 ft downstream from bridge.	9-13-63 10- 1-63 10-15-63 10-30-63 11-20-63	34.5 28.8 37.2 41.4 42.0	- - - - -

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