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Water Resources Data for South Dakota

Part 1. Surface Water Records

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DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

Prepared in cooperation with the State of South Dakota
and with other agencies

CALENDAR FOR WATER YEAR 1970

OCTOBER 1969

S	M	T	W	T	F	S
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MARCH 1970

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AUGUST 1970

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SEPTEMBER 1970

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Part 1. Surface Water Records

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Prepared in cooperation with the State of South Dakota
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South Dakota Water Resources Commission
South Dakota Department of Highways
East Dakota Conservancy Sub-district
Black Hills Conservancy Sub-district
Corps of Engineers, U.S. Army
Bureau of Reclamation, U.S. Department of the Interior
Fish and Wildlife Service, U.S. Department of the Interior
Bureau of Indian Affairs, U.S. Department of the Interior

Water resources records, 1970, for South Dakota are in the following reports of the U.S. Geological Survey:

1. Water Resources Data for South Dakota
   Part 1: Surface Water Records

2. Water Resources Data for South Dakota
   Part 2: Water Quality Records

Copies of this report may be obtained from
District Chief, Water Resources Division
U.S. Geological Survey
P. O. Box 1412
Room 231, Federal Building
Huron, South Dakota 57350

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WATER RESOURCES DATA FOR SOUTH DAKOTA, 1970

PART 1. SURFACE-WATER RECORDS

INTRODUCTION

Surface-water records for the 1970 water year for South Dakota, including records of streamflow or reservoir storage at gaging stations, partial-record stations, and miscellaneous sites, are given in this report and their locations shown in figure 1. The records were collected and computed by the Water Resources Division of the U.S. Geological Survey under the direction of J. E. Powell, District Chief. These data represent that portion of the National Water Data System collected by the U.S. Geological Survey and cooperating State and Federal agencies in South Dakota.

Through September 30, 1960, the records of discharge and stage of streams and canals 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."

Beginning with the 1961 water years, surface-water records have been released by the Geological Survey in annual reports on a State-boundary basis. Distribution of these reports is limited; they are designed primarily for rapid release of data shortly after the end of the water year to meet local needs. The discharge and reservoir storage records for 1961-65 are also published in a Geological Survey water-supply paper series entitled "Surface Water Supply of the United States 1961-65."

COOPERATION

The U.S. Geological Survey and organizations of the State of South Dakota have had cooperative agreements for the systematic collection of surface-water records since 1914. Organizations that supplied data are acknowledged in station descriptions. Organizations that assisted in collecting data through cooperative agreement with the Survey are:

South Dakota Water Resources Commission, J. W. Grimes, Chief Engineer.

South Dakota Department of Highways, M. G. Hallock, Director.

East Dakota Conservancy Sub-district, Vern W. Butler, Manager-Engineer.

Black Hills Conservancy Sub-district, Ed Glassgow, Manager-Treasurer.

Assistance in the form of funds or services was given by the Corps of Engineers, U.S. Army, in collecting records for 28 gaging stations, and the Fish and Wildlife Service, U.S. Department of the Interior, for one gaging station. The Missouri River Basin Program provided funds and services for 27 gaging stations.

DEFINITION OF TERMS

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

Acre-foot (AC-FT, acre-ft) is the quantity of water required to cover 1 acre to a depth of 1 foot and is equivalent to 43,560 cubic feet or 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, 1.9835 acre-feet, or 646,317 gallons, and represents a runoff of 0.0372 inch from 1 square mile.

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

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

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

Cubic foot per second (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.

Discharge is the volume of water (or more broadly, total fluids), that passes a given point within a given period of time.

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

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

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

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

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.

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

WRD is used as an abbreviation for "Water-Resources Data" in the summary REVISIONS paragraph to refer to previously published State annual basic-data reports.

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

SPECIAL NETWORKS AND PROGRAMS

Hydrologic bench-mark station is one that provides hydrologic data for a basin in which the hydrologic regimen will likely be governed solely by natural conditions. Data collected at a bench-mark station may be used to separate effects of natural from man-made 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.

International Hydrological Decade (IHD) River Stations provide a general index of runoff and materials in the water balance (discharge of water, and dissolved and transported solids) of the world. In the United States, IHD Stations provide indices of runoff and of the general distribution of water in the principal river basins of the conterminous United States and Alaska.

DOWNSTREAM ORDER AND STATION NUMBERS

Records are listed in a downstream direction along the main stream, and stations on tributaries are listed between stations on the main stream in the order in which those tributaries enter the main stream. Stations on tributaries entering above all mainstream stations are listed before the first mainstream station. Stations on tributaries to tributaries are listed in a similar manner. In the list of gaging stations in the front of this report the rank of tributaries is indicated by indention, each indention representing one rank.

As an added means of identification, each gaging station and partial-record station has been assigned a station number. These are in the same downstream order used in this report. In assigning station numbers, no distinction is made between partial-record stations and continuous-record gaging stations; therefore, the station number for a partial-record station indicates downstream order position in a list made up of both types of stations. Gaps are left in the 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 06476000, includes the part number "06" and a 6-digit station number and appears just to the left of the station name. In this report, the records are listed in downstream order by parts. All records for a drainage basin encompassing more than one State could be arranged in downstream order by assembling pages from the various State reports by station number to include all records in the basin.

EXPLANATION OF SURFACE-WATER DATA

Collection and Computation of Data

The base data collected at gaging stations consists of records of stage and measurements of discharge of streams or canals, and stage, surface area, and contents of lakes or reservoirs. In addition, observations of factors affecting the stage-discharge relation or the stage-capacity relation, weather records, and other information are used to supplement base data in determining the daily flow or volume of water in storage. Records of stage are obtained from a water-stage recorder that gives a continuous graph of the 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, using the general methods adopted by the Geological Survey on the basis of experience in stream gaging since 1888. These methods are described in standard textbooks on the measurement of stream discharge. (See also SELECTED REFERENCES.) Surface areas of lakes or reservoirs are determined from instrument surveys using standard methods. The configuration of the reservoir bottom is determined by sounding at many points.

For a stream-gaging station 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), velocity-area studies, and logarithmic plotting. The application of the daily mean gage heights to the rating table gives the daily mean discharge, from which the monthly and the yearly mean discharge 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 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 stream-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 required 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 changing stage; at these stations the rate of change in stage is used as a factor in determining discharge.

At some stream-gaging stations the stage-discharge relation is affected by ice in the winter, and it becomes impossible to compute the discharge in the usual manner. Discharge for periods of ice effect is computed on the basis of the 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 a lake or reservoir station, capacity tables giving the contents for any stage are prepared from stage-area relation curves defined by surveys. Discharge over spillways is computed from a stage-discharge relation curve defined by discharge measurements. The application of the stage to the capacity tables gives the contents, from which the daily, monthly, or yearly change in contents is computed.

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

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

measurements, weather records, and comparison with other station records from the same or nearby basins. Likewise daily contents may be estimated on the basis of operator's log, adjoining good record, inflow-outflow studies, and other information.

The data in this report generally comprise a description of the station and tabulations of basic data. For gaging stations on streams or canals a table showing the daily discharge and monthly and yearly discharge is given. For gaging stations on lakes and reservoirs a monthly summary table of stage and contents or a table showing the daily contents is given. Tables of daily mean gage heights are included for some streamflow stations and for some reservoir stations. Records are published for the water year, which begins on October 1 and ends on September 30. A calendar for the 1970 water year is shown on the reverse side of the front cover to facilitate finding the day of the week for any date.

The description of the gaging station gives the location, drainage area, period of record, type and history of gages, average discharge, extremes of discharge or contents, and general remarks. 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 or other agencies. Periods for which there are published records for the present station or for stations generally equivalent to the present one are given under "PERIOD OF RECORD." The type of gage currently in use, 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 record are given under "GAGE." In references to datum of gage, the phrase "mean sea level" denotes "Sea Level Datum of 1929" as used by the Topographic Division of the Geological Survey, unless otherwise qualified. The average discharge for the number of years indicated is given under "AVERAGE DISCHARGE"; it is not given for stations having fewer than 5 complete years of record or for stations where changes in water development during the period of record cause the figure to have little significance. In addition, the median of yearly mean discharges is given for stream-gaging stations having 10 or more complete years of record if the median differs from the average by more than 10 percent. The maximum discharge (or contents) and the maximum gage height, the minimum discharge if there is little or no regulation (or the minimum contents), and the minimum gage height if it is significant are given under "EXTREMES." The minimum daily discharge is given if there is extensive regulation (also the minimum discharge and gage height if they are abnormally low). In the first paragraph headed "Current year:" the data given are for the complete current water year unless

otherwise specified. In the second paragraph under "EXTREMES" headed "Period of record:" the data given are for the period of record given in the PERIOD OF RECORD paragraph. Reliable information concerning major floods that occurred outside the period of record is given in the third or last paragraph under "EXTREMES." Unless otherwise qualified, the maximum discharge (or contents) 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 or contents, it is given separately. Information pertaining to the accuracy of the discharge records, to conditions that affect the natural flow at the gaging station, and availability of Water Quality records, is given under "REMARKS"; for reservoir stations information on the dam forming the reservoir, the capacity, outlet works and spillway, and purpose and use of the reservoir, is also 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 records are usually published along with the current records in one of the annual or compilation reports. In order to make it easier to find such revised records, a paragraph headed "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 were revised, that 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.

Skeleton rating tables are published for stream-gaging stations where they serve a useful purpose and the dates of applicability can be easily identified.

Skeleton capacity tables are published for all reservoirs for which records of contents are published on a daily basis.

The daily tables for stream-gaging stations give 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 a day. For digital recorders, the daily mean discharge is always the average of the discharges at each punched reading. For stations equipped with nonrecording 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 a gage-height graph based on gage readings.

The daily tables for reservoir stations give the contents corresponding to the water-surface elevation at a given time, usually at 2400 each day. For some reservoirs the elevation at a given time is given in the daily table.

The monthly summary is given below the daily table. For stream-gaging stations the line headed "TOTAL" gives the sum of the daily figures; it is the total cubic feet per second per day for the month. The line headed "MEAN" gives the average flow in cubic feet per second during the month. The lines headed "MAX" and "MIN" give the maximum and minimum daily discharges, respectively, for the month. Discharge for the month also may be expressed in cubic feet per second per square mile (line headed "CFSM"), or in inches (line headed "IN.") or in acre-feet (line headed "AC-FT"). Figures of cubic feet per second per square mile and runoff in inches are omitted if there is extensive regulation or diversion, if the drainage area includes large noncontributing areas, or if the average rainfall on the drainage basin is usually less than 20 inches.

For reservoir stations the monthly summary gives the elevation (or gage height) at the end of the month and the change in contents during the month. If elevation or gage height is given in the daily table, the monthly summary gives the contents at the end of the month, rather than the elevation or gage height. For some reservoirs a tabulation of monthly evaporation from the water surface also is included.

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 in this summary are the minimum daily discharges.

For reservoir stations the yearly summary gives the change in contents for the calendar year and for the water year. For some reservoirs the yearly evaporation also is included.

Peak discharges and their times of occurrence and corresponding gage heights for many stations are listed below the yearly summary. All independent peaks above the selected base are given. The base discharge, which is given in parentheses, is selected so that an average of about three peaks a year can 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 and 1:30 p.m. is 1330.

In a general footnote, introduced by the word "NOTE" certain periods are indicated 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 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. Footnotes to reservoir tables may be used to explain the use of new capacity tables or for other special conditions.

Accuracy of Data

The accuracy of discharge 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 is within 5 percent; "good" within 10 percent and "fair" within 15 percent. "Poor" means that daily discharges have less than "fair" accuracy.

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

Discharge at many stations, as indicated by the monthly mean, may not reflect natural runoff due to the effects of diversion, consumptive use, regulation, evaporation, or other factors. For such stations, discharge in cubic feet per second per square mile and runoff in inches are not published unless satisfactory adjustments can be made for such effects. 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 unadjusted losses (consumptive use, evaporation, seepage, etc.) are large in comparison with the observed discharge.

Publications

Each volume of the 1960 series of U.S. Geological Survey water-supply papers entitled "Surface Water Supply of the United States" contains a listing of the numbers of all water-supply papers in which records of surface-water data were published for the area covered by the individual volumes. Each volume also contains a list of water-supply papers that give detailed information on major floods for the area. A new series of water-supply papers containing surface-water records for the 5-year period October 1, 1960, to September 30, 1965, also will include lists of annual and special reports published as water-supply papers.

Records through September 1950 for the area covered by this report have been compiled and published in Water-Supply Papers 1308(5) and 1309(6A); records for October 1950 to September 1960 have been compiled and published in Water-Supply Papers 1728(5) and 1729(6A). These reports contain summaries of monthly and annual discharge and monthend storage for all previously published records, as well as some records not contained in the annual series of water-supply papers. All records were reexamined and revised where warranted. Estimates of discharge were made to fill short gaps whenever practical. The yearly summary table for each gaging station lists the numbers of the water-supply papers in which daily records were published for that station.

Special reports on major floods or droughts or of other hydrologic studies for the area have been issued in publications other than water-supply papers. Information relative to these reports may be obtained from the district office.

Other Data Available

Data collected at partial-record stations and at miscellaneous sites are given in three tables at the end of the surface-water records in this report. The first is a table of discharge measurements at low-flow partial-record stations, the second is a table of annual maximum stage and discharge at crest-stage stations, and the third is a table of discharge measurements at miscellaneous sites.

More detailed information than that published for most of the gaging stations, such as discharge measurements, gage-height records, and rating tables, is on file in the district office. Many gaging-station records in South Dakota through 1966 have been analyzed to give several statistical summaries: (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. These data are given in Part 2 of this report. Under the "REMARKS" paragraph of the gaging-station description, reference is made to water-quality records collected on a regular basis.

HYDROLOGIC CONDITIONS

Annual runoff from the major river basins of the State was below normal for the 1970 water year.

A comparison of monthly and yearly mean discharges with the median discharge for the 30-year base period (1931-60) is shown in figure 2 for two key gaging stations.

Combined storage in the four Missouri River main-stem reservoirs--Lakes Oahe, Sharp, Francis Case, and Lewis and Clark, was 24,084,000 acre-ft at the end of the water year.

SELECTED REFERENCES

Carter, R. W., and Davidian, Jacob, 1968, General procedure for gaging streams: U.S. Geol. Survey Techniques Water-Resources Inv., book 3, chap. A6, 13 p.

Corbett, D. M., and others, 1943, stream-gaging procedure, a manual describing methods and practices of the Geological Survey: U.S. Geol. Survey Water-Supply Paper 888, 245 p.

Langbein, W. B., and Iseri, K. T., 1960, General introduction and hydrologic definitions: U.S. Geol. Survey Water-Supply Paper 1541-A, 29 p.

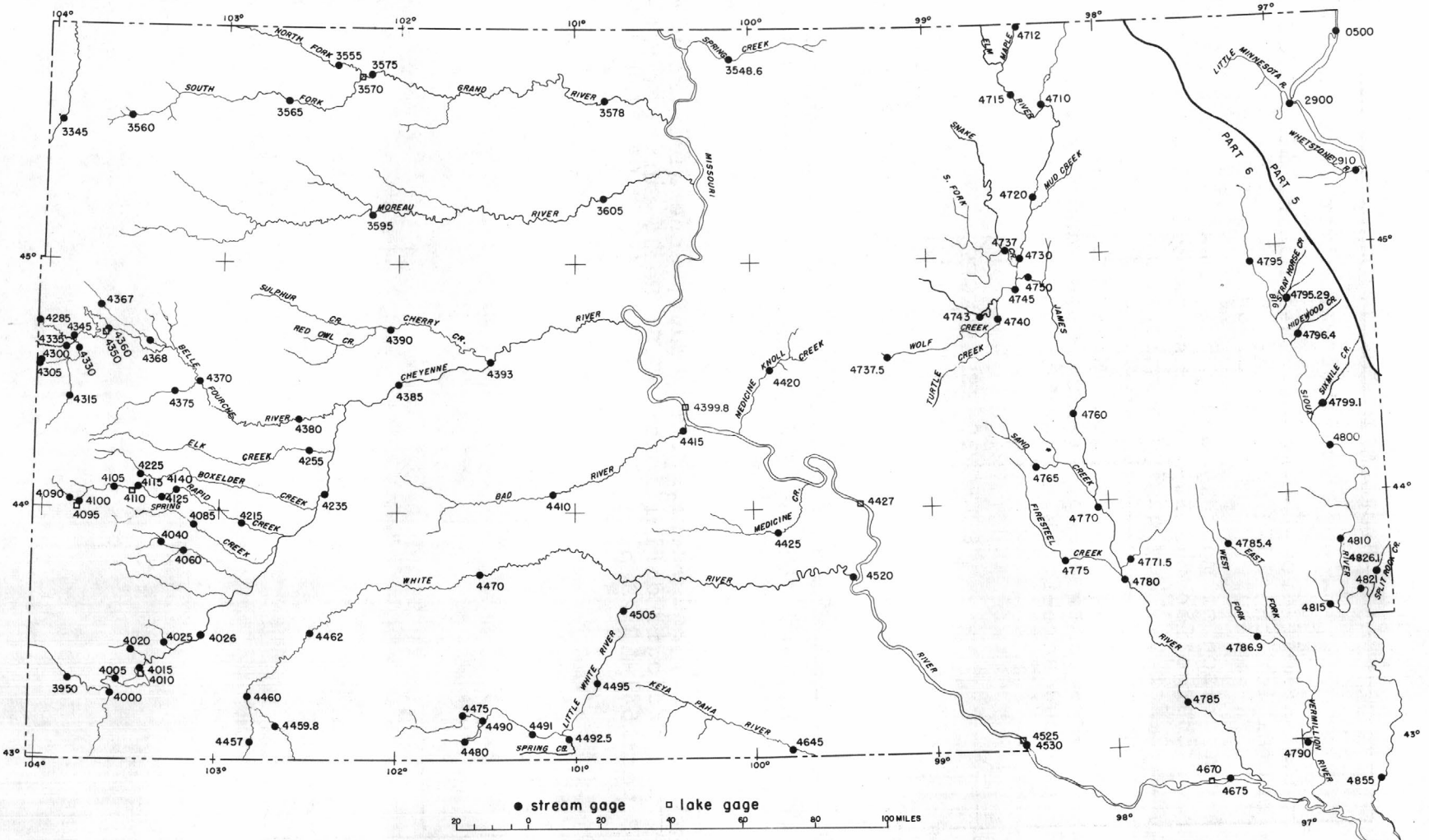
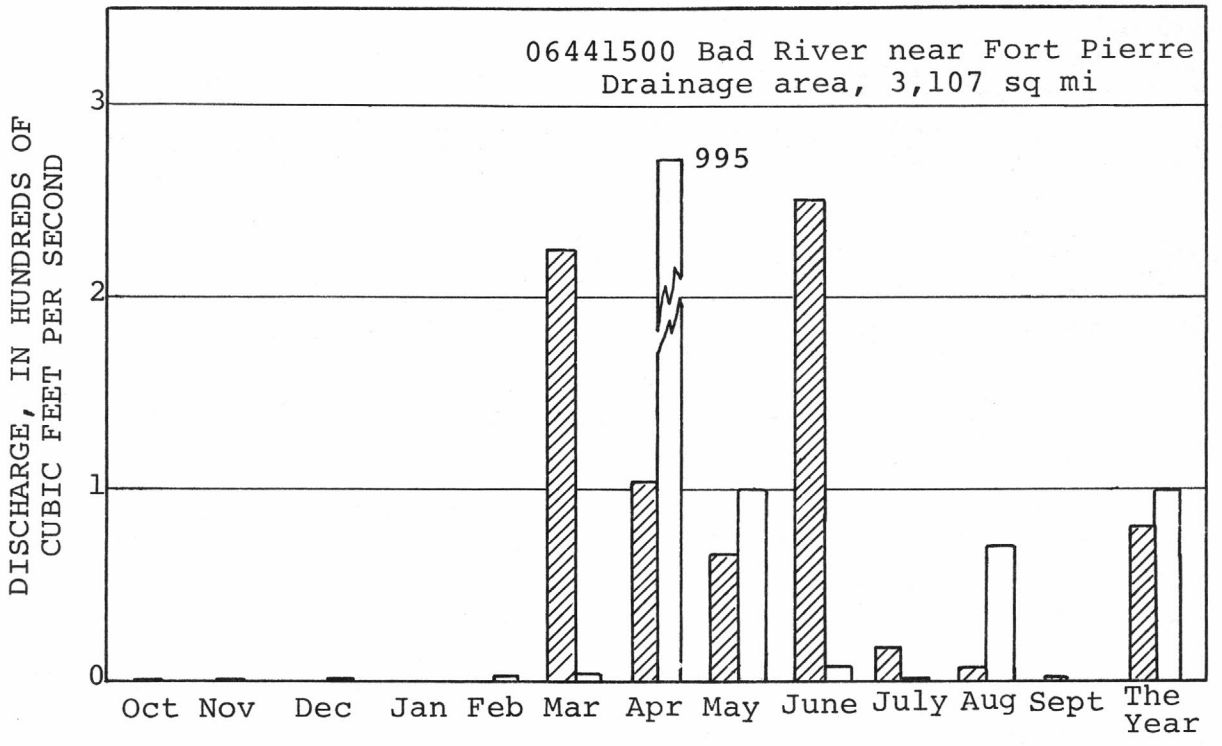
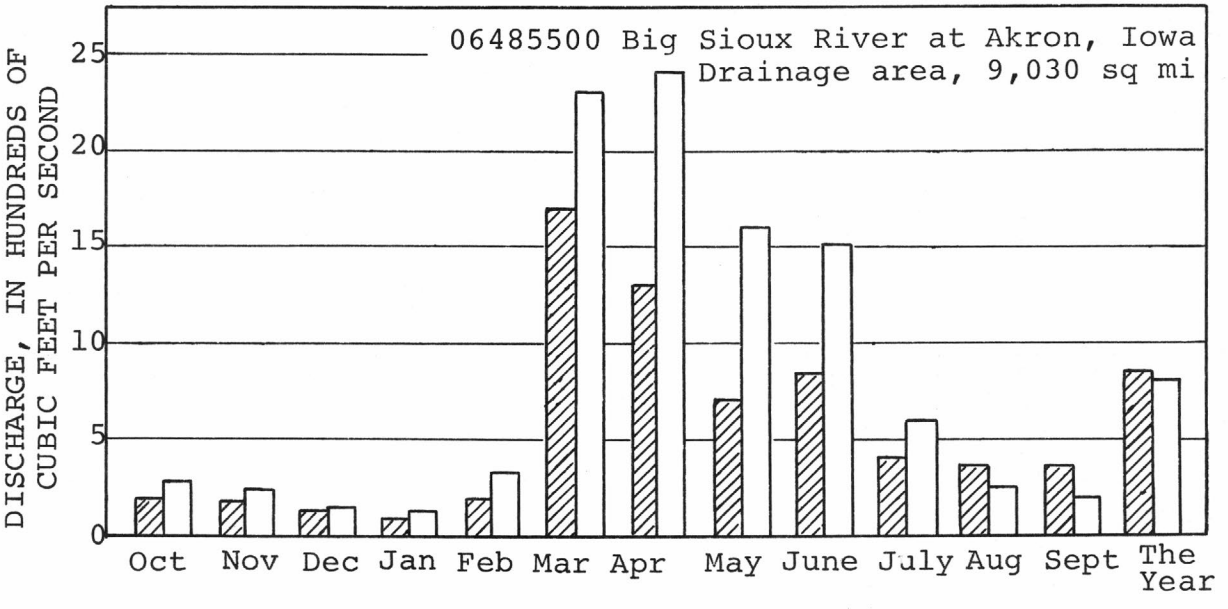


Figure 1. Map of South Dakota showing location of lake and stream gaging stations





Median of monthly and yearly mean discharges for water years 1931-60.

Monthly and yearly mean discharges during 1970 water year.

FIGURE 2.--RUNOFF DURING 1970 WATER YEAR COMPARED WITH MEDIAN RUNOFF FOR PERIOD 1931-60 FOR TWO REPRESENTATIVE GAGING STATIONS.

06334500 Little Missouri River at Camp Crook, S. Dak.

LOCATION.--Lat 45°32'49", long 103°58'23", in SW¼ sec.2, T.18 N., R.1 E., Harding County, on left bank 15 ft upstream from bridge on State Highway 20 at east edge of Camp Crook.

DRAINAGE AREA.--1,970 sq mi, approximately.

PERIOD OF RECORD.--September 1903 to November 1906, May 1956 to current year. Monthly discharge only for some periods, published in WSP 1309.

GAGE.--Water-stage recorder. Datum of gage is 3,110.98 ft above mean sea level. Prior to Nov. 30, 1906, nonrecording gage at site 0.5 mile upstream at different datum. May 1956 to Oct. 8, 1957, nonrecording gage at site 15 ft downstream at same datum.

AVERAGE DISCHARGE.--17 years, 122 cfs (88,390 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 1,370 cfs Apr. 13 (gage height, 5.26 ft); maximum gage height, 5.90 ft Mar. 28 (backwater from ice); minimum daily discharge, 0.54 cfs Sept. 30.
Period of record: Maximum discharge, 7,600 cfs May 28, 1962 (gage height, 13.07 ft); no flow at times. Flood of 1952 reached a stage of about 16 ft, from information by local residents.

REMARKS.--Records good except those for winter periods, which are poor. Small diversions above station for irrigation.

REVISIONS (WATER YEARS).--WSP 1309: 1904. WSP 1729: Drainage area.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	5.0	5.2	7.3	3.6	4.5	10	200	278	255	19	3.2	.72
2	3.6	6.1	7.7	3.6	4.0	11	200	218	1,050	18	2.9	1.2
3	4.0	5.2	7.0	3.8	4.5	11	158	162	1,010	16	3.0	1.2
4	4.5	4.9	6.5	3.5	5.5	11	122	123	635	16	3.1	1.2
5	4.0	4.8	6.0	3.5	5.5	12	168	97	395	15	3.4	1.4
6	4.1	4.9	5.8	3.5	5.4	15	188	67	234	14	4.2	1.3
7	4.2	5.7	5.5	3.5	5.4	15	347	53	148	11	42	1.6
8	4.3	5.6	4.5	3.2	5.4	12	341	46	72	9.3	18	1.5
9	4.2	5.3	4.0	3.0	5.2	10	392	45	78	9.4	8.5	1.3
10	3.6	5.0	3.5	4.0	5.5	10	502	30	46	8.8	5.6	1.2
11	4.2	5.1	3.8	4.5	5.5	11	866	115	28	11	4.3	1.2
12	4.4	4.8	4.0	3.5	5.0	10	1,180	352	43	11	4.0	1.2
13	5.0	4.5	4.5	3.5	4.5	8.0	1,340	794	51	10	3.6	1.4
14	4.4	4.5	5.0	3.8	4.6	8.0	1,160	806	286	11	3.5	1.5
15	4.5	5.0	5.0	3.6	4.8	9.0	1,090	500	639	8.0	3.2	1.7
16	4.5	5.0	4.8	3.0	5.5	12	1,060	508	625	7.2	3.0	2.3
17	4.1	4.8	4.5	2.5	5.5	14	840	833	417	6.6	2.9	1.8
18	4.0	4.5	4.0	2.5	5.0	15	556	977	228	8.6	2.8	1.5
19	3.8	5.0	3.8	2.8	5.0	20	354	971	153	7.1	2.5	1.5
20	4.1	5.4	4.0	2.6	5.5	25	271	746	100	7.1	2.5	1.4
21	4.1	5.4	4.0	3.5	6.5	30	214	344	80	6.5	2.6	1.3
22	4.1	5.3	4.0	4.0	7.0	30	253	221	60	6.0	2.6	1.2
23	6.1	5.3	4.2	4.5	8.0	40	463	135	46	6.2	3.0	1.2
24	4.1	5.5	4.0	4.8	9.0	50	757	97	38	4.6	2.4	1.4
25	5.0	5.1	3.8	5.0	11	75	936	67	33	4.0	1.9	.75
26	5.0	5.8	3.6	5.0	11	100	826	39	29	3.7	1.8	.63
27	4.4	8.6	3.7	4.9	10	150	664	30	25	3.5	1.2	.60
28	5.0	9.5	3.6	4.8	10	200	582	79	23	9.2	1.7	.55
29	5.0	9.2	3.6	4.8	------	250	446	38	21	5.8	.92	.56
30	4.7	7.2	3.8	5.0	------	300	346	194	21	5.2	.75	.54
31	5.0	------	3.6	5.0	------	300	------	197	------	5.1	.69	------
TOTAL	137.0	168.2	143.1	118.8	174.3	1,774.0	16,822	9,162	6,869	283.9	145.76	36.85
MEAN	4.42	5.61	4.62	3.83	6.23	57.2	561	296	229	9.16	4.70	1.23
MAX	6.1	9.5	7.7	5.0	11	300	1,340	977	1,050	19	42	2.3
MIN	3.6	4.5	3.5	2.5	4.0	8.0	122	30	21	3.5	.69	.54
AC-FT	272	334	284	236	346	3,520	33,370	18,170	13,620	563	289	73

CAL YR 1969 TOTAL 64,121.58 MEAN 176 MAX 3,370 MIN 0 AC-FT 127,200
WTR YR 1970 TOTAL 35,834.91 MEAN 98.2 MAX 1,340 MIN .54 AC-FT 71,080

PEAK DISCHARGE (BASE, 1,000 CFS)

DATE	TIME	G.H.	DISCHARGE
4-13	0345	5.26	1,370
6- 2	1945	5.09	1,270

06354860 Spring Creek near Herreid, S. Dak.

LOCATION(revised).--Lat 45°48'52", long 100°06'28", in SW¼ sec.13, T.127 N., R.77 W., Campbell County, on left bank 0.5 mile upstream from county highway bridge, 2.4 miles southwest of Herreid, and 13.2 miles upstream from high-water line of Lake Oahe.

DRAINAGE AREA.--440 sq mi, approximately, of which about 220 sq mi is probably noncontributing.

PERIOD OF RECORD.--October 1962 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,653.80 ft above mean sea level.

AVERAGE DISCHARGE.--8 years, 8.96 cfs (6,490 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 85 cfs June 15 (gage height, 5.91 ft); no flow for many days.
Period of record: Maximum discharge, 1,160 cfs Mar. 17, 1966 (gage height, 11.60 ft); no flow for several months each year.

REMARKS.--Records fair.

Rating table (gage height, in feet, and discharge, in cubic feet per second)

3.0	0	3.4	.90	4.4	16
3.1	.03	3.5	1.6	4.8	28
3.2	.10	3.7	3.8	5.2	46
3.3	.40	3.9	6.8	5.6	65

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1		0	.44	.52	.48	.56	1.1	7.8	3.1	1.5		
2		0	.44	.31	.52	.66	1.1	6.4	2.8	1.1		
3		0	.48	.22	.52	.60	1.1	6.8	2.3	.78		
4		0	.52	.31	.48	.60	1.5	5.8	1.9	.72		
5		0	.52	.31	.40	.66	1.9	5.2	1.8	.56		
6		0	.52	.37	.44	.66	2.6	4.5	1.4	.48		
7		0	.56	.40	.44	.66	4.9	4.8	1.2	.37		
8		0	.56	.34	.44	.66	4.8	4.1	1.0	.34		
9		0	.56	.34	.44	.72	3.0	3.0	.80	.31		
10		0	.52	.31	.48	.60	2.7	3.4	.60	.25		
11		0	.52	.40	.52	.60	2.2	4.1	.78	.16		
12		0	.52	.34	.52	.60	2.7	4.0	.84	.09		
13		0	.52	.31	.56	.60	9.2	3.7	.90	.07		
14		0	.52	.31	.52	.66	18	4.7	1.6	.05		
15		0	.52	.34	.52	.66	19	4.9	55	.04		
16		0	.52	.34	.48	.66	33	11	32	.04		
17		0	.52	.31	.52	.78	29	7.1	20	.03		
18		0	.52	.22	.56	.78	23	5.5	22	.02		
19		.38	.52	.19	.48	.78	28	4.8	27	0		
20		.28	.48	.22	.48	.90	31	4.8	38	0		
21		.28	.48	.22	.48	1.0	38	4.4	24	0		
22		.31	.48	.19	.48	.90	32	3.7	17	0		
23		.34	.48	.25	.48	1.0	24	3.5	12	0		
24		.40	.44	.25	.52	1.0	19	3.2	8.3	0		
25		.44	.44	.31	.52	1.0	17	3.0	7.6	0		
26		.40	.52	.31	.52	1.1	15	2.9	6.4	0		
27		.40	.52	.37	.56	1.1	13	2.8	5.1	0		
28		.37	.56	.40	.56	1.1	12	2.8	3.7	0		
29		.44	.60	.44	------	1.1	11	2.8	2.9	0		
30		.44	.60	.44	------	1.1	9.4	2.8	2.0	0		
31		------	.60	.48	------	1.1	------	3.6	------	0		------
TOTAL	0	4.48	16.00	10.07	13.92	24.90	410.2	141.9	304.02	6.91	0	0
MEAN	0	.15	.52	.32	.50	.80	13.7	4.58	10.1	.22	0	0
MAX	0	.44	.60	.52	.56	1.1	38	11	55	1.5	0	0
MIN	0	0	.44	.19	.40	.56	1.1	2.8	.60	0	0	0
AC-FT	0	8.9	32	20	28	49	814	281	603	14	0	0

CAL YR 1969 TOTAL 9,617.74 MEAN 26.4 MAX 1,120 MIN 0 AC-FT 19,080
WTR YR 1970 TOTAL 932.40 MEAN 2.55 MAX 55 MIN 0 AC-FT 1,850

PEAK DISCHARGE (BASE, 40 CFS revised)

DATE	TIME	G.H.	DISCHARGE	DATE	TIME	G.H.	DISCHARGE
4-16	1800	5.40	54	6-15	1200	5.91	85
4-20	2200	5.17	43	6-20	0600	5.08	42

06355500 North Fork Grand River near White Butte, S. Dak.

LOCATION.--Lat 45°48'10", long 102°21'45", in NE¼NE¼ sec.10, T.21 N., R.14 E., Perkins County, on left bank 100 ft upstream from highway bridge, 0.2 mile upstream from nearest tributary, and 9.8 miles south of White Butte.

DRAINAGE AREA.--1,190 sq mi, approximately.

PERIOD OF RECORD.--October 1945 to current year. Monthly discharge only for some periods, published in WSP 1309.

GAGE.--Water-stage recorder. Altitude of gage is 2,275 ft (by barometer). Aug. 28, 1947, and Apr. 17, 1950, to June 11, 1951, nonrecording gage, and Aug. 29, 1947, to Apr. 16, 1950, water-stage recorder all at site 100 ft downstream at same datum.

AVERAGE DISCHARGE.--25 years, 54.2 cfs (39,270 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 980 cfs May 7 (gage height, 5.66 ft); no flow for many days in October, September.
Period of record: Maximum discharge, 30,900 cfs Apr. 16, 1950 (gage height, 20.0 ft, from floodmarks), from rating curve extended above 4,300 cfs on basis of slope-area measurement of peak flow; no flow at times.

REMARKS.--Records good except those for winter periods, which are poor. Flow regulated by Bowman-Haley reservoir beginning Aug. 22, 1966.

REVISIONS(WATER YEARS).--WSP 1279: 1947, 1950.

Rating table (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Oct. 17 to Nov. 11; stage-discharge relation affected by ice Nov. 13 to Mar. 21)

1.5	0	2.0	5.8	2.9	81
1.6	.5	2.1	8.6	3.5	205
1.7	1.2	2.3	22	4.0	347
1.9	3.8	2.6	44	5.0	685

DISCHARGE IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0	3.1	3.8	2.0	1.2	5.5	8.3	34	127	56	1.2	.25
2	0	3.5	3.5	1.9	1.1	6.0	9.8	31	157	54	3.7	.20
3	0	3.8	3.3	1.9	1.2	6.0	11	30	229	48	3.7	.05
4	0	3.7	3.2	1.7	1.4	7.0	8.7	59	280	42	1.2	0
5	0	3.8	3.2	1.6	1.5	7.5	9.8	65	252	40	1.1	0
6	0	4.2	3.0	1.7	1.4	8.0	12	64	224	36	.88	0
7	0	4.4	2.8	1.6	1.4	8.5	15	114	189	33	3.5	0
8	0	4.6	2.6	1.4	1.4	8.0	16	103	164	31	6.2	0
9	0	5.0	2.5	1.3	1.4	6.0	13	111	139	26	9.8	0
10	0	4.8	2.5	1.5	1.5	6.0	19	127	125	22	29	0
11	0	5.0	2.7	1.3	1.4	7.0	18	359	111	19	31	0
12	0	5.4	3.0	1.2	1.3	6.5	22	430	135	19	20	0
13	0	5.0	3.5	1.2	1.2	6.0	23	367	182	14	15	0
14	0	4.0	3.6	1.3	1.2	6.5	21	302	227	13	10	.10
15	0	3.8	3.8	1.3	1.3	6.5	22	261	187	12	7.2	.20
16	0	3.5	3.7	1.1	1.5	7.0	22	245	234	7.5	5.4	.20
17	0	3.7	3.6	1.0	2.0	7.0	20	224	229	16	3.7	.20
18	.15	3.5	3.3	1.0	3.0	8.0	24	191	245	14	2.1	.10
19	.58	3.8	3.0	1.0	4.0	9.0	28	173	237	11	1.4	.15
20	.88	4.0	3.0	1.0	5.0	10	28	150	212	6.6	.62	.05
21	1.2	4.0	2.8	1.1	9.0	10	26	133	189	3.7	.30	.05
22	1.4	4.0	2.8	1.1	10	9.8	26	119	170	6.1	.25	0
23	1.6	4.0	2.8	1.1	11	13	26	119	148	8.6	1.1	0
24	2.1	4.0	3.0	1.1	6.0	13	30	123	127	9.8	1.0	0
25	2.1	3.9	2.8	1.2	6.5	13	32	96	109	8.3	1.0	.05
26	2.3	3.8	2.5	1.1	6.0	9.8	34	69	100	6.9	.80	.05
27	2.4	3.6	2.5	1.1	6.0	11	32	78	90	5.6	.65	.05
28	2.4	3.8	2.5	1.1	5.5	13	33	74	80	4.8	.58	.05
29	2.4	4.0	2.0	1.1	------	12	38	69	69	3.5	.58	.05
30	2.7	4.0	2.2	1.2	------	9.2	38	66	63	3.0	.45	.05
31	3.0	------	2.2	1.3	------	9.8	------	75	------	3.2	.35	------
TOTAL	25.21	121.7	91.7	40.5	95.4	265.6	665.6	4,461	5,030	583.6	163.76	1.85
MEAN	.81	4.06	2.96	1.31	3.41	8.57	22.2	144	168	18.8	5.28	.062
MAX	3.0	5.4	3.8	2.0	11	13	38	430	280	56	31	.25
MIN	0	3.1	2.0	1.0	1.1	5.5	8.3	30	63	3.0	.25	0
AC-FT	50	241	182	80	189	527	1,320	8,850	9,980	1,160	325	3.7

CAL YR 1969 TOTAL 18,950.19 MEAN 51.9 MAX 664 MIN 0 ACFT 37,590
WAT YR 1970 TOTAL 11,545.92 MEAN 31.6 MAX 430 MIN 0 ACFT 22,900

PEAK DISCHARGE (BASE, 400 CFS)

DATE	TIME	G.H.	DISCHARGE
5- 7	2400	5.66	980

06356000 South Fork Grand River at Buffalo, S. Dak.

LOCATION.--Lat 45°34'34", long 103°32'38", in SW¼ sec.29, T.19 N., R.5 E., Harding County, on right bank at downstream side of bridge on U.S. Highway 85, 0.3 mile south of Buffalo.

DRAINAGE AREA.--148 sq mi.

PERIOD OF RECORD.--August 1955 to current year.

GAGE.--Water-stage recorder. Datum of gage is 2,839.60 ft above mean sea level. Prior to May 5, 1970, nonrecording gage at same site and datum.

AVERAGE DISCHARGE.--15 years, 7.35 cfs (5,330 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 582 cfs June 12 (gage height, 6.23 ft); minimum daily, 0.40 cfs Dec. 19-21, Jan. 18-20.
Period of record: Maximum discharge, 2,780 cfs June 14, 1963 (gage height, 9.01 ft), from rating curve extended above 550 cfs on basis of slope-area measurement of peak flow; no flow at times.
Maximum stage known, 15.4 ft in 1908, from information by South Dakota Department of Highways.

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

REVISIONS (WATER YEARS).--WSP 1917: 1956-57.

DISCHARGE IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.5	2.0	1.3	.50	2.4	2.6	5.4	5.8	32	1.6	2.1	1.3
2	2.5	1.6	1.4	.60	2.2	2.4	5.8	4.8	6.5	1.7	7.5	1.5
3	3.2	1.5	2.1	.80	2.2	2.6	6.3	5.0	4.4	1.6	6.9	1.8
4	3.3	2.0	1.0	.80	2.4	2.6	5.2	4.8	4.2	1.5	4.2	1.8
5	3.2	1.6	1.0	.80	2.2	2.6	6.8	4.8	3.7	1.6	3.2	1.7
6	3.2	2.5	1.0	.85	2.2	3.0	7.0	4.2	3.7	1.6	5.1	1.7
7	3.2	2.5	1.0	.85	2.4	3.2	6.8	33	3.7	1.5	11	1.8
8	3.0	2.4	.80	.80	2.4	3.6	4.4	86	3.7	1.6	9.3	2.0
9	2.9	2.6	.80	.60	2.2	3.2	4.0	51	3.5	1.6	2.5	2.2
10	2.9	2.0	.60	.90	2.4	2.8	3.5	21	4.4	1.4	2.1	2.5
11	2.6	1.5	.80	.90	2.4	2.4	3.9	29	4.0	1.4	2.0	2.4
12	2.6	2.1	1.0	.80	2.4	2.4	63	18	106	1.5	1.8	2.4
13	2.6	2.0	1.0	.80	2.2	2.4	51	8.8	305	2.6	1.6	2.4
14	2.6	2.0	1.0	.80	2.0	2.4	26	14	25	18	1.6	4.0
15	2.5	1.8	1.0	.80	2.0	2.6	16	15	6.1	4.8	1.7	3.7
16	2.9	1.4	1.0	.80	2.4	2.6	14	7.9	4.0	2.6	1.8	4.2
17	2.8	1.3	.80	.60	2.8	2.6	16	4.6	3.3	2.1	1.7	3.5
18	2.6	1.3	.50	.40	2.4	3.0	21	3.9	3.3	2.0	1.6	3.2
19	2.8	1.3	.40	.40	2.4	4.0	16	5.4	3.7	2.1	1.4	2.8
20	2.5	1.3	.40	.40	2.6	5.0	15	5.0	4.4	1.8	1.4	2.6
21	2.4	1.3	.40	.80	2.8	5.6	58	11	2.8	1.6	1.6	2.6
22	2.0	1.2	.60	1.2	2.6	6.0	71	16	2.6	1.4	1.6	2.5
23	2.1	1.5	.60	1.6	2.6	18	57	8.6	2.6	4.9	1.6	2.5
24	2.0	1.3	.80	2.0	2.6	22	42	3.9	2.4	9.8	1.3	2.4
25	2.2	1.3	.60	2.2	2.2	20	25	3.3	2.1	4.2	1.1	2.5
26	2.2	1.3	.60	2.4	2.4	11	18	3.0	2.2	2.5	1.2	2.4
27	2.1	1.4	.50	2.2	2.6	13	15	2.8	2.1	2.1	1.4	2.5
28	2.1	1.4	.50	2.2	2.6	7.9	11	27	2.2	1.8	2.2	2.4
29	2.0	1.0	.50	2.2	------	8.1	14	17	2.0	1.8	1.7	2.4
30	1.7	1.4	.60	2.4	------	9.2	8.3	5.2	1.7	1.8	1.4	2.2
31	1.7	------	.50	2.4	------	8.1	------	62	------	1.8	1.3	------
TOTAL	78.9	49.8	25.10	35.80	67.0	186.9	616.4	491.8	557.3	88.3	86.9	73.9
MEAN	2.55	1.66	.81	1.15	2.39	6.03	20.5	15.9	18.6	2.85	2.80	2.46
MAX	3.3	2.6	2.1	2.4	2.8	22	71	86	305	18	11	4.2
MIN	1.7	1.0	.40	.40	2.0	2.4	3.5	2.8	1.7	1.4	1.1	1.3
AC-FT	157	99	50	71	133	371	1,220	975	1,110	175	172	147

CAL YR 1969 TOTAL 4,040.90 MEAN 11.1 MAX 570 MIN 0 ACFT 8,020
WAT YR 1970 TOTAL 2,358.10 MEAN 6.46 MAX 305 MIN .40 ACFT 4,680

PEAK DISCHARGE (BASE, 100 CFS)

DATE	TIME	G.H.	DISCHARGE
5- 8	0030	5.51	358
5-31	0800	4.32	117
6-12	2330	6.23	582

06356500 South Fork Grand River near Cash, S. Dak.

LOCATION.--Lat 45°38'56", long 102°38'27", in SW¼SW¼ sec.34, T.20 N., R.12 E., Perkins County, on left bank at downstream side of highway bridge, 1 mile upstream from Little Nasty Creek, 4 miles north of Cash, 10 miles south of Lodgepole, 12 miles northwest of Bison, and 16 miles downstream from Big Nasty Creek.

DRAINAGE AREA.--1,350 sq mi, approximately.

PERIOD OF RECORD.--October 1945 to current year. Monthly discharge only for some periods, published in WSP 1309.

GAGE.--Water-stage recorder. Altitude of gage is 2,416 ft (by barometer). Prior to Oct. 25, 1946, nonrecording gage, and Oct. 26, 1946, to June 22, 1966, water-stage recorder, at site 500 ft upstream. June 23, 1966, to May 2, 1968, nonrecording gage at present site, all at same datum.

AVERAGE DISCHARGE.--25 years, 52.1 cfs (37,750 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 1,210 cfs May 8 (gage height, 4.25 ft); minimum daily, 2.0 cfs Jan. 17, 18.
Period of record: Maximum discharge, 27,000 cfs Apr. 15, 1950 (gage height, 15.40 ft), from rating curve extended above 14,000 cfs on basis of slope-area measurement of peak flow; no flow at times.

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

DISCHARGE IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	11	13	16	8.0	4.0	40	42	80	116	20	24	8.6
2	12	12	16	7.0	3.5	40	44	66	192	15	23	8.0
3	13	12	16	7.0	3.5	30	48	53	137	15	18	7.6
4	13	13	16	6.0	3.3	30	54	48	95	15	23	7.6
5	14	15	15	5.0	3.5	35	50	43	62	15	24	7.6
6	14	15	15	5.5	3.5	40	59	40	50	15	26	7.6
7	14	15	14	5.0	3.5	50	50	40	48	15	28	8.0
8	15	15	13	4.5	3.5	45	44	283	45	14	25	9.3
9	14	15	13	5.0	4.0	35	40	469	43	14	30	10
10	14	15	12	6.0	4.0	30	38	420	39	14	30	10
11	15	14	15	5.0	3.5	30	36	260	37	14	26	10
12	15	14	17	4.0	3.5	30	36	178	44	14	21	11
13	15	12	17	3.0	3.0	30	42	144	63	13	19	11
14	15	13	17	4.0	3.5	30	82	113	334	14	18	11
15	16	14	17	4.0	3.5	30	82	117	316	14	17	11
16	17	14	17	3.0	5.0	35	71	93	113	14	15	11
17	17	13	17	2.0	7.0	30	62	80	73	18	13	11
18	18	12	16	2.0	4.0	30	59	67	46	19	13	12
19	18	13	14	2.5	3.0	30	59	60	37	18	13	11
20	18	14	15	2.5	3.5	30	59	51	32	13	13	12
21	18	15	14	3.0	4.0	35	56	53	29	13	13	13
22	17	15	15	4.0	3.5	35	56	51	29	13	12	13
23	17	15	14	5.0	5.0	40	101	51	28	13	12	12
24	16	15	15	5.0	4.0	50	169	53	26	17	11	12
25	16	15	14	4.0	5.0	40	232	73	25	17	11	12
26	16	14	12	4.0	10	45	183	57	21	17	10	12
27	15	14	10	4.0	20	45	128	46	20	17	10	12
28	15	15	9.0	3.5	30	50	101	43	19	17	9.3	12
29	15	15	8.0	3.5	------	60	95	45	21	15	10	12
30	15	16	9.0	4.0	------	55	95	82	21	13	10	12
31	15	------	9.0	5.0	------	52	------	75	------	13	9.3	------
TOTAL	473	422	437.0	136.0	157.3	1,187	2,273	3,334	2,161	468	536.6	317.3
MEAN	15.3	14.1	14.1	4.39	5.62	38.3	75.8	108	72.0	15.1	17.3	10.6
MAX	18	16	17	8.0	30	60	232	469	334	20	30	13
MIN	11	12	8.0	2.0	3.0	30	36	40	19	13	9.3	7.6
AC-FT	938	837	867	270	312	2,350	4,510	6,610	4,290	928	1,060	629

CAL YR 1969 TOTAL 18,781.0 MEAN 51.5 MAX 1,110 MIN 0 ACFT 37,250
WAT YR 1970 TOTAL 11,902.2 MEAN 32.6 MAX 469 MIN 2.0 ACFT 23,610

PEAK DISCHARGE (BASE, 500 CFS)

DATE	TIME	G.H.	DISCHARGE
5- 8	1930	4.25	1,210

06357000 Shadehill Reservoir at Shadehill, S. Dak.

LOCATION.--Lat 45°45'12", long 102°12'12", in NW¼ sec.30, T.21 N., R.16 E., Perkins County, at dam on Grand River, 0.8 mile west of Shadehill.

DRAINAGE AREA.--3,120 sq mi, approximately.

PERIOD OF RECORD.--June 1950 to current year.

GAGE.--Water-stage recorder. Datum of gage is at mean sea level. Prior to Apr. 3, 1952, occasional elevations obtained by level circuits and Apr. 3, 1952 to Apr. 28, 1970, nonrecording gage at same site and datum.

EXTREMES.--Current year: Maximum contents, 81,980 acre-ft June 26 (elevation, 2,272.11 ft); minimum, 48,500 acre-ft Mar. 27-30 (elevation, 2,264.71 ft).
Period of record: Maximum contents, 259,900 acre-ft Apr. 10, 1952 (elevation, 2,297.86 ft); minimum since first filling to spillway level, 25,950 acre-ft Mar. 17, 1962 (elevation, 2,258.90 ft).

REMARKS.--Reservoir formed by earthfill dam. Storage began July 1, 1950; dam completed August 1951. Conservation storage, 81,443 acre-ft between elevations 2,250.8 ft (invert of canal and river outlet) and elevation 2,272.0 ft (crest of morning glory spillway). Dead storage, 58,231 acre-ft below elevation 2,250.8 ft. Flood control, 217,708 acre-ft between elevations 2,272.0 ft and 2,302.0 ft (crest of emergency spillway). Surcharge, 111,203 acre-ft at elevation 2,312.0 ft (maximum pool elevation). Total reservoir capacity is 468,585 acre-ft at elevation 2,312.0 ft. The reservoir provides flood control and water for irrigation purposes. Figures given herein represent usable contents above elevation 2,250.8 ft. Prior to Oct. 1, 1968, reservoir contents published as total contents and included dead storage. Records of chemical analyses for the water year 1970 are published in Part 2 of this report.

COOPERATION.--Records of elevations and contents furnished by Bureau of Reclamation.

MONTHEND ELEVATION AND CONTENTS AT 2400, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

Date	Elevation (feet)	Contents (acre-feet)	Change in contents (acre-feet)
Sept.30	2,269.56	69,840	-
Oct. 31	2,268.46	64,800	-5,040
Nov. 30	2,267.57	60,800	-4,000
Dec. 31	2,266.82	57,500	-3,300
CAL YR 1969	-	-	+21,060
Jan. 31	2,265.89	53,480	-4,020
Feb. 28	2,265.01	49,750	-3,730
Mar. 31	2,264.72	48,540	-1,210
Apr. 30	2,265.91	53,560	+5,020
May 31	2,269.84	71,140	+17,580
June 30	2,272.06	81,740	+10,600
July 31	2,271.07	76,950	-4,790
Aug. 31	2,269.92	71,520	-5,430
Sept.30	2,268.72	65,980	-5,540
WTR YR 1970	-	-	-3,860

06357500 Grand River at Shadehill, S. Dak.

LOCATION.--Lat 45°45'25", long 102°11'41", in NW¼NW¼ sec.30, T.21 N., R.16 E., Perkins County, on left bank 0.2 mile downstream from Shadehill Dam, 1 mile southwest of Shadehill, and 12 miles southwest of Lemmon.

DRAINAGE AREA.--3,120 sq mi, approximately.

PERIOD OF RECORD.--February 1943 to current year. Records for July 1904 to October 1906 collected at site 4 miles upstream and published as "at Seim" in WSP 130, 172, and 208 have been found to be unreliable and should not be used.

GAGE.--Water-stage recorder. Datum of gage is 2,192.48 ft above mean sea level. Feb. 23, 1943, to Aug. 30, 1947, nonrecording gage, and Aug. 31, 1947, to Oct. 24, 1958, water-stage recorder, at site 0.8 mile downstream at datum 6.02 ft lower.

AVERAGE DISCHARGE.--27 years, 114 cfs (82,590 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 114 cfs June 28 (gage height, 3.49 ft); minimum daily, 39 cfs Apr. 28.

Period of record: Maximum discharge, 58,000 cfs Apr. 16, 1950 (gage height, 21.0 ft, from floodmarks upstream from bridge; 19.06 ft, from floodmark in gage well, unreliable, site and datum then in use); no flow for many days in most years.

REMARKS.--Records good except those for winter periods, which are poor. Flow completely regulated by Shadehill Reservoir (see sta 6-3570) since July 1, 1950.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	63	72	70	66	66	65	60	46	43	74	75	66
2	55	72	72	65	66	66	63	42	42	72	74	68
3	63	72	72	65	66	68	62	41	43	66	74	70
4	66	72	72	65	65	68	61	41	42	57	74	70
5	68	72	72	65	66	68	63	41	43	55	74	69
6	68	72	72	65	66	68	51	41	43	48	74	70
7	68	72	72	65	66	66	42	42	43	66	74	70
8	68	72	72	63	66	66	39	44	44	75	74	70
9	68	72	70	60	66	68	41	44	44	77	74	70
10	66	72	70	61	66	68	40	44	44	79	71	67
11	70	72	70	61	66	68	41	44	45	79	69	68
12	70	72	68	61	66	68	42	44	48	78	67	68
13	68	74	68	61	66	68	43	43	45	77	67	68
14	68	72	68	61	66	66	42	43	45	83	67	68
15	68	72	68	60	66	66	41	43	45	76	67	66
16	68	72	68	60	66	65	41	43	45	76	67	66
17	66	72	68	58	66	65	42	42	50	75	67	66
18	66	72	68	57	65	65	43	43	47	76	67	69
19	66	70	68	58	65	65	42	43	51	77	66	72
20	66	70	68	60	65	65	41	43	58	75	67	72
21	68	70	68	63	65	63	40	43	65	75	67	71
22	68	70	68	66	65	63	40	43	73	75	66	71
23	66	70	66	65	65	63	40	43	83	75	66	72
24	68	68	65	65	65	63	40	42	84	74	66	72
25	68	68	65	63	65	63	42	43	90	77	68	72
26	68	70	66	63	65	63	43	43	88	79	67	71
27	68	70	66	63	65	63	43	43	89	76	67	70
28	70	70	65	65	65	61	39	43	94	76	67	68
29	68	70	65	63	------	61	44	43	82	76	67	68
30	70	70	65	63	------	61	46	43	85	77	67	68
31	72	------	65	63	------	61	------	43	------	76	66	------
TOTAL	2,083	2,134	2,120	1,939	1,836	2,017	1,357	1,329	1,743	2,277	2,143	2,076
MEAN	67.2	71.1	68.4	62.5	65.6	65.1	45.2	42.9	58.1	73.5	69.1	69.2
MAX	72	74	72	66	66	68	63	46	94	83	75	72
MIN	55	68	65	57	65	61	39	41	42	48	66	66
AC-FT	4,130	4,230	4,210	3,850	3,640	4,000	2,690	2,640	3,460	4,520	4,250	4,120

CAL YR 1969 TOTAL 43,883.0 MEAN 120 MAX 1,140 MIN 7.0 AC-FT 87,040
WTR YR 1970 TOTAL 23,054 MEAN 63.2 MAX 94 MIN 39 AC-FT 45,730

06357800 Grand River at Little Eagle, S. Dak.

LOCATION.--Lat 45°39'28", long 100°49'04", in NE¼NE¼ sec.32, T.20 N., R.27 E., Corson County, on left bank at downstream side of bridge on State Highway 63, 1.3 miles southwest of Little Eagle, and 4.7 miles downstream from Little Oak Creek. Prior to Aug. 12, 1970, at site 0.6 mile downstream.

DRAINAGE AREA.--5,370 sq mi, approximately.

PERIOD OF RECORD.--July 1958 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,628.63 ft above mean sea level. Prior to May 12, 1959, nonrecording gage, and May 12, 1959, to Aug. 11, 1970, water-stage recorder at site 0.6 mile downstream at datum 2.00 ft lower.

AVERAGE DISCHARGE.--12 years, 185 cfs (134,000 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 8,280 cfs May 10 (gage height, 13.20 ft); minimum daily, 26 cfs Jan. 18, 19.

Period of record: Maximum discharge, 11,000 cfs June 13, 1962 (gage height, 14.54 ft, site and datum then in use); maximum gage height, 21.76 ft Mar. 18, 1966 (site and datum then in use), from floodmark (ice jam); no flow at times in 1958-62, 1969.

REMARKS.--Records good except those for winter periods, which are poor. Flow regulated by Shadehill Reservoir. (See sta 6-3570.) Water-quality records for the water year 1970 are published in Part 2 of this report.

CORRECTION.--Daily discharges for November and December 1968 are interchanged in WRD S. Dak. 1969.

Rating tables (gage height, in feet, and discharge, in cubic feet per second)
(Stage-discharge relation affected by ice Nov. 14 to Apr. 5; shifting-control method used Apr. 6-20, May 18 to June 13, June 18 to Aug. 11)

Oct. 1, 1969 to Aug. 11, 1970				Aug. 12 to Sept. 30, 1970	
4.2	57	6.0	843	3.6	48
4.4	92	7.0	1,640	3.8	62
4.7	184	9.0	3,240	4.0	89
5.0	298	11.0	5,040	4.4	188
5.5	518	13.0	7,920		

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	64	77	80	60	65	150	160	912	790	135	90	56
2	65	77	80	55	50	100	170	563	853	131	85	56
3	65	75	80	55	55	110	180	387	375	119	85	56
4	70	75	75	50	55	120	200	298	235	111	85	55
5	70	77	70	50	60	130	220	247	164	103	85	53
6	70	79	65	48	60	140	254	198	125	92	85	53
7	67	71	60	44	60	140	375	164	100	92	90	81
8	65	77	50	42	55	100	417	141	86	90	100	129
9	71	79	55	44	55	50	350	3,910	77	86	200	165
10	73	82	55	46	60	60	177	6,900	73	79	195	155
11	71	86	55	44	55	70	119	3,130	71	75	128	112
12	73	86	60	40	50	75	119	3,200	108	77	86	97
13	77	71	65	36	48	75	191	2,780	1,440	75	79	79
14	75	60	65	36	46	75	422	1,340	4,590	125	70	81
15	77	50	60	36	48	75	367	882	3,120	181	65	79
16	82	48	70	34	50	80	383	1,200	1,900	119	61	78
17	79	46	70	30	55	85	392	687	3,320	119	58	76
18	75	44	70	26	50	90	535	449	1,860	106	56	73
19	84	44	70	26	50	90	858	338	1,110	86	55	71
20	84	48	65	28	60	95	648	282	707	77	55	69
21	77	55	65	30	70	100	580	243	518	73	53	65
22	75	60	65	34	80	110	535	202	417	70	53	66
23	71	65	65	38	90	120	858	174	314	86	53	66
24	71	70	70	42	100	130	1,390	150	220	84	53	66
25	75	70	65	46	120	140	2,170	167	224	77	53	69
26	75	70	65	50	140	150	2,490	164	216	79	53	70
27	71	65	65	55	160	160	2,130	128	195	80	52	70
28	70	70	60	60	200	140	1,860	119	174	80	55	70
29	77	75	60	60	------	120	2,700	108	153	85	58	69
30	79	80	60	60	------	140	1,960	103	141	85	57	69
31	79	------	60	60	------	150	------	100	------	90	56	------
TOTAL	2,277	2,032	2,020	1,365	2,047	3,370	23,210	29,666	23,676	2,967	2,409	2,354
MEAN	73.5	67.7	65.2	44.0	73.1	109	774	957	789	95.7	77.7	78.5
MAX	84	86	80	60	200	160	2,700	6,900	4,590	181	200	165
MIN	64	44	50	26	46	50	119	100	71	70	52	53
AC-FT	4,520	4,030	4,010	2,710	4,060	6,680	46,040	58,840	46,960	5,890	4,780	4,670

CAL YR 1969 TOTAL 135,555.60 MEAN 371 MAX 8,390 MIN 0 AC-FT 268,900
WTR YR 1970 TOTAL 97,393 MEAN 267 MAX 6,900 MIN 26 AC-FT 193,200

06359500 Moreau River near Faith, S. Dak.

LOCATION (revised).--Lat 45°11'46", long 102°09'18", in NW¼NW¼ sec.10, T.14 N., R.16 E., Perkins County, near right bank on downstream side of State Highway 73, 500 ft right of highway bridge, 3.2 miles downstream from Rabbit Creek, and 13.5 miles northwest of Faith.

DRAINAGE AREA.--2,660 sq mi, approximately.

PERIOD OF RECORD.--March 1943 to current year.

GAGE.--Water-stage recorder. Datum of gage is 2,238.68 ft above mean sea level. Prior to Oct. 5, 1949, nonrecording gage 0.3 mile upstream and Oct. 5, 1949, to July 16, 1959, nonrecording gage and crest-stage gage at site 500 ft upstream; both at datum 1.0 ft higher.

AVERAGE DISCHARGE.--27 years, 135 cfs (97,810 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 2,700 cfs Apr. 26 (gage height, 7.78 ft). No flow for many days in August, September.

Period of record: Maximum discharge, 26,000 cfs Apr. 9, 1944 (gage height, 20.9 ft, from floodmarks, site and datum then in use), from rating curve extended above 12,000 cfs on basis of slope-area measurement of peak flow; no flow for long periods.

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

REVISIONS (WATER YEARS).--WSP 1176: WSP 1279: 1946 (M).

Rating table (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Oct. 1 to Nov. 12, Apr. 25 to May 5, May 10 to June 16; stage-discharge relation affected by ice Nov. 13 to Apr. 3)

1.25	0	1.9	16	4.0	405
1.3	.30	2.2	32	5.0	775
1.4	1.3	2.5	61	6.0	1,260
1.5	2.8	3.0	153	8.0	2,690
1.6	5.2				

DISCHARGE IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.0	9.1	12	4.5	4.0	18	55	219	159	14	.50	0
2	1.7	10	12	4.5	4.0	20	65	164	114	13	.12	0
3	2.2	9.7	10	4.5	4.0	19	75	136	161	12	.02	0
4	2.2	9.7	9.5	4.0	4.0	18	85	76	189	11	.23	0
5	2.8	9.7	9.0	4.0	4.5	19	72	66	155	10	1.4	0
6	3.0	10	8.0	4.0	4.5	22	42	62	103	15	2.5	0
7	3.4	10	7.0	3.5	5.0	25	29	62	74	9.7	91	2.2
8	3.2	11	6.5	3.0	5.0	22	27	103	54	8.4	29	1.7
9	3.6	10	6.0	3.0	5.0	18	24	80	42	7.8	17	1.7
10	3.8	10	5.0	3.5	5.5	18	23	327	36	8.4	10	.80
11	4.0	10	6.0	4.0	5.5	19	26	470	34	7.8	7.4	.40
12	4.6	11	7.0	3.5	5.5	17	51	1,030	60	7.1	6.2	.40
13	4.6	9.0	8.0	3.5	6.0	15	55	1,310	50	5.8	13	.30
14	5.2	9.0	8.5	3.0	6.0	15	108	928	220	8.7	11	.30
15	6.5	10	9.0	3.0	6.5	16	153	484	291	8.4	9.1	.30
16	6.8	10	8.5	2.5	6.5	22	134	305	458	6.8	7.4	.20
17	6.8	10	8.0	2.5	7.0	26	153	824	374	5.5	5.0	.20
18	6.5	9.0	7.5	2.0	5.0	30	153	391	233	5.2	3.0	.02
19	6.8	9.5	7.0	2.0	4.0	34	147	224	159	4.0	1.7	0
20	7.1	10	7.0	3.0	8.0	30	108	161	105	3.0	1.2	0
21	8.1	11	7.0	3.5	10	34	103	126	70	2.0	1.1	0
22	8.7	11	7.5	3.5	11	38	132	99	53	2.4	.90	0
23	8.7	11	7.5	3.5	12	36	256	74	43	3.0	.40	0
24	9.1	11	8.0	4.0	13	36	652	67	34	3.8	0	0
25	9.1	10	7.5	4.5	14	32	1,230	56	31	3.0	0	0
26	8.7	10	6.0	4.5	15	30	2,330	60	26	2.8	0	0
27	8.4	10	5.0	4.5	16	34	1,950	43	24	2.4	0	0
28	9.4	11	5.0	4.5	17	40	842	42	22	2.4	0	0
29	9.1	11	4.5	4.0	------	60	484	36	17	1.1	0	0
30	9.1	12	5.0	4.0	------	50	335	127	16	.60	0	0
31	9.4	------	4.5	4.0	------	50	------	229	------	.94	0	------
TOTAL	184.6	304.7	229.0	112.0	213.5	863	9,899	8,381	3,407	196.04	219.17	8.52
MEAN	5.95	10.2	7.39	3.61	7.63	27.8	330	270	114	6.32	7.07	.28
MAX	9.4	12	12	4.5	17	60	2,330	1,310	458	15	91	2.2
MIN	1.7	9.0	4.5	2.0	4.0	15	23	36	16	.60	0	0
AC-FT	366	604	454	222	423	1,710	19,630	16,620	6,760	389	435	17

CAL YR 1969 TOTAL 56,775.10 MEAN 156 MAX 4,400 MIN 0 ACFT 112,600
WAT YR 1970 TOTAL 24,017.53 MEAN 65.8 MAX 2,330 MIN 0 ACFT 47,640

PEAK DISCHARGE (BASE, 700 CFS)

DATE	TIME	G.H.	DISCHARGE
4-26	1800	7.78	2,700
5-13	1500	6.20	1,440
5-17	0600	5.57	1,100

06360500 Moreau River near Whitehorse, S. Dak.

LOCATION.--Lat 45°15'21", long 100°50'33", in SW¼SE¼ sec.17, T.15 N., R.27 E., Dewey County, on left bank 30 ft downstream from bridge, 2.4 miles southeast of Whitehorse, 8.8 miles (corrected) downstream from Little Moreau River, and 16.3 miles southeast of town of Timber Lake.

DRAINAGE AREA.--4,880 sq mi, approximately.

PERIOD OF RECORD.--June 1954 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,661.48 ft above mean sea level. Prior to Nov. 23, 1954, nonrecording gage at same site and datum.

AVERAGE DISCHARGE.--16 years, 156 cfs (113,000 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 7,260 cfs May 9 (gage height, 14.78 ft); no flow for many days.
Period of record: Maximum discharge, 17,500 cfs May 22, 1962 (gage height, 21.0 ft); no flow at times in each year.
Flood in June 1953 reached a stage of about 26.2 ft. Flood in March 1947 was probably higher.

REMARKS.--Records good except those for winter periods, which are poor. Water-quality records for the water year 1970 are published in Part 2 of this report.

REVISIONS (WATER YEAR).--WSP 1917: 1957, 1960.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0	0	.11	3.7	.17	.35	100	1,020	132	32	18	0
2	.03	0	3.7	3.7	.17	.35	100	668	154	24	14	0
3	.02	0	3.7	3.7	.17	.35	95	516	254	18	15	0
4	.02	.01	4.2	4.2	.11	.35	96	402	217	14	14	0
5	.01	.02	5.1	4.2	.11	.35	108	224	154	14	14	0
6	.01	.03	5.6	3.2	.11	.40	120	241	145	13	14	0
7	0	.03	6.1	2.4	.11	.40	98	205	151	12	16	7.5
8	0	.05	5.1	1.6	.11	.35	144	169	161	10	51	2.0
9	0	.05	5.1	1.6	.11	.35	135	5,120	135	8.0	45	0
10	0	.05	5.6	1.6	.11	.30	89	2,560	120	6.1	98	0
11	0	.05	4.6	1.6	.11	.30	71	1,620	104	3.7	27	0
12	0	.05	3.7	1.6	.10	.40	89	1,620	249	8.0	19	0
13	0	.07	3.2	1.4	.09	.50	89	1,610	525	13	15	0
14	0	.05	3.2	1.2	.10	1.0	100	1,860	381	11	14	0
15	0	.03	3.2	.99	.10	2.0	130	1,960	576	8.0	13	.15
16	0	.03	3.7	.84	.09	10	200	1,400	363	5.1	13	.07
17	0	.02	3.7	.71	.09	30	200	957	245	3.2	19	.11
18	0	.03	4.2	.60	.08	40	180	731	309	1.8	4.2	.20
19	0	.02	4.2	.45	.09	45	180	895	432	.99	.33	.20
20	0	.02	4.6	.30	.10	45	150	682	345	.51	.38	.20
21	0	.02	4.2	.24	.20	50	140	483	249	.28	.44	.14
22	.01	.02	3.7	.20	.30	55	150	369	183	.20	.33	.05
23	.01	.02	3.2	.20	.40	60	200	350	144	.38	.14	.07
24	.01	.03	3.2	.20	.40	70	400	417	113	.84	.28	.09
25	.01	.05	3.2	.20	.40	90	800	231	92	1.6	.33	.11
26	.02	.05	3.7	.20	.38	95	2,000	189	76	1.6	.33	.14
27	.01	.05	3.7	.20	.36	95	3,820	165	61	4.2	.20	.14
28	.02	.05	3.7	.20	.35	90	3,880	145	50	5.1	.17	.17
29	.01	.07	3.7	.17	------	90	2,650	128	44	8.0	.11	.09
30	.01	.09	3.7	.17	------	90	1,650	144	35	19	.05	.07
31	0	------	3.7	.17	------	95	------	187	------	21	.02	------
TOTAL	0.20	1.06	122.31	41.74	5.02	1,057.75	18,164	27,268	6,199	268.60	426.31	11.50
MEAN	.007	.035	3.95	1.35	.18	34.1	605	880	207	8.66	13.8	.38
MAX	.03	.09	6.1	4.2	.40	95	3,880	5,120	576	32	98	7.5
MIN	0	0	.11	.17	.08	.30	71	128	35	.20	.02	0
AC-FT	.4	2.1	243	83	10	2,100	36,030	54,090	12,300	533	846	23

CAL YR 1969 TOTAL 120,685.61 MEAN 331 MAX 7,240 MIN 0 AC-FT 239,400
WTR YR 1970 TOTAL 53,565.49 MEAN 147 MAX 5,120 MIN 0 AC-FT 106,200

PEAK DISCHARGE (BASE, 1,800 CFS)

DATE	TIME	G.H.	DISCHARGE	DATE	TIME	G.H.	DISCHARGE
4-28	1300	10.69	4,110	5-14	2200	7.90	2,400
5- 9	1800	14.78	7,260				

06395000 Cheyenne River at Edgemont, S. Dak.

LOCATION (corrected).--Lat 43°18'20", long 103°49'14", in SW¼SE¼SE¼ sec.36, T.8 S., R.2 E., Fall River County, on right bank at downstream side of bridge on U.S. Highway 18 at Edgemont, 300 ft downstream from Chicago, Burlington and Quincy Railroad bridge, and 600 ft upstream from Cottonwood Creek.

DRAINAGE AREA.--7,143 sq mi.

PERIOD OF RECORD.--June 1903 to November 1906 (no winter records), April 1928 to February 1933, October 1946 to current year.

GAGE.--Water-stage recorder. Datum of gage is 3,416.56 ft above mean sea level. Prior to Nov. 30, 1906, nonrecording gage 20 ft upstream at datum 2.7 ft lower. Apr. 11, 1928, to Feb. 28, 1933, Oct. 4, 1946, to Oct. 23, 1947, and Jan. 11, 1961, to Apr. 24, 1963, nonrecording gage at present site and datum.

AVERAGE DISCHARGE.--28 years (1928-32, 1946-70), 105 cfs (76,070 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 502 cfs May 17 (gage height, 1.98 ft); no flow for many days.
Period of record: Maximum discharge, 13,500 cfs June 17, 1962 (gage height, 9.46 ft); no flow at times most years.
Maximum stage known, 12.0 ft May 1, 1922 (present datum), from floodmarks at railroad bridge. Flood of May 12, 1920, reached a stage of 11.0 ft (present datum), from floodmarks at railroad bridge.

REMARKS.--Records good except those for winter periods, which are poor. Many small reservoirs above station used for stock and irrigation water (total capacity, about 45,000 acre-ft). Records of chemical analyses for the water year 1970 are published in Part 2 of this report.

REVISIONS (WATER YEARS).--WSP 1086: Drainage area. WSP 1116: 1947.

Rating table (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used June 8-21; stage-discharge relation affected by ice Nov. 10 to Mar. 15, Mar. 20, 21)

0.15	0	0.7	48
.2	2.2	1.0	100
.3	7.9	1.4	207
.4	15	1.9	418
.5	23	2.5	835

DISCHARGE IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0	9.9	6.0	8.5	6.0	65	66	69	38	2.8	0	0
2	0	9.9	6.5	8.5	6.0	70	58	56	30	2.8	0	0
3	0	9.9	7.0	8.0	6.5	60	56	58	24	2.8	0	0
4	3.9	11	8.0	7.5	6.5	55	52	55	25	2.2	0	0
5	4.5	11	9.0	7.0	6.5	55	48	52	26	.88	0	0
6	4.5	11	10	6.5	7.0	55	46	48	20	.88	15	0
7	5.6	13	10	6.0	7.0	60	44	45	18	0	88	0
8	6.8	13	10	5.5	7.0	70	45	49	16	0	42	0
9	7.9	13	9.0	5.0	7.5	60	78	94	14	0	20	.44
10	7.9	13	10	6.0	8.0	50	88	98	14	0	81	.44
11	7.9	13	11	6.0	9.0	45	76	86	14	0	26	.44
12	9.9	10	11	6.0	9.0	50	58	142	22	21	4.5	0
13	11	2.3	12	6.0	8.0	60	45	104	26	32	.88	1.3
14	9.3	2.0	13	6.5	9.0	65	48	147	224	30	.88	3.3
15	9.3	2.5	11	6.5	9.5	70	50	106	289	18	0	.88
16	9.3	3.0	11	5.5	10	84	49	92	134	100	0	.44
17	9.3	2.8	11	5.0	15	74	50	345	80	16	0	.44
18	9.3	2.5	11	5.0	20	69	54	312	56	.88	0	0
19	8.6	2.5	10	5.5	18	58	56	127	72	0	0	.13
20	8.6	3.0	10	5.5	20	70	56	80	98	0	0	.88
21	8.6	4.0	10	6.0	25	70	64	52	124	.59	0	1.3
22	8.6	5.0	10	6.5	40	68	74	37	73	0	0	1.3
23	8.6	5.0	9.5	7.0	55	78	82	34	41	2.7	0	1.8
24	8.6	5.0	9.5	7.5	70	82	94	37	25	.88	0	3.3
25	8.6	5.0	9.0	7.0	80	58	217	64	18	0	0	6.2
26	8.6	4.5	8.5	6.5	70	76	321	86	12	0	0	5.6
27	7.3	4.5	8.0	6.5	80	140	217	68	8.3	0	0	6.8
28	9.3	4.7	8.0	6.0	70	140	113	86	2.8	0	0	6.8
29	9.3	4.5	9.0	6.0	------	100	82	64	3.3	0	0	6.8
30	9.9	5.0	10	6.0	------	84	61	49	2.8	21	0	8.6
31	9.9	------	9.0	6.5	------	76	------	49	------	7.8	0	------
TOTAL	230.9	205.5	297.0	197.5	685.5	2,217	2,448	2,791	1,550.2	263.21	278.26	57.19
MEAN	7.45	6.85	9.58	6.37	24.5	71.5	81.6	90.0	51.7	8.49	8.98	1.91
MAX	11	13	13	8.5	80	140	321	345	289	100	88	8.6
MIN	0	2.0	6.0	5.0	6.0	45	44	34	2.8	0	0	0
AC-FT	458	408	589	392	1,360	4,400	4,860	5,540	3,070	522	552	113

CAL YR 1969 TOTAL 37,819.60 MEAN 104 MAX 5,340 MIN 0 ACFT 75,020
WAT YR 1970 TOTAL 11,221.26 MEAN 30.7 MAX 345 MIN 0 ACFT 22,260

PEAK DISCHARGE (BASE, 1,500 CFS).--No peak above base.

06400000 Hat Creek near Edgemont, S. Dak.

LOCATION.--Lat 43°14'46", long 103°35'16", in SW¼SE¼SE¼ sec.24, T.9 S., R.4 E., Fall River County, on left bank at downstream side of bridge on State Highway 71, 2.0 miles upstream from mouth, 2 miles west of Heppner, and 12.5 miles southeast of Edgemont.

DRAINAGE AREA.--1,044 sq mi.

PERIOD OF RECORD.--April 1905 to September 1906, October 1950 to current year. Monthly discharge only for some periods, published in WSP 1309.

GAGE.--Water-stage recorder. Datum of gage is 3,295.71 ft above mean sea level. Nonrecording gage Apr. 8, 1905, to May 2, 1906, at site 1,000 ft downstream and May 3 to July 7, 1906, at site 0.8 mile upstream at different datum. Nov. 6, 1950, to May 1, 1951, nonrecording gage at present site and datum.

AVERAGE DISCHARGE.--21 years, 24.2 cfs (17,530 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 335 cfs July 13 (gage height, 6.20 ft); no flow for many days.
Period of record: Maximum discharge, 13,300 cfs June 16, 1967 (gage height, 13.35 ft), from rating curve extended above 2,600 cfs on basis of slope-area measurement at 11.98 ft. No flow for many days in each year.

REMARKS.--Records fair except those for winter periods, which are poor. A few small diversions above station for irrigation. Lander ditch diverts water from Hat Creek 0.8 mile upstream from gaging station for irrigating hay meadows downstream from station. Results of discharge measurements, in cubic feet per second, of Lander ditch during water year 1969-70 are given herewith:

Nov. 13	0	Feb. 25	0	June 17	7.23
Dec. 10	0	Mar. 25	2.21	July 14	0
Dec. 30	0	Apr. 28	8.99	Aug. 13	4.19
Jan. 29	0	May 19	0	Sept. 21	0

DISCHARGE IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0	0	3.0	.30	.30	2.0	.56	.87	.07		0	
2	0	0	3.0	.30	.20	2.5	.49	.42	0		0	
3	0	0	2.5	.30	.30	2.0	.42	.14	0		0	
4	0	0	2.0	.20	.30	1.5	.49	.42	0		0	
5	0	0	1.5	.10	.30	1.5	.56	.49	0		0	
6	0	.03	1.0	.05	.40	1.5	.83	.42	0		0	
7	0	.83	.90	.05	.45	2.0	.83	.42	0		0	
8	0	1.1	.80	0	.40	1.5	.83	.63	0		0	
9	0	.63	.70	0	.50	1.0	.70	.56	0		0	
10	0	.42	.70	.50	.50	.50	.56	.56	0		0	
11	0	.83	.90	.50	.40	.50	.83	.56	0		0	
12	0	1.1	1.0	.40	.40	.60	.83	.49	.35		0	
13	.04	.83	1.5	.40	.30	.60	.49	.63	78		11	
14	.14	.35	1.6	.50	.40	.70	.42	1.2	48		0	
15	.28	1.2	1.5	.40	.50	.70	.63	1.5	202		0	
16	.28	1.2	1.5	.20	1.0	.70	3.1	1.4	45		0	
17	.42	1.9	1.5	.10	2.0	.60	.42	1.2	4.7		0	
18	.42	2.4	1.5	.05	3.0	.50	.63	.96	16		0	
19	.49	3.0	1.3	.05	2.0	.45	11	.56	26		0	
20	2.7	4.5	1.4	.05	2.3	.40	6.0	.07	2.6		0	
21	3.3	5.2	1.4	.05	2.6	.42	26	0	.07		0	
22	3.0	5.2	1.4	.05	2.6	.56	17	.14	7.8		0	
23	2.4	4.5	1.2	.10	2.6	1.7	21	0	.60		0	
24	2.0	3.9	1.0	.15	2.5	2.2	45	0	0		0	
25	1.4	2.8	.90	.20	2.5	2.1	96	0	0		0	
26	.56	3.0	.70	.15	3.0	.28	118	0	0		0	
27	0	2.6	.50	.20	2.5	.41	44	0	0		0	
28	0	2.4	.30	.15	2.0	1.6	22	0	0		0	
29	0	3.0	.40	.10	------	3.0	22	0	0		0	
30	0	2.8	.45	.10	------	2.8	5.0	.14	0		0	
31	0	------	.40	.20	------	.63	------	.14	------		0	------
TOTAL	17.43	55.72	38.45	5.90	36.25	37.45	446.62	13.92	431.19	0	11	0
MEAN	.56	1.86	1.24	.19	1.29	1.21	14.9	.45	14.4	0	.35	0
MAX	3.3	5.2	3.0	.50	3.0	3.0	118	1.5	202	0	11	0
MIN	0	0	.30	0	.20	.28	.42	0	0	0	0	0
AC-FT	35	111	76	12	72	74	886	28	855	0	22	0

CAL YR 1969 TOTAL 3,062.24 MEAN 8.39 MAX 309 MIN 0 ACFT 6,070
WAT YR 1970 TOTAL 1,093.93 MEAN 3.00 MAX 202 MIN 0 ACFT 2,170

PEAK DISCHARGE (BASE, 1,000 CFS).--No peak above base.

06400500 Cheyenne River near Hot Springs, S. Dak.

LOCATION.--Lat 43°18'19", long 103°33'43", in SE¼SE¼ sec.31, T.8 S., R.5 E., Fall River County, near right bank on downstream side of bridge on State Highway 87, 0.2 mile downstream from Cascade Creek and, 10 miles southwest of Hot Springs.

DRAINAGE AREA.--8,710 sq mi, approximately.

PERIOD OF RECORD.--September 1914 to September 1920 (published as "near Cascade Springs" 1914-15), March 1943 to current year.

GAGE.--Water-stage recorder. Datum of gage is 3,190.89 ft above mean sea level. Sept. 11, 1914, to Apr. 1, 1915, water-stage recorder, and Apr. 2, 1915, to Sept. 30, 1920, nonrecording gage at site 3 miles downstream at different datum. Mar. 1, 1943, to June 17, 1954, nonrecording gage at present site and datum.

AVERAGE DISCHARGE.--33 years, 237 cfs (171,700 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 590 cfs May 18 (gage height, 8.08 ft); minimum daily observed, 1.2 cfs Sept. 5, 7.
Period of record: Maximum discharge, 114,000 cfs May 12, 1920 (gage height, 29.2 ft, from floodmarks, site and datum then in use), from rating curve extended above 19,000 cfs on basis of slope-area measurement of peak flow; minimum daily observed, 1.2 cfs Sept. 5, 7, 1970.

REMARKS.--Records good. Some diversions above station for irrigation during summer months.

REVISIONS(WATER YEARS).--WSP 976: 1920, drainage area. WSP 1309: 1944(M). WSP 1339: 1953.

Rating table (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Aug. 6-31)

6.15	0	7.0	124
6.2	6.0	7.5	332
6.4	34	8.0	550
6.7	86		

DISCHARGE IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	9.9	24	48	30	24	139	86	72	70	16	44	6.0
2	9.9	25	44	30	31	210	78	72	59	18	40	3.6
3	9.9	25	42	31	46	157	74	72	44	20	37	2.4
4	16	24	46	25	52	172	72	68	38	20	30	2.4
5	20	22	59	18	58	127	68	64	37	18	22	1.2
6	20	22	46	18	54	100	64	61	38	16	20	2.4
7	18	22	34	18	52	114	64	59	36	15	115	1.2
8	18	19	31	18	49	143	61	59	32	14	148	2.4
9	18	22	42	19	52	112	61	66	28	12	59	6.0
10	18	24	38	19	59	46	88	116	22	11	46	6.0
11	19	26	36	19	70	63	109	116	22	9.9	125	6.0
12	24	26	36	18	64	105	109	109	54	9.9	80	6.0
13	26	28	36	19	61	149	78	169	56	99	34	12
14	26	16	38	22	58	119	54	126	86	67	16	18
15	26	22	38	20	56	154	75	182	398	43	12	19
16	24	26	37	20	58	122	78	116	288	32	19	18
17	20	43	37	20	64	116	70	122	143	93	26	20
18	20	33	40	20	112	109	70	493	93	59	25	20
19	20	26	40	20	102	93	98	250	82	31	22	19
20	20	32	42	20	93	70	95	126	95	16	20	16
21	24	40	44	19	97	139	93	82	124	16	18	16
22	24	44	44	20	92	109	107	64	137	16	12	18
23	24	42	38	20	140	100	112	52	95	18	12	18
24	24	44	46	20	172	102	124	43	82	19	14	19
25	24	42	37	19	144	98	182	46	49	20	12	19
26	24	44	34	19	127	86	396	83	38	18	11	19
27	22	38	40	19	114	107	359	95	34	18	11	19
28	22	38	42	18	198	207	227	80	24	20	11	20
29	25	44	31	22	------	157	132	98	20	22	9.9	20
30	25	49	30	24	------	119	95	82	18	16	9.9	20
31	24	------	30	24	------	104	------	76	------	32	8.6	------
TOTAL	644.7	932	1,226	648	2,299	3,748	3,379	3,319	2,342	834.8	1,069.4	375.6
MEAN	20.8	31.1	39.5	20.9	82.1	121	113	107	78.1	26.9	34.5	12.5
MAX	26	49	59	31	198	210	396	493	398	99	148	20
MIN	9.9	16	30	18	24	46	54	43	18	9.9	8.6	1.2
AC-FT	1,280	1,850	2,430	1,290	4,560	7,430	6,700	6,580	4,650	1,660	2,120	745

CAL YR 1969 TOTAL 50,576.7 MEAN 139 MAX 5,980 MIN 9.9 ACFT 100,300
WAT YR 1970 TOTAL 20,817.5 MEAN 57.0 MAX 493 MIN 1.2 ACFT 41,290

PEAK DISCHARGE (BASE, 2,000 CFS).--No peak above base.

06401000 Angostura Reservoir near Hot Springs, S. Dak.

LOCATION.--Lat 43°20'35", long 103°26'16", in SW¼NW¼ sec.20, T.8 S., R.6 E., Fall River County, at dam on Cheyenne River, 6.5 miles southeast of Hot Springs.

DRAINAGE AREA.--9,100 sq mi, approximately.

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

GAGE.--Water-stage recorder. Datum of gage is at mean sea level. Prior to Aug. 26, 1965, nonrecording gage at same site and datum.

EXTREMES.--Current year: Maximum contents, 127,700 acre-ft May 19, 20 (elevation, 3,187.24 ft); minimum, 84,330 acre-ft Sept. 30 (elevation, 3,176.88 ft).
Period of record: Maximum contents observed, 145,200 acre-ft June 18, 1962 (elevation, 3,189.00 ft); minimum observed since normal operating level was reached, 45,350 acre-ft Sept. 28, 1960 (elevation, 3,162.90 ft).

REMARKS.--Reservoir formed by concrete gravity dam with earth embankment with gated concrete gravity spillway section. Storage began October 3, 1949; dam completed December 1949. Conservation capacity, 127,558 acre-ft between elevations 3,139.75 ft (invert of lowest outlet) and 3,187.2 ft (top of spillway gates). Dead storage below elevation 3,139.75 ft, 11,203 acre-ft. Surcharge capacity, 196,221 acre-ft (maximum pool elevation). Figures given herein represent contents above elevation 3,139.75 ft. Water is stored for irrigation.

COOPERATION.--Elevations, contents, and diversion to Angostura project furnished by Bureau of Reclamation.

MONTHEND ELEVATION AND CONTENTS AT 2400, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

Date	Elevation (feet)	Contents (acre-feet)	Change in contents (acre-feet)	+Diversions (acre-feet)
Sept.30	3,181.51	102,400	-	-
Oct. 31	3,181.21	101,200	-1,200	1,396
Nov. 30	3,181.54	102,600	+1,400	-
Dec. 31	3,182.00	104,500	+1,900	-
CAL YR 1969	-	-	-3,000	-
Jan. 31	3,182.32	105,800	+1,300	-
Feb. 28	3,183.22	109,600	+3,800	-
Mar. 31	3,184.91	117,000	+7,400	-
Apr. 30	3,186.43	123,900	+6,900	-
May 31	3,187.04	126,800	+2,900	2,392
June 30	3,186.42	123,900	-2,900	5,995
July 31	3,182.47	106,400	-17,500	16,679
Aug. 31	3,178.56	90,700	-15,700	15,622
Sept.30	3,176.88	84,330	-6,370	5,100
WTR YR 1970	-	-	-18,070	-

(+) Diversions to Angostura irrigation project.

06401500 Cheyenne River below Angostura Dam, S. Dak.

LOCATION.--Lat 43°20'42", long 103°26'12", in NE¼NW¼NW¼ sec.20, T.8 S., R.6 E., Fall River County, on right bank 800 ft downstream from Angostura Dam, 4.8 miles upstream from Fall River, and 6.5 miles southeast of Hot Springs.

DRAINAGE AREA.--9,100 sq mi, approximately.

PERIOD OF RECORD.--October 1945 to current year. Monthly discharge only for some periods, published in WSP 1309.

GAGE.--Water-stage recorder. Datum of gage is 3,058.02 ft above mean sea level (Bureau of Reclamation bench mark). Prior to Oct. 16, 1946, nonrecording gage, and prior to July 7, 1946, water-stage recorder at site 4.8 miles downstream at different datum.

AVERAGE DISCHARGE.--25 years, 84.6 cfs (61,290 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 160 cfs May 20 (gage height, 3.86 ft); minimum daily, 0.50 cfs Feb. 25-27.
Period of record: Maximum discharge, 24,300 cfs June 18, 1962 (gage height, 13.81 ft), from rating curve extended above 6,000 cfs; no flow Oct. 9, 1949, to Feb. 5, 1950, Apr. 28, Aug. 26, 30, 1951.

REMARKS.--Records good except those below 5 cfs, which are fair. Flow completely regulated by and diversions made at Angostura Reservoir. (See sta 6-4010.) Water-quality records for the water year 1970 are published in Part 2 of this report.

REVISIONS (WATER YEARS).--WSP 1309: 1946 (M).

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.2	1.4	1.3	1.0	.91	.52	1.1	1.2	1.9	1.4	1.1	1.1
2	1.1	1.5	1.4	.96	.95	.58	1.1	1.2	1.9	1.3	1.1	1.1
3	1.2	1.4	1.4	.96	.83	.55	1.1	1.1	1.9	1.4	1.1	1.1
4	1.2	1.4	1.4	1.0	.80	.55	1.1	1.1	2.0	1.4	1.1	1.1
5	1.1	1.3	1.4	1.0	.82	.58	1.1	1.8	2.0	1.4	1.1	1.1
6	1.1	1.3	1.4	1.1	.76	.58	1.0	1.2	1.9	1.2	1.1	1.1
7	1.1	1.4	1.4	1.2	.76	.58	1.0	1.3	3.4	1.2	1.1	1.1
8	1.1	1.3	1.4	1.4	.74	.64	.97	1.4	1.9	1.2	1.1	1.0
9	1.1	1.5	1.4	1.4	.70	.70	.98	1.4	1.8	1.1	1.1	1.1
10	1.1	1.5	1.4	1.1	.71	.66	1.1	1.3	1.9	1.1	1.1	1.1
11	1.2	1.5	1.4	1.1	.71	.67	1.1	2.0	2.1	1.1	1.1	1.1
12	1.1	1.5	1.4	1.1	.67	.67	1.1	1.4	2.5	1.2	1.1	1.2
13	1.1	1.6	1.4	1.2	.67	.67	1.1	3.2	1.9	1.0	1.1	1.4
14	1.1	1.6	1.4	1.2	.67	.74	1.2	2.0	1.9	1.0	1.1	1.3
15	1.4	1.5	1.4	1.2	.62	.74	1.2	1.9	2.0	1.0	1.1	1.2
16	1.2	1.5	1.4	1.4	.60	.73	1.1	1.9	2.1	1.0	1.1	1.3
17	1.2	1.6	1.4	1.8	.60	.85	1.2	3.0	1.8	1.1	.99	1.3
18	1.2	1.5	1.2	1.5	.61	.86	1.6	2.1	1.8	1.1	1.0	1.2
19	1.2	1.5	1.2	1.4	.55	.82	1.3	108	1.7	1.2	1.1	1.2
20	1.3	1.4	1.2	1.4	.55	.88	1.2	153	1.8	1.1	1.1	1.2
21	1.2	1.3	1.1	1.4	.57	.88	1.2	56	1.6	1.1	1.0	1.2
22	1.2	1.3	1.2	1.3	.52	.98	1.2	1.9	2.1	1.1	1.1	1.2
23	1.2	1.3	1.1	1.3	.52	.99	1.1	2.7	1.7	1.1	1.1	1.2
24	1.2	1.2	.96	1.2	.52	1.0	1.1	2.1	1.7	1.0	1.1	1.4
25	1.3	1.2	.96	1.2	.50	1.1	.55	2.3	1.7	1.1	1.0	1.3
26	1.3	1.3	1.0	1.2	.50	1.2	.67	2.1	1.5	1.1	.97	1.4
27	1.3	1.3	1.0	1.1	.50	1.2	.72	2.0	1.7	1.4	1.0	1.3
28	1.3	1.3	1.0	1.1	.52	1.1	.83	2.0	1.9	1.2	1.0	1.3
29	1.3	1.3	1.0	1.0	------	1.1	.91	2.4	1.6	1.0	1.1	1.3
30	1.4	1.3	1.0	1.4	------	1.1	1.1	2.3	1.5	1.1	1.1	1.3
31	1.4	------	1.0	.89	------	1.1	------	2.0	------	1.1	1.1	------
TOTAL	37.4	42.0	38.62	37.51	18.38	25.32	32.03	369.3	57.2	35.8	33.36	36.2
MEAN	1.21	1.40	1.25	1.21	.66	.82	1.07	11.9	1.91	1.15	1.08	1.21
MAX	1.4	1.6	1.4	1.8	.95	1.2	1.6	153	3.4	1.4	1.1	1.4
MIN	1.1	1.2	.96	.89	.50	.52	.55	1.1	1.5	1.0	.97	1.0
AC-FT	74	83	77	74	36	50	64	733	113	71	66	72

CAL YR 1969 TOTAL 24,265.22 MEAN 66.5 MAX 5,490 MIN .90 AC-FT 48,130
WTR YR 1970 TOTAL 763.12 MEAN 2.09 MAX 153 MIN .50 AC-FT 1,510

06402000 Fall River at Hot Springs, S. Dak.

LOCATION(revised).--Lat 43°25'50", long 103°28'33", in NW¼NW¼ sec.24, T.7 S., R.5 E., Fall River County, on left bank at intersection of River Street and University Avenue in Hot Springs, and 6.0 miles upstream from mouth.

DRAINAGE AREA.--137 sq mi.

PERIOD OF RECORD.--October 1937 to current year. Monthly discharge only for October 1937, published in WSP, 1309.

GAGE.--Water-stage recorder. Datum of gage is 3,413.20 ft above mean sea level. Prior to June 2, 1939, nonrecording gage at site 300 ft upstream at datum 3.00 ft higher.

AVERAGE DISCHARGE.--33 years, 26.3 cfs (19,050 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 152 cfs July 27 (gage height, 2.58 ft); minimum daily, 16 cfs May 21-23, 25-27.

Period of record: Maximum discharge, 13,100 cfs Sept. 4, 1938 (gage height, 18.4 ft, site and datum then in use), from rating curve extended above 51 cfs on basis of weir formula and slope-area measurement of peak flow; minimum, 4 cfs Sept. 23, 1940.

REMARKS.--Records good. Flow regulated by Coldbrook Reservoir (capacity, 7,200 acre-ft) beginning September 1952, and Cottonwood Reservoir (capacity, 8,385 acre-ft) since June 1969. Some diversion above station for municipal supply of Hot Springs.

REVISIONS(WATER YEARS).--WSP 1729: 1938, 1941(M), 1947(M).

Rating table (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Oct. 22 to Nov. 22, Dec. 28 to Feb. 7)

1.9	12
2.0	17
2.1	26
2.2	48
2.3	79
2.5	152

DISCHARGE IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	24	22	23	21	19	23	20	19	19	21	21	21
2	24	22	23	21	20	24	20	19	19	22	21	21
3	24	22	23	20	20	23	20	19	19	22	21	21
4	24	22	24	20	21	22	20	20	18	22	22	21
5	24	22	24	21	21	22	21	20	18	22	22	21
6	23	22	24	21	21	23	20	20	18	22	23	21
7	23	21	24	20	21	22	20	20	18	20	22	21
8	23	21	25	20	22	22	20	21	18	20	22	21
9	23	21	25	20	22	22	19	22	18	20	21	21
10	23	21	25	20	22	22	18	22	19	20	22	21
11	23	20	25	20	22	22	19	22	20	20	22	22
12	24	20	24	20	22	22	19	22	23	19	22	21
13	24	20	23	20	22	21	19	22	18	19	22	24
14	24	20	23	20	22	21	19	22	19	19	21	23
15	23	18	23	21	22	22	19	22	19	19	22	22
16	25	18	23	21	22	22	18	21	20	19	21	22
17	26	19	22	21	22	22	19	21	21	19	20	22
18	26	18	22	22	22	22	19	20	22	19	20	22
19	25	19	22	22	22	22	19	21	22	19	20	22
20	25	20	22	22	22	22	20	19	22	19	20	23
21	25	20	22	21	22	22	20	16	22	19	20	24
22	24	20	22	20	22	22	20	16	22	19	20	24
23	23	21	22	20	22	22	20	16	22	20	20	25
24	23	21	22	22	22	22	19	17	23	20	20	25
25	24	21	21	22	22	22	19	16	22	20	20	24
26	23	22	21	21	22	22	19	16	22	20	20	24
27	23	22	22	21	24	22	20	16	22	30	20	24
28	23	22	21	21	24	19	20	17	22	22	21	23
29	23	22	21	20	------	19	20	18	21	22	21	23
30	22	23	21	19	------	19	21	18	22	22	21	25
31	22	------	21	19	------	19	------	19	------	21	21	------
TOTAL	735	622	705	639	609	673	586	599	610	637	651	674
MEAN	23.7	20.7	22.7	20.6	21.8	21.7	19.5	19.3	20.3	20.5	21.0	22.5
MAX	26	23	25	22	24	24	21	22	23	30	23	25
MIN	22	18	21	19	19	19	18	16	18	19	20	21
AC-FT	1,460	1,230	1,400	1,270	1,210	1,330	1,160	1,190	1,210	1,260	1,290	1,340

CAL YR 1969 TOTAL 8,463 MEAN 23.2 MAX 36 MIN 14 ACFT 16,790
WAT YR 1970 TOTAL 7,740 MEAN 21.2 MAX 30 MIN 16 ACFT 15,350

PEAK DISCHARGE (BASE, 135 CFS)

DATE	TIME	G.H.	DISCHARGE
7-27	2030	2.58	152

06402500 Beaver Creek near Buffalo Gap, S. Dak.

LOCATION.--Lat 43°27'56", long 103°18'22", in SE¼SE¼ sec.5, T.7 S., R.7 E., Fall River County, on left bank 1.5 miles south of Buffalo Gap, and 4.5 miles upstream from mouth.

DRAINAGE AREA.--130 sq mi, approximately.

PERIOD OF RECORD.--October 1937 to current year. Monthly discharge only for October 1937, published in WSP 1309.

GAGE.--Water-stage recorder. Altitude of gage is 3,150 ft (from topographic map). Prior to June 20, 1939, nonrecording gage at site 0.8 mile downstream at different datum.

AVERAGE DISCHARGE.--33 years, 7.05 cfs (5,110 acre-ft per year).

EXTREMES.--Current year: Maximum discharge 15 cfs Mar. 10 (gage height, 4.04 ft); maximum gage height, 5.15 ft Jan. 7, 8 (backwater from ice); minimum daily discharge, 0.36 cfs Aug. 10.

Period of record: Maximum discharge, 11,700 cfs Sept. 4, 1938 (gage height, 16.46 ft, site and datum then in use), from rating curve extended above 11 cfs on basis of slope-area measurement of peak flow; no flow at times in some years.

Maximum stage known, 18.0 ft in 1927 (former site and datum), from information by local residents.

REMARKS.--Records good except those above 50 cfs and the winter periods, which are poor. Nearly all flow is diverted above station during irrigation season.

REVISIONS(WATER YEARS).--WSP 956: 1941. WSP 1309: 1939-40(M), 1947(M).

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	5.0	10	9.3	5.5	11	6.8	11	11	.63	.66	.49	.38
2	4.7	11	4.5	5.5	11	6.7	8.2	11	.63	.68	.59	.42
3	4.9	11	4.4	5.5	11	6.9	5.3	11	.62	.70	1.9	.54
4	9.3	11	4.1	5.0	11	8.4	5.5	9.7	.59	.73	3.3	1.3
5	9.5	11	5.0	4.8	11	9.1	6.0	5.9	.57	.78	3.3	2.0
6	9.8	11	7.7	4.6	11	12	6.0	7.2	.53	.96	3.3	2.2
7	12	11	7.7	4.2	11	12	6.0	6.8	.51	.95	4.0	2.1
8	11	10	7.9	4.0	11	12	5.5	6.0	.49	.90	1.1	4.3
9	11	6.9	8.0	4.5	11	13	5.5	9.9	.48	1.0	.40	4.6
10	11	6.1	7.9	5.0	11	12	5.7	12	.49	1.1	.36	4.3
11	11	4.7	7.7	7.0	11	12	7.0	12	.58	1.1	.47	1.1
12	11	5.0	7.7	9.0	9.8	12	6.0	13	4.3	1.1	3.2	.73
13	11	4.7	7.6	12	7.2	12	6.0	8.2	2.3	1.4	1.1	1.5
14	11	5.0	7.6	11	7.9	12	6.0	4.5	2.1	1.5	1.0	7.1
15	12	5.6	7.6	11	7.8	12	7.0	3.7	2.0	1.3	1.1	9.1
16	11	6.0	7.7	12	9.0	12	8.0	3.6	2.2	1.4	1.1	11
17	9.0	6.2	8.1	10	9.0	12	9.8	3.5	2.1	1.3	.97	11
18	9.3	6.6	9.1	9.5	9.0	13	10	3.2	2.3	1.2	.48	10
19	11	7.2	9.2	9.5	8.7	13	11	2.8	2.3	1.3	.38	9.3
20	11	7.1	9.7	9.5	8.8	12	11	1.2	2.2	1.4	.40	8.7
21	11	7.4	9.8	10	8.8	12	11	1.1	2.2	1.3	.40	7.4
22	11	8.2	9.9	11	8.5	12	11	1.2	3.3	1.2	.38	9.6
23	11	7.3	9.8	11	8.5	12	11	1.2	7.2	1.6	.40	9.4
24	10	8.0	9.4	11	8.6	13	10	1.1	5.0	1.3	.42	9.6
25	10	8.2	9.7	11	8.7	11	10	.91	3.9	.86	.60	9.6
26	10	8.4	9.0	10	8.9	12	10	.82	.85	.74	1.2	9.5
27	11	9.4	8.0	11	8.8	12	10	.76	.77	.71	1.6	9.0
28	11	9.6	7.0	10	6.8	11	10	.76	.70	.80	1.4	9.1
29	11	9.0	6.0	10	------	11	11	.69	.70	.64	.62	8.8
30	11	8.8	6.0	10	------	11	11	.65	.67	.56	.40	8.7
31	11	------	6.0	10	------	11	------	.64	------	.53	.40	------
TOTAL	313.5	241.4	239.1	264.1	265.8	348.9	251.5	156.03	53.21	31.70	36.76	182.37
MEAN	10.1	8.05	7.71	8.52	9.49	11.3	8.38	5.03	1.77	1.02	1.19	6.08
MAX	12	11	9.9	12	11	13	11	13	7.2	1.6	4.0	11
MIN	4.7	4.7	4.1	4.0	6.8	6.7	5.3	.64	.48	.53	.36	.38
AC-FT	622	479	474	524	527	692	499	309	106	63	73	362

CAL YR 1969	TOTAL 2,113.89	MEAN 5.79	MAX 55	MIN .40	AC-FT 4,190
WTR YR 1970	TOTAL 2,384.37	MEAN 6.53	MAX 13	MIN .36	AC-FT 4,730

PEAK DISCHARGE (BASE, 24 CFS).--No peak above base.

06402600 Cheyenne River near Buffalo Gap, S. Dak.

LOCATION.--Lat 43°30'05", long 103°04'23", in SW¼NE¼ sec.29, T.6 S., R.9 E., Custer County, on right bank at right end of highway bridge, 5.8 miles upstream from Cottonwood Creek, and 12 miles east of Buffalo Gap.

DRAINAGE AREA.--9,810 sq mi, approximately.

PERIOD OF RECORD.--October 1968 to current year.

GAGE.--Water-stage recorder. Altitude of gage is 2,820 ft (from topographic map).

EXTREMES.--Current year: Maximum discharge, 414 cfs Apr. 24 (gage height, 4.13 ft); minimum daily, 32 cfs July 2.
Period of record: Maximum discharge, 8,620 cfs July 21, 1969 (gage height, 9.89 ft); minimum daily, 20 cfs Dec. 30, 1968.

REMARKS.--Records good except those for winter periods, which are poor. Flow regulated by Angostura Reservoir. (See sta 6-4010.) Records of chemical analyses and water temperature for the water year 1970 are published in Part 2 of this report.

Rating table (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used June 9 to July 16; stage-discharge relation affected by ice Dec. 9-14, Dec. 25 to Feb. 22, Mar. 10-13)

2.3	30
2.6	46
2.9	76
3.2	130
3.8	303

DISCHARGE IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	85	71	63	78	80	57	59	64	66	33	55	88
2	79	70	63	76	75	60	61	64	57	32	55	90
3	76	70	61	74	76	61	59	64	48	38	57	75
4	88	71	64	72	77	59	55	64	47	41	62	66
5	91	69	63	70	77	58	55	60	48	42	64	60
6	85	69	63	65	78	58	55	56	50	43	63	61
7	82	69	66	60	80	59	54	60	51	39	79	75
8	80	69	66	55	80	63	54	63	51	42	78	71
9	79	68	60	60	82	65	54	64	50	45	82	66
10	80	65	55	70	85	62	55	64	50	49	82	71
11	80	64	60	75	82	55	58	63	52	46	82	72
12	84	64	65	75	80	60	75	62	116	45	76	66
13	88	65	70	75	75	63	65	63	98	49	74	75
14	84	62	80	76	76	65	60	64	72	42	70	117
15	84	69	90	75	78	65	72	62	64	40	65	104
16	76	65	90	70	78	68	82	56	61	38	64	85
17	74	66	88	65	76	70	75	53	48	34	64	84
18	71	63	85	60	74	74	102	53	40	38	61	79
19	70	61	85	60	70	72	96	62	43	34	61	74
20	69	65	95	60	75	69	79	186	43	38	62	68
21	76	62	91	65	82	69	90	215	41	42	65	68
22	71	63	79	68	88	70	102	115	40	46	62	66
23	70	62	70	75	99	68	143	76	42	53	61	65
24	71	64	69	80	64	70	277	68	48	61	62	70
25	71	63	68	85	59	70	164	65	51	55	68	76
26	70	63	66	80	60	66	95	60	43	55	69	74
27	69	62	70	85	60	64	82	54	38	48	74	70
28	69	66	80	80	59	63	76	63	36	72	79	71
29	71	65	85	75	------	64	69	74	36	93	80	72
30	71	64	85	75	------	62	65	66	36	71	74	71
31	71	------	80	80	------	61	------	72	------	65	80	------
TOTAL	2,385	1,969	2,275	2,219	2,125	1,990	2,488	2,275	1,566	1,469	2,130	2,250
MEAN	76.9	65.6	73.4	71.6	75.9	64.2	82.9	73.4	52.2	47.4	68.7	75.0
MAX	91	71	95	85	99	74	277	215	116	93	82	117
MIN	69	61	55	55	59	55	54	53	36	32	55	60
AC-FT	4,730	3,910	4,510	4,400	4,210	3,950	4,930	4,510	3,110	2,910	4,220	4,460

CAL YR 1969 TOTAL 48,728 MEAN 134 MAX 5,980 MIN 25 ACFT 96,650
WAT YR 1970 TOTAL 25,141 MEAN 68.9 MAX 277 MIN 32 ACFT 49,870

06404000 Battle Creek near Keystone, S. Dak.

LOCATION.--Lat 43°52'18", long 103°20'09", in SW¼SW¼ sec.18, T.2 S., R.7 E., Pennington County, on right bank 40 ft upstream from highway bridge, 0.6 mile downstream from Iron Creek, and 4.5 miles southeast of Keystone.

DRAINAGE AREA.--66 sq mi.

PERIOD OF RECORD.--July 1945 to July 1947, October 1961 to current year.

GAGE.--Water-stage recorder. Altitude of gage is 3,790 ft (from topographic map). Prior to Dec. 5, 1961, nonrecording gage at site 40 ft downstream; prior to Nov. 13, 1961, at different datum.

AVERAGE DISCHARGE.--10 years (1945-46, 1961-70), 10.7 cfs (7,750 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 680 cfs June 12 (gage height, 3.58 ft); no flow for many days. Period of record: Maximum discharge, 718 cfs May 24, 1965 (gage height, 3.71 ft), from rating curve extended above 310 cfs; no flow for many days in 1961, 1962, 1970.

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

Rating tables (gage height, in feet, and discharge, in cubic feet per second)
(Stage-discharge relation affected by ice, Nov. 13, Nov. 18 to Apr. 16, Apr. 18-21)

Oct. 1 to Apr. 26

0.6	0	1.1	7.1
.7	.5	1.4	21
.8	1.3	1.6	36
1.0	4.3		

Apr. 27 to Sept. 30

0.7	0	1.5	23
.8	.4	1.8	51
.9	1.2	2.2	117
1.0	2.4	2.6	225
1.2	6.8	3.0	393

DISCHARGE IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.82	1.7	2.0	.60	.30	.30	1.8	16	30	5.5	1.7	0
2	.74	1.8	1.6	.50	.20	.40	2.0	14	22	5.2	1.4	0
3	.74	1.8	1.1	.40	.30	.30	3.0	12	18	4.7	1.3	.33
4	1.4	1.9	.80	.20	.30	.30	4.0	11	15	4.5	1.2	.32
5	1.5	2.0	.80	0	.30	.30	5.0	11	12	4.7	1.1	.14
6	1.4	2.0	.70	0	.30	.40	7.0	11	11	5.5	40	0
7	1.3	1.9	.60	0	.20	.50	7.0	10	9.1	5.0	23	.68
8	1.2	1.7	.50	0	.20	.50	8.0	15	8.0	4.2	7.6	.45
9	1.1	1.5	.50	0	.40	.30	7.0	17	8.0	5.5	3.8	.27
10	1.1	1.5	.50	.05	.40	.30	5.5	14	6.8	4.7	2.4	.14
11	1.1	1.5	.60	0	.30	.30	5.0	19	7.6	4.0	3.9	.09
12	1.3	1.5	.60	0	.20	.30	5.0	18	380	3.5	2.4	.04
13	1.5	1.5	.70	0	.10	.30	5.0	15	214	3.8	1.9	.58
14	1.8	1.2	1.0	.05	.20	.30	5.5	24	107	3.7	1.7	2.0
15	1.7	1.5	1.0	.05	.20	.40	6.0	29	70	3.1	1.6	1.7
16	1.5	1.7	.90	0	.40	1.0	5.0	22	54	2.4	1.3	1.6
17	1.5	1.7	1.0	0	.40	1.7	5.1	18	39	2.2	1.2	1.7
18	1.7	1.6	1.0	0	.20	1.6	5.0	15	33	2.2	1.0	6.8
19	1.7	1.8	1.0	0	.30	1.5	5.0	13	32	2.4	.90	2.4
20	1.7	2.0	1.2	0	.40	1.5	5.0	12	26	2.4	.82	2.3
21	1.7	2.0	1.3	0	.40	1.6	5.5	10	22	2.2	.75	2.3
22	1.7	2.0	1.4	.10	.50	1.6	6.0	9.9	19	2.0	.60	1.4
23	1.7	1.8	1.3	.30	.50	1.8	6.3	11	16	2.4	.52	1.3
24	1.7	1.8	1.4	.50	.50	2.0	9.8	11	14	2.4	.45	2.0
25	1.7	1.7	1.3	.40	.50	2.0	18	9.5	12	2.2	.45	2.3
26	1.7	1.5	1.0	.40	.50	1.8	29	8.0	10	1.8	.36	2.3
27	1.8	1.5	.70	.50	.40	1.7	34	41	9.9	1.8	.27	2.0
28	1.8	1.7	.50	.30	.30	1.8	36	50	8.0	3.3	.27	2.0
29	1.8	1.8	.50	.20	------	1.8	28	33	6.8	2.6	.18	2.0
30	1.8	2.0	.60	.20	------	1.6	19	24	6.3	2.2	.09	2.0
31	1.8	------	.60	.30	------	1.6	------	27	------	1.9	0	------
TOTAL	46.00	51.6	28.70	5.05	9.20	31.80	293.5	550.4	1,226.5	104.0	104.16	41.14
MEAN	1.48	1.72	.93	.16	.33	1.03	9.78	17.8	40.9	3.35	3.36	1.37
MAX	1.8	2.0	2.0	.60	.50	2.0	36	50	380	5.5	40	6.8
MIN	.74	1.2	.50	0	.10	.30	1.8	8.0	6.3	1.8	0	0
AC-FT	91	102	57	10	18	63	582	1,090	2,430	206	207	82

CAL YR 1969 TOTAL 2,128.89 MEAN 5.83 MAX 236 MIN .20 ACFT 4,220
WAT YR 1970 TOTAL 2,492.05 MEAN 6.83 MAX 380 MIN 0 ACFT 4,940

PEAK DISCHARGE (BASE, 100 CFS)

DATE	TIME	G.H.	DISCHARGE
5-27	1630	2.28	146
6-12	1100	3.58	680
8- 6	1900	3.11	442

06405000 Grace Coolidge Creek near Custer, S. Dak.

LOCATION.--Lat 43°45'40", long 103°21'42", in SE¼NE¼ sec.26, T.3 S., R.6 E., Custer County, on right bank at U.S. Highway 16, 1.7 miles southwest of junction U.S. Highways 36 and 16, and 11.5 miles east of Custer, S. Dak.

DRAINAGE AREA.--25.3 sq mi.

PERIOD OF RECORD.--July 1945 to July 1947, (published as Squaw Creek near Custer), July 1967 to current year.

GAGE.--Water-stage recorder and grouted rock control. Altitude of gage is 4,100 ft (from topographic map). Prior to July 31, 1947, nonrecording gage at site 0.5 mile upstream at different datum.

EXTREMES.--Current year: Maximum discharge, 184 cfs Aug. 6 (gage height, 1.61 ft); no flow for many days.
Period of record: Maximum discharge, 206 cfs June 21, 1947 (gage height, 4.50 ft from floodmark, site and datum then in use), from rating curve extended above 120 cfs; no flow for many days most years.
Flood of June 12, 1967, reached a stage of 1.45 ft, from floodmarks, (discharge, 151 cfs).

REMARKS.--Records fair except those for winter periods, which are poor. Considerable losses in sinkholes in vicinity of gage.

Rating table (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Nov. 11-13; stage-discharge relation affected by ice Nov. 14, 18, Dec. 3 to Mar. 21, Mar. 26-28)

0.2	0
.3	1.0
.4	3.3
.5	7.0
.6	13
.8	31
1.2	95

DISCHARGE IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.2	.67	.34	.30	.90	.70	1.0	5.9	7.6	.54	0	.82
2	1.2	.67	.34	.30	.50	.90	1.2	5.2	5.5	.43	0	.67
3	1.0	.82	.50	.20	.65	1.0	.82	5.2	4.4	.67	0	.82
4	2.2	.67	.80	.10	.80	.20	.82	5.2	4.0	1.0	0	1.0
5	2.5	1.0	.50	.10	1.0	.10	1.4	4.4	2.7	1.4	0	.67
6	1.6	1.0	.40	.10	1.0	.10	1.6	4.0	2.5	3.3	14	.26
7	1.2	.82	.30	.10	1.0	.20	1.8	4.0	2.2	1.9	68	.82
8	1.0	.82	.20	.10	1.0	.30	1.8	5.5	2.2	1.2	18	.82
9	1.0	.67	.20	.50	1.1	.10	1.8	6.3	2.0	2.5	11	.54
10	.82	.67	.10	1.0	1.2	.20	.82	6.0	2.2	2.2	7.6	.67
11	.67	.67	.20	1.0	1.1	.20	1.2	6.0	2.7	2.0	12	.18
12	1.0	.67	.50	.90	.90	.20	1.8	6.0	92	1.6	10	.11
13	1.4	.54	.80	.80	.60	.20	1.5	6.0	79	1.8	6.6	.78
14	1.4	.50	.80	.70	.70	.50	1.5	6.5	44	1.6	5.5	2.7
15	1.4	1.2	.80	.65	.90	.70	1.2	6.5	31	.82	4.8	3.0
16	1.2	1.8	.90	.50	1.7	.90	1.3	6.0	27	.11	5.2	3.0
17	1.2	1.8	1.0	.40	1.2	1.0	1.5	5.5	20	0	4.4	2.7
18	1.2	1.8	1.0	.10	.80	1.0	2.5	5.0	19	.07	3.3	1.6
19	1.4	2.0	1.0	.10	1.0	.80	2.0	5.0	17	.34	3.0	1.4
20	1.4	2.2	1.0	.20	1.1	.50	1.5	4.5	15	.43	2.2	1.0
21	1.2	2.5	1.0	.50	1.1	1.0	1.5	4.5	12	.35	2.2	.67
22	1.2	2.5	1.0	.80	1.2	1.4	1.7	4.0	11	0	2.2	.67
23	1.2	3.2	.90	1.0	1.2	1.6	1.7	4.0	8.2	.28	1.6	.67
24	1.4	3.2	.80	1.2	1.2	1.8	2.0	4.8	7.6	.43	.89	.54
25	1.2	.54	.70	1.1	1.1	2.5	3.0	3.7	6.3	0	.54	.67
26	1.2	2.9	.50	1.2	1.1	1.2	4.5	3.0	4.8	0	1.0	.67
27	1.0	.34	.30	1.2	1.0	.90	4.8	5.0	3.3	.14	1.0	.67
28	1.0	1.7	.20	1.2	.70	.90	4.4	11	2.0	.55	1.0	.54
29	.82	1.4	.30	1.1	------	1.2	7.0	8.2	1.4	.02	1.0	.54
30	.82	.54	.30	1.1	------	1.4	7.6	5.2	1.0	0	.82	.54
31	.82	------	.30	1.1	------	1.2	------	7.2	------	0	.82	------
TOTAL	37.85	39.81	17.98	19.65	27.75	24.90	67.26	169.3	439.6	25.68	188.67	29.74
MEAN	1.22	1.33	.58	.63	.99	.80	2.24	5.46	14.7	.83	6.09	.99
MAX	2.5	3.2	1.0	1.2	1.7	2.5	7.6	11	92	3.3	68	3.0
MIN	.67	.34	.10	.10	.50	.10	.82	3.0	1.0	0	0	.11
AC-FT	75	79	36	39	55	49	133	336	872	51	374	59

CAL YR 1969 TOTAL 534.87 MEAN 1.47 MAX 16 MIN 0 ACFT 1,060
WAT YR 1970 TOTAL 1,088.19 MEAN 2.98 MAX 92 MIN 0 ACFT 2,160

PEAK DISCHARGE (BASE, 25 CFS)

DATE	TIME	G.H.	DISCHARGE
6-12	1300	1.47	153
8- 6	2330	1.61	184
8-11	1500	.95	57

06406000 Battle Creek at Hermosa, S. Dak.

LOCATION.--Lat 43°49'41", long 103°11'43", in NE¼SW¼SW¼ sec.32, T.2 S., R.8 E., Custer County, on right bank 130 ft downstream from Chicago and North Western Railway Co. bridge, 0.8 mile south of Hermosa, and 2.9 miles downstream from Grace Coolidge Creek.

DRAINAGE AREA.--178 sq mi.

PERIOD OF RECORD.--August to December 1903 (gage heights only), July 1949 to current year.

GAGE.--Water-stage recorder. Altitude of gage is 3,290 ft (from topographic map). Nonrecording gage August to December 1903, at site 130 ft upstream, and July 7, 1949, to Nov. 2, 1950, at site 0.5 mile upstream at different datum. Nov. 3, 1950, to Dec. 6, 1961, nonrecording gage at site 120 ft downstream at same datum.

AVERAGE DISCHARGE.--21 years, 8.62 cfs (6,250 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 520 cfs June 12 (gage height, 5.60 ft); minimum, 0.62 cfs Sept. 1, 28; minimum gage height, 1.67 ft Sept. 1.
Period of record: Maximum discharge, 2,950 cfs May 22, 1952 (gage height, 14.00 ft); no flow at times in 1954-57, 1959.

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

Rating table (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Oct. 1 to Nov. 12; stage-discharge relation affected by ice Nov. 13, 14, 26, 27, Dec. 7-11, Dec. 22 to Feb. 3)

1.6	0.62	2.1	20
1.7	2.0	2.5	61
1.8	4.0	3.0	128
1.9	7.3	4.0	278
2.0	13		

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.5	4.0	2.5	2.1	3.0	2.6	2.6	6.4	13	3.9	1.8	.89
2	2.1	4.2	2.7	2.1	3.0	2.7	2.6	5.5	9.5	4.2	2.1	.86
3	2.3	4.2	2.7	2.1	2.8	2.6	2.4	5.0	6.7	4.0	2.2	1.4
4	2.9	4.0	2.7	2.1	2.7	2.6	2.4	4.6	5.3	3.5	2.1	1.4
5	2.9	4.2	2.7	1.8	2.7	2.6	2.4	4.4	4.8	3.6	2.1	1.1
6	2.9	4.0	2.5	2.2	2.5	2.6	2.4	4.2	4.3	4.1	2.1	1.2
7	2.9	4.2	2.3	2.4	2.1	2.3	2.4	4.1	3.9	3.2	20	2.1
8	2.9	4.2	2.2	2.4	2.1	1.6	2.4	4.6	3.6	2.9	3.9	1.6
9	2.9	4.2	2.0	2.8	2.1	2.0	2.5	4.6	2.8	3.5	2.7	1.5
10	2.9	4.2	2.0	3.4	2.0	1.7	2.4	5.0	2.8	3.5	2.2	1.6
11	2.9	4.2	2.1	3.6	2.1	1.6	2.8	5.1	3.0	3.0	2.0	1.6
12	3.1	4.0	2.3	3.8	2.1	1.6	3.5	5.1	201	3.3	2.0	1.6
13	2.9	3.8	2.3	3.8	2.1	1.8	3.2	5.2	173	3.9	1.6	2.5
14	2.0	3.8	2.1	4.1	2.0	1.8	3.2	5.7	72	3.2	1.5	3.5
15	2.0	3.8	2.1	4.2	2.0	1.8	3.7	9.8	50	2.5	2.1	2.7
16	2.0	3.8	2.1	4.0	2.0	1.8	3.5	9.8	42	2.5	2.0	2.5
17	2.0	3.5	2.1	3.8	2.0	1.9	3.6	7.2	35	2.3	2.0	2.5
18	2.1	2.9	2.3	3.6	2.1	2.7	4.9	6.2	29	2.6	1.1	2.1
19	2.3	2.3	2.3	3.6	2.1	3.0	4.1	5.5	26	3.1	1.1	2.0
20	2.5	2.1	2.5	3.8	2.3	2.8	3.9	5.3	23	3.0	1.3	2.0
21	2.9	2.1	2.5	3.9	2.3	2.6	3.8	4.0	18	2.7	1.7	2.0
22	2.9	2.1	2.4	4.0	2.3	2.6	3.9	3.6	15	2.1	1.6	2.0
23	2.9	2.1	2.3	4.0	2.3	2.6	4.2	3.6	12	2.7	1.5	2.0
24	3.1	2.1	2.3	4.0	2.5	2.8	5.1	3.8	9.5	2.5	1.4	1.1
25	3.1	2.1	2.2	4.0	2.4	2.9	5.3	4.3	7.2	2.0	1.4	1.4
26	3.3	2.1	2.1	4.0	2.4	2.8	5.6	4.0	6.3	1.7	1.2	1.2
27	3.3	2.2	2.0	4.2	2.5	2.6	6.4	5.0	5.1	1.8	1.3	1.1
28	3.1	2.5	1.8	3.8	2.6	2.6	12	29	4.5	2.6	1.2	.98
29	3.1	2.5	1.6	3.6	------	2.6	11	21	4.4	1.7	1.2	.86
30	3.5	2.5	1.8	3.2	------	2.6	8.5	14	4.1	1.6	1.1	.99
31	4.0	------	2.2	3.0	------	2.6	------	10	------	1.6	1.0	------
TOTAL	86.2	97.9	69.7	103.4	65.1	73.4	126.7	215.6	796.8	88.8	72.5	50.28
MEAN	2.78	3.26	2.25	3.34	2.33	2.37	4.22	6.95	26.6	2.86	2.34	1.68
MAX	4.0	4.2	2.7	4.2	3.0	3.0	12	29	201	4.2	20	3.5
MIN	2.0	2.1	1.6	1.8	2.0	1.6	2.4	3.6	2.8	1.6	1.0	.86
AC-FT	171	194	138	205	129	146	251	428	1,580	176	144	100

CAL YR 1969 TOTAL 2,053.24 MEAN 5.63 MAX 183 MIN .94 AC-FT 4,070
WTR YR 1970 TOTAL 1,846.38 MEAN 5.06 MAX 201 MIN .86 AC-FT 3,660

PEAK DISCHARGE (BASE, 50 CFS)

DATE	TIME	G.H.	DISCHARGE
6-12	1600	5.60	520
8- 7	0115	2.66	78

06408500 Spring Creek near Hermosa, S. Dak.

LOCATION.--Lat 43°56'30", long 103°09'33", in SE¼SE¼SE¼ sec.21, T.1 S., R.8 E., Pennington County, on right bank 150 ft upstream from highway bridge, 0.3 mile upstream from Chicago and North Western Railway Company bridge, and 7.5 miles north of Hermosa.

DRAINAGE AREA.--199 sq mi.

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

GAGE(revised).--Nonrecording gage and crest-stage gage. Datum of gage is 3,267.30 ft above mean sea level.

AVERAGE DISCHARGE.--21 years, 4.75 cfs (3,440 acre-ft per year).

EXTREMES.--Current year: Maximum daily discharge, 5.0 cfs June 13; maximum observed gage height, 1.08 ft Jan. 14 (backwater from ice); no flow for many days.
Period of record: Maximum discharge, 772 cfs June 7, 1967 (gage height, 5.49 ft), from rating curve extended above 150 cfs; no flow for many days in most years.

REMARKS.--Records fair except those for winter periods, which are poor. Considerable loss in sinkholes in reach 10 to 15 miles above station. Flow regulated by Lake Sheridan (capacity, 12,657 acre-ft), 24 miles above station.

REVISIONS(WATER YEARS).--WSP 1729: 1950.

Rating table (gage height, in feet, and discharge, in cubic feet per second)
(Stage-discharge relation affected by ice Nov. 13-29, Dec. 4 to Mar. 16)

0.3	0
.4	.1
.5	.4
.6	1.1
.7	2.6
.8	5.6

DISCHARGE IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0	.31	.40	.10	.50	.25	.10	.89	.28	.14		
2	0	.37	.28	.10	.40	.25	.09	1.1	.28	.14		
3	0	.37	.25	.10	.30	.20	.06	1.2	.25	.13		
4	0	.40	.20	.10	.40	.20	.05	.96	.25	.13		
5	0	.40	.30	.10	.40	.20	.09	.89	.25	.12		
6	0	.75	.25	.10	.40	.20	.13	.61	.25	.12		
7	0	.82	.20	.10	.40	.20	.10	.54	.22	.11		
8	0	.89	.20	.10	.40	.20	.10	.54	.22	.11		
9	0	.89	.15	.15	.40	.20	.10	.54	.22	.10		
10	0	.96	.15	.25	.40	.15	.10	.54	.22	.10		
11	0	.96	.20	.30	.30	.15	.10	.34	.61	.09		
12	0	1.6	.25	.30	.25	.15	.10	.31	2.4	.09		
13	0	.30	.30	.30	.20	.15	.10	.31	5.0	.08		
14	0	.30	.35	.60	.25	.15	.10	.31	4.7	.08		
15	0	.40	.35	.60	.30	.20	.13	.31	4.4	.07		
16	0	.30	.35	.40	.35	.20	.22	.34	3.5	.07		
17	0	.20	.35	.20	.40	.22	.28	.34	3.2	.06		
18	0	.20	.30	.15	.20	.22	.28	.34	2.9	.06		
19	.01	.30	.25	.25	.25	.22	.28	.34	2.6	.05		
20	.02	.60	.20	.40	.30	.22	.28	.34	2.2	.05		
21	.03	.80	.20	.60	.30	.22	.28	.34	2.0	.04		
22	.04	.60	.20	.60	.30	.22	.28	.37	1.8	.04		
23	.05	.55	.20	.80	.30	.22	.28	.34	1.0	.03		
24	.06	.40	.20	.80	.30	.22	.28	.34	.70	.03		
25	.08	.40	.20	.60	.30	.22	.31	.31	.40	.03		
26	.10	.30	.15	.60	.30	.22	.61	.31	.22	.02		
27	.12	.20	.15	.60	.25	.22	1.1	.31	.20	.01		
28	.13	.30	.15	.50	.20	.25	.47	.31	.18	0		
29	.14	.40	.10	.50	------	.25	.54	.28	.16	0		
30	.15	.40	.10	.60	------	.25	.75	.28	.16	0		
31	.16	------	.10	.60	------	.25	------	.28	------	0		------
TOTAL	1.09	15.67	7.03	11.50	9.05	6.47	7.69	14.56	40.77	2.10	0	0
MEAN	.035	.52	.23	.37	.32	.21	.26	.47	1.36	.068	0	0
MAX	.16	1.6	.40	.80	.50	.25	1.1	1.2	5.0	.14	0	0
MIN	0	.20	.10	.10	.20	.15	.05	.28	.16	0	0	0
AC-FT	2.2	31	14	23	18	13	15	29	81	4.2	0	0

CAL YR 1969 TOTAL 908.58 MEAN 2.49 MAX 248 MIN 0 ACFT 1,800
WAT YR 1970 TOTAL 115.93 MEAN .32 MAX 5 MIN 0 ACFT 230

06409000 Castle Creek above Deerfield Reservoir, near Hill City, S. Dak.

(Hydrologic benchmark station)

LOCATION.--Lat 44°00'49", long 103°49'48", in SW¼ sec.25, T.1 N., R.2 E., Pennington County, on right bank 50 ft downstream from highway bridge, 250 ft downstream from South Fork Castle Creek, 600 ft upstream from high-water line of Deerfield Reservoir, 2.5 miles southwest of Deerfield Dam, and 14 miles northwest of Hill City.

DRAINAGE AREA.--83 sq mi, approximately.

PERIOD OF RECORD.--June 1948 to current year. Prior to October 1953, published as "above Deerfield Reservoir, near Deerfield."

GAGE.--Water-stage recorder and grouted-rock control. Altitude of gage is 5,910 ft (from reservoir elevation). Prior to Aug. 31, 1948, nonrecording gage at site 50 ft upstream at datum 2.05 ft higher.

AVERAGE DISCHARGE.--22 years, 9.68 cfs (7,010 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 95 cfs Apr. 27 (gage height, 3.28 ft); maximum gage height, 3.80 ft Dec. 4 (backwater from ice); minimum daily discharge, 7.2 cfs Jan. 25; minimum gage height, 1.51 ft Apr. 16.

Period of record: Maximum discharge, 1,120 cfs May 22, 1952 (gage height, 5.81 ft), from rating curve extended above slope-area measurement at gage height, 5.67 ft; minimum, 1.2 cfs Apr. 25, 1969; minimum gage height, 1.35 ft Nov. 12, 1949, Feb. 19, 1954, Mar. 7, 1957, Mar. 29, 1961.

REMARKS.--Records good except those for winter periods, which are poor. Recording rain gage located at station. Records of chemical analyses and water temperatures for the water year 1970 are published in Part 2 of this report.

Rating table (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used May 11-14; stage-discharge relation affected by ice Oct. 12-17, Nov. 3, 4, Nov. 13 to Dec. 16, Dec. 23 to Jan. 12, Jan. 27 to Feb. 5, Mar. 9-13, 19-27, Apr. 7-24)

1.6	6.6	2.5	38
1.9	14	3.0	70
2.1	21		

DISCHARGE IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	12	12	11	8.5	8.5	8.4	9.3	19	20	9.8	11	9.8
2	11	12	10	8.0	9.0	8.6	9.3	22	18	10	11	10
3	12	12	10	8.0	10	8.4	8.8	33	18	10	11	11
4	10	12	10	7.5	9.5	7.9	8.8	43	17	10	11	10
5	9.8	12	10	7.5	9.0	8.4	10	38	16	9.8	16	11
6	11	12	10	7.5	8.4	7.9	15	39	16	9.0	14	11
7	11	12	9.5	7.5	8.4	9.0	25	34	16	9.8	16	9.3
8	11	12	9.0	7.5	8.1	9.0	22	56	15	11	12	8.4
9	12	12	8.5	9.0	8.4	8.5	15	32	16	14	11	9.6
10	12	12	8.5	13	8.4	10	18	29	15	11	12	10
11	11	12	10	16	8.1	10	17	34	15	11	12	10
12	8.0	12	13	9.5	8.1	11	14	29	33	11	12	10
13	8.0	7.5	18	9.0	7.9	10	13	30	22	12	11	11
14	9.0	8.0	14	8.8	7.9	9.0	11	30	18	12	11	11
15	10	9.0	12	8.8	7.9	8.8	10	32	17	12	11	11
16	10	9.0	12	8.8	7.9	9.0	9.5	28	17	12	11	10
17	11	8.5	12	8.8	8.4	9.0	10	27	16	11	11	10
18	12	8.5	11	8.6	8.4	9.0	8.0	26	16	11	11	10
19	12	9.0	9.8	8.6	8.4	9.0	9.0	25	16	12	11	10
20	12	9.5	9.8	8.6	8.6	10	9.0	24	15	12	11	11
21	12	10	9.8	8.4	8.4	9.5	9.0	24	15	11	11	12
22	12	9.0	8.1	8.4	8.4	10	11	24	13	11	10	12
23	11	8.5	8.0	8.4	8.8	9.0	12	24	12	13	10	13
24	11	8.5	8.0	8.6	8.4	8.5	12	23	12	12	10	13
25	11	8.5	8.0	7.2	8.4	8.0	22	22	12	11	10	13
26	11	8.0	8.0	8.4	8.8	9.0	33	20	11	11	10	13
27	13	8.0	7.5	8.5	8.6	10	49	20	11	11	10	13
28	12	8.5	7.5	8.5	8.4	9.6	42	21	11	11	10	12
29	12	9.0	8.0	8.0	------	9.0	25	20	9.8	11	10	12
30	11	9.5	8.5	8.0	------	8.8	19	20	9.6	11	9.8	12
31	11	------	8.5	8.0	------	8.8	------	21	------	11	9.8	------
TOTAL	341.8	300.5	308.0	269.9	237.5	281.1	485.7	869	468.4	344.4	347.6	329.1
MEAN	11.0	10.0	9.94	8.71	8.48	9.07	16.2	28.0	15.6	11.1	11.2	11.0
MAX	13	12	18	16	10	11	49	56	33	14	16	13
MIN	8.0	7.5	7.5	7.2	7.9	7.9	8.0	19	9.6	9.0	9.8	8.4
AC-FT	678	596	611	535	471	558	963	1,720	929	683	689	653

CAL YR 1969 TOTAL 4,149.7 MEAN 11.4 MAX 32 MIN 5.8 ACFT 8,230
WAT YR 1970 TOTAL 4,583.0 MEAN 12.6 MAX 56 MIN 7.2 ACFT 9,090

PEAK DISCHARGE (BASE, 50 CFS)

DATE	TIME	G.H.	DISCHARGE	DATE	TIME	G.H.	DISCHARGE
4-27	1900	3.28	95	5- 8	0530	3.16	78
5- 4	1900	3.23	88	6-12	0900	2.73	52

06409500 Deerfield Reservoir near Hill City, S. Dak.

LOCATION.--Lat 44°01'46", long 103°47'09", in NE¼SW¼ sec.20, T.1 N., R.3 E., at dam on Castle Creek, 0.4 mile upstream from Dutchman Creek and 12.5 miles northwest of Hill City.

DRAINAGE AREA.--95 sq mi, approximately.

PERIOD OF RECORD.--May 1947 to current year. Some elevations obtained during period of initial filling, December 1945 to May 1947, are available in Bureau of Reclamation files. Prior to October 1953, published as "near Deerfield."

GAGE.--Water-stage recorder. Datum of gage is at mean sea level (levels by Bureau of Reclamation). Prior to July 20, 1964, nonrecording gage at same site and datum.

EXTREMES.--Current year: Maximum contents, 15,240 acre-ft Apr. 28 (elevation, 5,908.20 ft); minimum, 12,380 acre-ft Sept. 28 (elevation, 5,900.94 ft).

Period of record: Maximum contents observed, 15,340 acre-ft May 22, 1952 (elevation, 5,908.50 ft), from capacity table extended above elevation 5,908.00 ft (crest of spillway); minimum observed, 5 acre-ft Oct. 2, 1959 (elevation, 5,839.10 ft).

REMARKS.--Reservoir is formed by earthfill dam. Storage began Dec. 4, 1945; dam completed in 1947. Usable capacity, 15,153 acre-ft between elevations 5,839 ft (lowest outlet) and 5,908 ft (crest of spillway). Dead storage below elevation 5,839 ft, 565 acre-ft. Figures given herein represent usable contents. Water is used to supplement Rapid City water supply and for irrigation in Rapid Creek basin downstream from Rapid City.

COOPERATION.--Records of elevation and contents furnished by Bureau of Reclamation.

MONTHEND ELEVATION AND CONTENTS AT 2400, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

Date	Elevation (feet)	Contents (acre-feet)	Change in contents (acre-feet)
Sept.30	5,900.32	12,160	-
Oct. 31	5,901.46	12,580	+420
Nov. 30	5,902.49	12,960	+380
Dec. 31	5,903.66	13,410	+450
CAL YR 1969	-	-	-440
Jan. 31	5,904.83	13,870	+460
Feb. 28	5,905.86	14,280	+410
Mar. 31	5,907.12	14,790	+510
Apr. 30	5,908.10	15,190	+400
May 31	5,907.75	15,050	-140
June 30	5,907.55	14,970	-80
July 31	5,907.19	14,820	-150
Aug. 31	5,904.24	13,640	-1,180
Sept.30	5,901.02	12,410	-1,230
WTR YR 1970	-	-	+250

06410000 Castle Creek below Deerfield Dam, S. Dak.

LOCATION.--Lat 44°01'49", long 103°46'58", in NW¼SE¼ sec.20, T.1 N., R.3 E., Pennington County, on right bank at downstream side of bridge, 500 ft upstream from Dutchman Creek, 800 ft downstream from Deerfield Dam, and 12.5 miles northwest of Hill City.

DRAINAGE AREA.--96 sq mi, approximately.

PERIOD OF RECORD.--July 1946 to current year.

GAGE.--Water-stage recorder and grouted-rock control. Altitude of gage is 5,805 ft (from topographic map). Prior to Oct. 15, 1947, water-stage recorder at site 700 ft downstream at datum 3.77 ft lower. Oct. 15, 1947, to Sept. 1, 1948, water-stage recorder at site 850 ft downstream at datum 5.77 ft lower.

AVERAGE DISCHARGE.--24 years, 10.1 cfs (7,320 acre-ft per year).

EXTREMES.--Current year: Maximum daily discharge, 74 cfs May 8; maximum gage height, 2.60 ft May 11-13; minimum daily discharge, 1.7 cfs Nov. 20; minimum gage height, 1.11 ft Sept. 28.
Period of record: Maximum daily discharge, 200 cfs May 22, 1952; maximum gage height, 3.87 ft May 23, 1952 (backwater from spillway overflow); no flow at times in 1948, 1959-60.

REMARKS.--Records good. Flow regulated by Deerfield Reservoir. (See sta 6-4095.)

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.3	2.1	2.1	1.9	2.1	2.4	2.7	28	13	10	25	33
2	2.2	2.1	2.1	1.9	2.1	2.3	2.7	27	13	10	25	33
3	2.2	2.1	2.1	1.9	2.1	2.3	2.6	33	13	10	25	32
4	2.2	2.1	2.1	1.9	2.0	2.3	2.5	48	14	10	25	32
5	2.2	1.9	2.1	1.9	1.9	2.3	2.5	59	15	10	25	32
6	2.2	1.9	2.1	1.9	2.0	2.3	2.6	50	15	10	25	32
7	2.2	1.9	2.1	1.9	2.1	2.3	2.8	50	15	10	24	31
8	2.2	1.9	1.9	2.1	2.1	2.3	2.2	74	15	10	24	31
9	2.3	1.9	1.9	2.1	2.2	2.3	2.0	62	15	11	24	31
10	2.3	1.9	1.9	2.1	2.2	2.3	2.1	53	15	11	24	31
11	2.3	1.9	1.9	2.1	2.2	2.3	19	55	15	11	24	31
12	2.3	1.9	1.9	2.1	2.2	2.3	26	49	35	11	24	31
13	2.3	1.9	1.9	2.1	2.2	2.3	21	48	39	11	24	31
14	2.3	1.8	1.9	2.1	2.2	2.2	21	45	33	11	24	31
15	2.3	1.8	1.9	2.1	2.2	2.2	22	40	24	11	24	31
16	2.3	1.8	1.9	2.1	2.2	2.2	16	40	24	11	24	30
17	2.3	1.9	1.9	2.1	2.2	2.3	17	40	24	11	25	30
18	2.3	1.8	1.8	2.1	2.2	2.3	27	40	24	11	25	30
19	2.4	1.8	1.8	2.1	2.3	2.3	20	40	19	11	25	31
20	2.5	1.7	1.8	2.1	2.3	2.3	17	40	15	11	25	30
21	2.3	1.8	1.8	2.1	2.3	2.3	14	40	15	10	25	30
22	2.1	1.8	1.9	2.2	2.3	2.3	14	27	15	10	25	30
23	2.1	1.8	1.8	2.2	2.4	2.3	16	17	15	10	26	30
24	2.1	1.8	1.8	2.1	2.4	2.4	17	17	15	10	26	30
25	2.1	1.8	1.8	2.1	2.4	2.4	20	17	15	10	26	30
26	2.0	1.9	1.8	2.1	2.4	2.4	36	14	12	10	26	30
27	2.0	1.9	1.8	2.1	2.4	2.5	55	13	10	10	26	30
28	2.0	1.9	1.9	2.1	2.4	2.5	69	13	10	10	30	12
29	2.1	1.9	1.9	2.1	------	2.7	45	13	10	15	32	2.3
30	2.1	1.9	1.9	2.1	------	2.7	31	13	10	25	33	2.3
31	2.1	------	1.9	2.1	------	2.7	------	13	------	25	33	------
TOTAL	68.6	56.6	59.4	63.9	62.0	73.0	547.7	1,118	522	357	798	850.6
MEAN	2.21	1.89	1.92	2.06	2.21	2.35	18.3	36.1	17.4	11.5	25.7	28.4
MAX	2.5	2.1	2.1	2.2	2.4	2.7	69	74	39	25	33	33
MIN	2.0	1.7	1.8	1.9	1.9	2.2	2.0	13	10	10	24	2.3
AC-FT	136	112	118	127	123	145	1,090	2,220	1,040	708	1,580	1,690

CAL YR 1969 TOTAL 4,261.8 MEAN 11.7 MAX 40 MIN 1.7 AC-FT 8,450
WTR YR 1970 TOTAL 4,576.8 MEAN 12.5 MAX 74 MIN 1.7 AC-FT 9,080

06410500 Rapid Creek above Pactola Reservoir, at Silver City, S. Dak.

LOCATION.--Lat 44°05'05", long 103°34'48", in SW¼SE¼ sec.36, T.2 N., R.4 E., Pennington County, on right bank 0.8 mile west of Silver City, and 3.0 miles downstream from Slate Creek.

DRAINAGE AREA.--292 sq mi.

PERIOD OF RECORD.--October 1953 to current year.

GAGE.--Water-stage recorder. Datum of gage is 4,620.00 ft above mean sea level (Bureau of Reclamation bench mark).

AVERAGE DISCHARGE.--17 years, 40.0 cfs (28,980 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 995 cfs Apr. 19 (gage height, 7.98 ft); minimum daily, 8.0 cfs Dec. 23.
Period of record: Maximum discharge, 2,060 cfs May 15, 1965 (gage height, 10.44 ft), from rating curve extended above 1,000 cfs on basis of slope-area measurement of peak flow; minimum daily, 4 cfs Jan. 20, 1962.

REMARKS.--Records good except those for winter periods, which are poor. Flow regulated by Deerfield Reservoir. (See sta 6-4095.)

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	39	19	16	14	20	17	35	108	114	57	47	46
2	27	19	16	13	18	20	25	106	87	56	46	46
3	22	17	16	13	20	18	27	122	81	54	47	49
4	22	18	25	12	18	18	37	142	78	53	46	47
5	21	21	18	11	19	19	24	170	76	54	56	46
6	20	20	15	11	20	20	37	179	74	54	61	46
7	20	20	12	10	19	22	118	198	72	55	67	46
8	19	19	11	10	19	22	134	306	72	51	57	45
9	18	19	11	15	22	20	72	305	76	60	52	45
10	18	17	10	22	25	18	71	247	71	52	51	47
11	18	19	13	20	22	17	92	264	70	49	50	46
12	18	18	18	18	18	18	89	245	197	54	49	46
13	18	10	21	16	15	18	68	222	217	61	48	49
14	19	17	19	18	16	19	65	229	192	52	47	51
15	20	17	18	17	18	20	63	218	175	48	47	50
16	18	19	16	15	20	23	56	208	155	44	46	49
17	18	17	18	13	22	22	55	194	141	41	45	49
18	21	16	17	13	18	20	533	190	142	41	44	46
19	20	18	18	15	18	19	777	184	128	41	44	45
20	21	18	16	18	20	20	59	171	107	41	44	45
21	21	20	15	20	22	21	49	155	97	39	43	45
22	20	18	12	22	23	25	48	148	89	37	43	45
23	19	17	8.0	25	24	25	47	129	86	45	43	46
24	19	18	12	25	20	20	53	115	83	46	43	48
25	18	22	15	23	20	25	65	107	78	39	43	50
26	18	18	15	23	20	37	100	97	73	37	42	49
27	16	17	14	25	18	25	171	92	68	37	42	48
28	17	15	13	20	17	25	217	99	65	38	42	47
29	20	18	13	18	------	22	166	92	64	36	47	28
30	18	17	14	20	------	28	123	89	60	42	46	21
31	18	------	15	22	------	29	------	96	------	47	46	------
TOTAL	621	538	470.0	537	551	672	3,476	5,227	3,088	1,461	1,474	1,366
MEAN	20.0	17.9	15.2	17.3	19.7	21.7	116	169	103	47.1	47.5	45.5
MAX	39	22	25	25	25	37	777	306	217	61	67	51
MIN	16	10	8.0	10	15	17	24	89	60	36	42	21
AC-FT	1,230	1,070	932	1,070	1,090	1,330	6,890	10,370	6,130	2,900	2,920	2,710

CAL YR 1969	TOTAL 12,940.0	MEAN 35.5	MAX 130	MIN 8.0	AC-FT 25,670
WTR YR 1970	TOTAL 19,481.0	MEAN 53.4	MAX 777	MIN 8.0	AC-FT 38,640

PEAK DISCHARGE (BASE, 120 CFS)

DATE	TIME	G.H.	DISCHARGE	DATE	TIME	G.H.	DISCHARGE
4- 7	2330	6.16	322	5- 8	1530	6.29	384
4-19	1430	7.98	995	6-12	1445	5.95	280
4-28	0445	5.82	236				

06411000 Pactola Reservoir near Silver City, S. Dak.

LOCATION.--Lat 44°04'20", long 103°29'17", in NE¼SW¼ sec.2, T.1 N., R.5 E., Pennington County, in outlet works of dam on Rapid Creek, 3.8 miles east of Silver City.

DRAINAGE AREA.--319 sq mi.

PERIOD OF RECORD.--August 1956 to current year.

GAGE.--Water-stage recorder. Datum of gage is at mean sea level (Bureau of Reclamation datum). Prior to Feb. 18, 1970, nonrecording gage at same site and datum.

EXTREMES.--Current year: Maximum contents observed, 55,150 acre-ft June 13 (elevation, 4,580.42 ft); minimum observed, 49,990 acre-ft Jan. 9-21 (elevation, 4,574.21 ft).
Period of record: Maximum contents observed, 60,970 acre-ft May 19, 1965 (elevation, 4,585.87 ft); minimum contents observed since initial filling, 50,070 acre-ft Sept. 29, 1968 (elevation, 4,574.31 ft).

REMARKS.--Reservoir formed by an earthfill dam completed August 1956. Storage began August 22, 1956. Conservation capacity, 54,960 acre-ft between elevations 4,456.1 ft and 4,580.2 ft. Combined dead and inactive storage below elevation 4,456.1 ft is 1,003 acre-ft. Flood storage capacity, 43,050 acre-ft between elevations 4,580.2 ft and 4,621.5 ft (crest of spillway). Surcharge capacity, 15,780 acre-ft between elevations 4,621.5 ft and 4,633.7 ft (maximum pool elevation). Figures given herein represent contents above elevation 4,456.1 ft. The reservoir provides flood control and water for municipal and irrigation uses.

COOPERATION.--Records of elevations and capacity table furnished by Bureau of Reclamation.

MONTHEND ELEVATION AND CONTENTS AT 2400, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

Date	Elevation (feet)	Contents (acre-feet)	Change in contents (acre-feet)
Sept.30	4,574.31	50,070	-
Oct. 31	4,574.39	50,130	+60
Nov. 30	4,574.37	50,120	-10
Dec. 31	4,574.25	50,020	-100
CAL YR 1969	-	-	-2,990
Jan. 31	4,574.30	50,060	+40
Feb. 28	4,574.42	50,160	+100
Mar. 31	4,574.79	50,460	+300
Apr. 30	4,577.47	52,650	+2,190
May 31	4,579.85	54,660	+2,010
June 30	4,579.54	54,400	-260
July 31	4,577.02	52,270	-2,130
Aug. 31	4,575.83	51,300	-970
Sept.30	4,574.47	50,200	-1,100
WTR YR 1970	-	-	+130

06411500 Rapid Creek below Pactola Dam, S. Dak.

LOCATION.--Lat 44°04'36", long 103°28'54", in SW¼NE¼ sec.2, T.1 N., R.5 E., Pennington County, on right bank 2,000 ft downstream from Pactola Dam, 3.9 miles upstream from Deer Creek, and 13 miles west of Rapid City.

DRAINAGE AREA.--320 sq mi, approximately.

PERIOD OF RECORD.--October 1928 to September 1932 (combined records of creek and Dakota Power and Light Co. flume), July 1946 to current year. Prior to October 1953, published as "near Pactola." Monthly discharge only for some periods, published in WSP 1309.

GAGE.--Water-stage recorder; concrete control since Oct. 16, 1962. Datum of gage is 4,406.00 ft above mean sea level (Bureau of Reclamation bench mark). Apr. 19, 1929, to June 30, 1932, nonrecording gage at site 3,500 ft upstream at different datum. July 24, 1946, to Aug. 24, 1947, nonrecording gage and Aug. 25, 1947, to Nov. 18, 1953, water-stage recorder, at site 2 miles upstream at different datum.

AVERAGE DISCHARGE.--28 years, 44.4 cfs (32,170 acre-ft per year).

EXTREMES.--Current year: Maximum daily discharge, 304 cfs May 12 (gage height, 8.44 ft); maximum gage height, 8.44 ft May 11-13; minimum discharge, 7.5 cfs Oct. 1 (gage height, 6.91 ft).
Period of record: Maximum discharge, 2,170 cfs May 22, 1952 (corrected) (gage height, 6.74 ft, site and datum then in use); no flow Oct. 11-17, 1962.

REMARKS.--Records good. Flow completely regulated by Pactola Reservoir since Aug. 22, 1956. (See sta 6-4110.) Records of chemical analyses and water temperatures for the water year 1970 are published in Part 2 of this report.

REVISIONS(WATER YEARS).--WSP 1309: 1931(M).

Rating table (gage height, in feet, and discharge, in cubic feet per second)

7.1	12
7.3	22
7.5	38
7.7	62
7.9	99
8.1	161
8.5	338

DISCHARGE IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	37	17	15	15	15	15	15	95	108	57	77	67
2	19	17	15	15	15	15	15	93	105	57	76	67
3	17	18	15	15	15	15	15	93	95	58	76	67
4	16	18	15	15	15	15	15	93	89	53	74	67
5	15	18	15	16	15	15	15	93	81	53	74	67
6	15	18	15	15	15	15	15	93	77	79	72	67
7	15	18	15	15	15	15	15	91	77	79	72	67
8	15	18	15	15	15	16	15	113	70	81	72	67
9	15	19	15	15	15	16	15	200	67	93	65	67
10	15	19	15	15	15	15	15	235	67	102	54	67
11	15	19	15	15	15	15	15	262	67	108	50	67
12	15	20	15	15	15	15	15	304	102	108	53	65
13	15	20	15	15	15	15	15	267	196	102	53	65
14	15	20	15	15	15	15	15	244	235	99	54	65
15	15	19	16	15	15	15	16	244	235	99	54	65
16	15	19	16	15	15	15	16	244	235	93	52	65
17	15	19	16	15	15	15	16	244	235	85	49	65
18	15	19	16	15	15	15	16	192	235	83	57	64
19	15	18	16	15	15	15	16	131	174	81	59	64
20	15	18	16	15	15	15	16	116	138	74	59	64
21	15	18	16	15	15	15	36	116	128	67	59	64
22	15	18	16	15	15	15	49	102	99	64	61	64
23	15	17	16	15	15	15	78	91	91	64	61	64
24	16	17	16	15	15	15	93	91	81	64	61	64
25	16	16	16	15	15	15	93	91	76	64	65	64
26	16	16	16	15	15	15	93	91	69	62	65	61
27	16	16	16	15	15	15	93	91	65	62	65	61
28	16	16	16	15	15	15	93	149	65	70	65	39
29	16	16	16	15	------	15	93	154	65	70	65	28
30	16	16	15	15	------	15	95	108	58	72	67	28
31	17	------	15	15	------	15	------	108	------	77	67	------
TOTAL	503	537	480	466	420	467	1,122	4,639	3,485	2,380	1,953	1,856
MEAN	16.2	17.9	15.5	15.0	15.0	15.1	37.4	150	116	76.8	63.0	61.9
MAX	37	20	16	16	15	16	95	304	235	108	77	67
MIN	15	16	15	15	15	15	15	91	58	53	49	28
AC-FT	998	1,070	952	924	833	926	2,230	9,200	6,910	4,720	3,870	3,680

CAL YR 1969 TOTAL 13,950 MEAN 38.2 MAX 142 MIN 15 ACFT 27,670
WAT YR 1970 TOTAL 18,308 MEAN 50.2 MAX 304 MIN 15 ACFT 36,310

06412500 Rapid Creek above Canyon Lake, near Rapid City, S. Dak.

LOCATION.--Lat 44°03'04", long 103°18'47", in NE¼NE¼ sec.18, T.1 N., R.7 E., Pennington County, on right bank at bridge on State Highway 40, 1.0 mile southwest of city limits of Rapid City, and 2.8 miles downstream from Victoria Creek.

DRAINAGE AREA.--371 sq mi.

PERIOD OF RECORD.--July 1946 to current year.

GAGE.--Water-stage recorder. Datum of gage is 3,407.39 ft above mean sea level (levels by Corps of Engineers). Prior to Oct. 6, 1947, nonrecording gage, and Oct. 6, 1947, to Nov. 2, 1968, water-stage recorder at present site and datum. Nov. 3, 1968, to Sept. 28, 1968, nonrecording gage at site 0.2 mile downstream at datum 3.12 ft lower.

AVERAGE DISCHARGE.--24 years, 37.6 cfs (27,240 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 245 cfs June 14 (gage height, 3.42 ft); maximum gage height, 4.20 ft Mar. 21 (backwater from ice); minimum daily discharge, 5.0 cfs Jan. 8.
Period of record: Maximum discharge, 2,600 cfs May 23, 1952 (gage height, 8.08 ft); no flow at times in 1950, 51, 1957-60, 1962, 63.

REMARKS.--Records good except those for winter periods, which are poor. Flow regulated by Pactola Reservoir. (See sta 6-4110.)

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	32	12	10	7.0	10	12	12	101	115	73	73	61
2	20	13	9.0	6.5	9.0	13	15	101	115	74	74	61
3	17	12	8.5	6.5	11	12	16	102	106	72	74	61
4	15	12	8.5	6.0	12	11	10	102	95	68	73	61
5	12	12	8.0	5.5	12	12	9.5	104	90	64	85	61
6	12	12	7.5	6.0	12	13	9.8	106	80	85	87	60
7	11	12	7.5	5.5	11	14	8.9	108	77	87	87	61
8	10	12	7.0	5.0	11	12	8.0	114	75	87	80	60
9	10	12	7.0	6.0	13	10	7.8	148	69	92	75	60
10	10	12	6.5	8.0	13	8.0	7.9	182	68	104	62	60
11	11	12	7.0	9.5	11	7.5	10	200	71	107	61	60
12	13	12	8.0	9.0	10	8.0	12	234	138	112	55	59
13	13	11	9.0	8.0	8.0	8.0	10	226	209	111	52	59
14	12	11	10	9.0	9.0	9.0	9.5	208	240	106	53	59
15	13	15	10	9.0	9.0	9.0	10	196	236	103	54	58
16	12	13	9.5	8.0	12	11	9.5	196	233	100	52	57
17	12	12	11	7.0	11	11	10	192	231	93	47	57
18	12	10	10	6.0	9.0	11	11	182	229	90	48	56
19	12	10	9.0	7.0	12	10	16	154	207	85	57	55
20	11	11	10	7.0	15	10	13	125	166	78	57	54
21	11	11	10	9.0	17	11	11	123	160	69	56	54
22	10	11	10	11	17	11	33	120	141	61	56	53
23	10	10	10	12	18	12	49	102	123	61	57	54
24	10	10	10	13	17	13	88	98	116	61	56	56
25	10	10	9.5	12	18	11	94	96	99	60	56	60
26	10	9.0	9.0	11	18	11	95	95	97	60	59	60
27	11	8.0	8.0	12	16	10	98	95	90	60	59	62
28	11	8.0	7.0	11	14	11	101	140	90	63	59	61
29	11	9.0	6.0	10	------	11	101	150	89	66	60	33
30	11	10	7.0	10	------	10	98	120	83	67	59	31
31	11	------	7.0	11	------	10	------	115	------	68	60	------
TOTAL	386	334.0	266.5	263.5	355.0	332.5	983.9	4,335	3,938	2,487	1,943	1,704
MEAN	12.5	11.1	8.60	8.50	12.7	10.7	32.8	140	131	80.2	62.7	56.8
MAX	32	15	11	13	18	14	101	234	240	112	87	62
MIN	10	8.0	6.0	5.0	8.0	7.5	7.8	95	68	60	47	31
AC-FT	766	662	529	523	704	660	1,950	8,600	7,810	4,930	3,850	3,380

CAL YR 1969 TOTAL 10,922.0 MEAN 29.9 MAX 121 MIN 6.0 AC-FT 21,660
WTR YR 1970 TOTAL 17,328.4 MEAN 47.5 MAX 240 MIN 5.0 AC-FT 34,370

06414000 Rapid Creek at Rapid City, S. Dak.

LOCATION.--Lat 44°05'08", long 103°14'24", in SW¼SE¼ sec.35, T.2 N., R.7 E., Pennington County, on right bank 200 ft downstream from Oskosh Street Bridge in Rapid City, and 3.7 miles downstream from Canyon Lake.

DRAINAGE AREA.--410 sq mi, approximately.

PERIOD OF RECORD.--June 1903 to November 1906, July 1942 to current year. Monthly discharge only for some periods, published in WSP 1309.

GAGE.--Water-stage recorder. Datum of gage is 3,230.8 ft above mean sea level (levels by Corps of Engineers). Prior to Nov. 30, 1906, nonrecording gage at site 1 mile downstream at different datum.

AVERAGE DISCHARGE.--31 years, 62.1 cfs (44,990 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 350 cfs June 12 (gage height, 2.01 ft); maximum gage height, 2.36 ft Jan. 20 (backwater from ice); minimum daily discharge, 15 cfs Jan. 8, 9, 18; minimum gage height, 0.61 ft Nov. 21.

Period of record: Maximum discharge, 3,300 cfs July 13, 1962 (gage height, 8.37 ft), from rating curve extended above 1,400 cfs on basis of slope-area measurement of peak flow; minimum, 1.6 cfs Apr. 20, 1962.

Flood of May 12, 13, 1920, reached a stage of 13.6 ft, from floodmark.

REMARKS.--Records good except those for winter periods, which are poor. Several small diversions above station to municipal park pools and for irrigation of about 320 acres. Flow regulated by Pactola Reservoir (see sta 6-4110), and by Canyon Lake.

Rating table (gage height, in feet, and discharge, in cubic feet per second)
(Discharge relation affected by ice Nov. 13, 14, Dec. 7-11, Dec. 26 to Jan. 13, Jan. 15-21, Feb. 1-3, 16-21, Mar. 9-12)

0.6	14
.8	35
1.2	102
1.6	198
2.0	350

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	58	28	27	20	24	30	24	106	131	66	65	58
2	41	31	25	19	22	32	25	106	127	65	66	64
3	26	29	24	19	23	30	23	105	121	63	66	72
4	26	29	22	18	25	27	22	105	105	67	66	75
5	25	28	27	17	25	28	23	104	100	64	80	67
6	24	27	25	17	24	27	23	103	89	87	90	67
7	20	27	25	16	25	29	23	100	82	81	92	81
8	21	26	23	15	27	30	21	116	76	82	86	72
9	21	26	19	15	26	27	21	167	69	98	80	70
10	22	27	19	17	26	23	21	227	70	111	70	70
11	22	27	21	20	27	23	27	251	73	111	66	68
12	26	27	22	23	27	23	32	297	225	116	59	67
13	28	26	26	22	27	29	30	290	272	119	60	79
14	26	26	28	25	27	28	24	259	332	111	56	78
15	27	28	27	25	29	28	30	244	315	108	66	71
16	26	30	27	20	29	27	28	244	306	94	65	70
17	25	28	26	16	30	29	27	241	302	83	57	70
18	26	25	27	15	29	29	32	227	302	82	48	66
19	26	24	26	17	28	27	30	141	266	89	59	65
20	27	27	25	16	31	26	32	122	179	89	61	64
21	26	28	27	20	31	28	28	121	176	71	65	65
22	25	29	27	25	30	29	43	125	152	64	72	65
23	25	26	26	24	30	28	59	100	119	73	71	64
24	26	28	26	26	30	28	105	101	114	76	67	66
25	25	23	23	27	30	29	111	100	99	66	59	70
26	27	24	21	26	30	27	127	97	96	61	62	67
27	28	24	20	26	30	25	90	98	83	56	67	70
28	27	22	19	25	30	26	109	111	84	59	71	67
29	27	27	18	23	------	32	117	214	80	57	78	39
30	26	28	19	28	------	28	106	106	78	58	74	34
31	27	------	19	23	------	26	------	139	------	60	69	------
TOTAL	832	805	736	645	772	858	1,413	4,867	4,623	2,487	2,113	2,001
MEAN	26.8	26.8	23.7	20.8	27.6	27.7	47.1	157	154	80.2	68.2	66.7
MAX	58	31	28	28	31	32	127	297	332	119	92	81
MIN	20	22	18	15	22	23	21	97	69	56	48	34
AC-FT	1,650	1,600	1,460	1,280	1,530	1,700	2,800	9,650	9,170	4,930	4,190	3,970

CAL YR 1969 TOTAL 15,762 MEAN 43.2 MAX 147 MIN 18 AC-FT 31,260
WTR YR 1970 TOTAL 22,152 MEAN 60.7 MAX 332 MIN 15 AC-FT 43,940

06421500 Rapid Creek near Farmingdale, S. Dak.

LOCATION.--Lat 43°56'31", long 102°51'12", in SW¼SW¼SW¼ sec.19, T.1 S., R.11 E., Pennington County, on right bank at downstream side of bridge, 2 miles southeast of Farmingdale, and 4.8 miles downstream from Antelope Creek.

DRAINAGE AREA.--602 sq mi.

PERIOD OF RECORD.--July 1946 to current year.

GAGE.--Water-stage recorder. Altitude of gage is 2,700 ft (from topographic map). Prior to Sept. 19, 1947, nonrecording gage at same site and datum.

AVERAGE DISCHARGE.--24 years, 52.4 cfs (37,960 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 1,000 cfs Apr. 25 (gage height, 8.74 ft); no flow July 5-9, Aug. 2.
Period of record: Maximum discharge, 2,640 cfs June 21, 1947; maximum gage height, 10.67 ft Dec. 6, 1969 (backwater from ice); no flow at times in 1949, 1952-56, 1958-63, 1969, 1970.

REMARKS.--Records good except those for winter periods, which are poor. Diversions for irrigation of about 10,000 acres above station. Flow regulated by Pactola Reservoir. (See sta 6-4110.) Water-quality records for the water year 1970 are published in Part 2 of this report.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	21	40	53	35	34	46	40	222	161	36	.50	2.8
2	30	48	50	33	32	47	39	213	137	10	0	1.1
3	18	57	48	34	33	62	38	208	128	3.5	5.2	.78
4	16	53	45	30	34	70	34	204	124	2.8	6.0	4.3
5	13	53	37	26	34	54	32	202	110	0	.53	8.1
6	15	53	37	27	35	66	32	199	106	0	19	8.1
7	14	46	36	26	35	60	34	199	94	0	77	38
8	9.5	50	35	27	35	50	33	204	87	0	77	88
9	13	49	35	30	36	46	30	234	78	0	69	59
10	12	50	35	45	37	45	30	249	66	21	39	59
11	12	52	38	42	36	46	34	290	62	17	33	72
12	13	47	42	38	35	46	68	293	94	24	26	68
13	20	46	45	35	34	45	75	301	207	37	16	75
14	26	23	48	40	35	46	78	293	168	32	10	123
15	28	64	40	40	36	46	72	278	182	37	6.9	130
16	27	49	37	38	38	48	108	254	185	26	2.4	117
17	26	48	37	35	40	49	138	244	187	35	4.0	120
18	27	43	35	30	38	50	110	244	190	22	6.8	110
19	25	47	34	31	39	48	101	230	197	16	7.2	101
20	24	46	35	32	40	46	148	176	189	21	4.6	85
21	30	42	35	34	45	46	145	154	162	39	7.0	83
22	35	43	38	36	50	49	174	150	162	22	12	81
23	36	43	38	36	60	50	237	152	149	8.4	8.3	69
24	32	42	39	37	60	50	362	134	127	2.7	11	72
25	31	41	38	38	60	48	502	130	116	7.9	4.4	82
26	31	43	36	36	55	45	501	128	99	3.5	3.1	88
27	36	38	34	36	49	46	453	120	92	4.1	2.5	91
28	41	35	32	35	46	45	345	122	79	.56	2.7	91
29	43	54	30	34	------	45	261	126	77	2.4	4.4	92
30	45	52	35	36	------	46	234	183	52	2.6	5.2	77
31	46	------	35	37	------	44	------	128	------	3.1	6.5	------
TOTAL	795.5	1,397	1,192	1,069	1,141	1,530	4,488	6,264	3,867	436.56	477.23	2,096.18
MEAN	25.7	46.6	38.5	34.5	40.8	49.4	150	202	129	14.1	15.4	69.9
MAX	46	64	53	45	60	70	502	301	207	39	77	130
MIN	9.5	23	30	26	32	44	30	120	52	0	0	.78
AC-FT	1,580	2,770	2,360	2,120	2,260	3,030	8,900	12,420	7,670	866	947	4,160

CAL YR 1969 TOTAL 14,805.33 MEAN 40.6 MAX 381 MIN 0 AC-FT 29,370
WTR YR 1970 TOTAL 24,753.47 MEAN 67.8 MAX 502 MIN 0 AC-FT 49,100

06422500 Boxelder Creek near Nemo, S. Dak.

LOCATION.--Lat 44°08'38", long 103°27'16", in SE¼SE¼ sec.12, T.2 N., R.5 E., Lawrence County, on right bank at ranch 0.2 mile upstream from county line, 0.9 mile downstream from Jim Creek, and 4.5 miles southeast of Nemo.

DRAINAGE AREA.--96 sq mi, approximately.

PERIOD OF RECORD.--July 1945 to July 1947, June 1966 to current year.

GAGE.--Water-stage recorder. Datum of gage is 4,322.27 ft above mean sea level. July 1945 to July 1947, nonrecording gage at same site and different datum.

AVERAGE DISCHARGE.--5 years (1946, 1967-70), 20.3 cfs (14,710 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 648 cfs June 12 (gage height, 5.18 ft); minimum daily, 1.6 cfs Jan. 8.

Period of record: Maximum discharge observed, 1,180 cfs May 2, 1946 (gage height, 5.75 ft, datum then in use) from rating curve extended above 210 cfs; minimum daily, 0.70 cfs Dec. 30, 1968.

Highest known stage, about 14 feet, occurred in 1911.

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

Rating table (gage height, in feet, and discharge, in cubic feet per second) (Stage-discharge relation affected by ice, Nov. 13, 14, 17-28, Dec. 4-11, 25-27, Jan. 5-9, Jan. 14 to Feb. 21, Mar. 9-16, 19; shifting-control method used Dec. 20-24, Feb. 23 to Mar. 8)

1.7	1.6	3.0	64
1.8	3.1	3.5	126
2.0	8.0	4.0	221
2.3	18	5.0	540
2.6	34		

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	5.2	6.0	4.2	2.4	2.8	5.0	4.3	52	69	33	14	9.9
2	5.8	7.2	3.3	2.2	2.5	5.8	4.7	53	53	31	13	10
3	5.2	4.6	3.1	2.0	2.8	6.0	4.2	63	49	30	14	11
4	5.5	6.6	3.0	2.0	2.5	6.0	6.1	67	44	29	12	11
5	5.2	8.0	3.0	1.8	2.5	5.8	13	71	42	28	56	10
6	5.0	8.3	3.0	1.8	3.0	6.6	17	77	39	29	68	9.4
7	5.0	8.0	2.8	1.7	2.6	6.9	47	82	38	29	54	9.7
8	4.8	8.0	2.5	1.6	2.0	7.4	45	145	36	27	33	9.5
9	4.8	7.4	2.5	1.8	2.0	5.5	35	169	38	33	26	8.8
10	4.4	7.2	2.5	2.0	2.2	5.0	39	204	37	28	23	9.1
11	4.4	7.4	2.8	1.8	2.2	4.5	51	120	39	26	22	9.1
12	4.4	7.4	3.7	1.9	2.1	4.5	36	90	375	35	20	9.1
13	4.4	4.5	4.2	1.9	2.1	4.5	16	70	246	31	18	10
14	5.0	4.5	4.2	2.0	2.2	4.5	21	90	169	25	17	11
15	5.5	5.5	4.2	2.0	2.4	4.6	26	100	134	23	16	11
16	6.0	7.2	3.9	1.8	2.5	5.5	21	90	118	22	15	11
17	4.2	6.5	4.2	1.8	3.0	5.5	23	81	98	21	14	11
18	5.2	4.5	3.7	1.8	2.5	5.2	15	75	85	21	14	10
19	6.0	5.0	4.2	2.0	2.6	5.5	19	70	85	20	13	9.7
20	6.3	5.5	3.9	2.0	3.0	4.9	20	63	70	21	13	9.1
21	6.6	5.5	4.2	3.9	4.0	5.3	17	54	62	19	12	8.3
22	6.3	5.5	4.6	4.0	4.6	6.3	19	53	58	16	12	8.3
23	5.8	4.5	4.4	4.0	5.0	4.9	20	53	54	19	12	8.3
24	5.5	4.5	3.9	4.5	5.8	5.5	22	50	51	22	12	8.8
25	5.2	3.5	3.1	4.5	6.0	4.5	30	47	47	18	12	10
26	5.2	3.5	3.0	4.2	6.9	4.2	51	43	44	15	11	10
27	4.2	3.0	2.8	4.5	6.6	4.9	77	43	42	15	11	9.1
28	4.8	3.5	3.0	4.0	6.0	5.2	97	49	40	15	11	8.8
29	6.3	3.9	2.5	3.8	------	4.8	73	43	38	15	11	8.6
30	6.0	4.4	2.8	3.5	------	4.4	58	47	37	13	10	8.6
31	6.0	------	2.6	3.0	------	4.0	------	82	------	14	10	------
TOTAL	164.2	171.1	105.8	82.1	94.4	163.2	927.3	2,396	2,337	723	599	288.2
MEAN	5.30	5.70	3.41	2.65	3.37	5.26	30.9	77.3	77.9	23.3	19.3	9.61
MAX	6.6	8.3	4.6	4.5	6.9	7.4	97	204	375	35	68	11
MIN	4.2	3.0	2.5	1.6	2.0	4.0	4.2	43	36	13	10	8.3
AC-FT	326	339	210	163	187	324	1,840	4,750	4,640	1,430	1,190	572

CAL YR 1969 TOTAL 3,217.9 MEAN 8.82 MAX 85 MIN 1.0 AC-FT 6,380
WTR YR 1970 TOTAL 8,051.3 MEAN 22.1 MAX 375 MIN 1.6 AC-FT 15,970

PEAK DISCHARGE (BASE, 100 CFS)

DATE	TIME	G.H.	DISCHARGE	DATE	TIME	G.H.	DISCHARGE
4-27	2345	3.51	132	6-12	0845	5.18	648
5-11	0115	4.58	394	8- 5	2015	4.28	306
5-31	1845	3.62	149				

06423500 Cheyenne River near Wasta, S. Dak.

LOCATION (revised).--Lat 44°04'52", long 102°24'03", in NE¼NE¼NW¼ sec.2, T.1 N., R.14 E., Pennington County, on left bank at downstream end of highway bridge, 200 ft downstream from Chicago and North Western Railway Co. bridge, 3.0 miles east of Wasta, and 8.6 miles downstream from Box Elder Creek.

DRAINAGE AREA.--12,800 sq mi, approximately.

PERIOD OF RECORD.--July 1914 to June 1915, August 1928 to June 1932, March 1934 to current year. Monthly discharge only for some periods, published in WSP 1309. Records for Feb. 19-28, 1930, published in WSP 701, have been found to be unreliable and should not be used.

GAGE.--Water-stage recorder. Datum of gage is 2,262.78 ft above mean sea level. Prior to July 31, 1940, nonrecording gage at site 50 ft upstream and Aug. 1, to Dec. 3, 1941, nonrecording gage at present site, all at same datum.

AVERAGE DISCHARGE.--39 years (1928-31, 1934-70), 369 cfs (267,300 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 10,900 cfs Apr. 25 (gage height, 7.57 ft); minimum daily, 35 cfs Jan. 19.

Period of record: Maximum discharge observed, 46,300 cfs May 6, 1932 (gage height, 11.28 ft), from rating curve extended above 11,000 cfs on basis of an incomplete discharge measurement at gage height 8.65 ft; maximum gage height observed, 12.5 ft June 13, 1915; minimum discharge, 0.6 cfs July 27, 1961.

Flood in May 1920 reached a stage of 16 ft, from information by local residents.

REMARKS.--Records good except those for winter periods, which are poor. Flow regulated by Angostura Reservoir. (See sta 6-4010.) Water-quality records for the water year 1970 are published in Part 2 of this report.

REVISIONS (WATER YEARS).--WSP 786: Drainage area. WSP 1279: 1930(M), 1931, 1937. See also Period of Record.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	90	102	140	80	65	300	123	1,300	400	100	54	73
2	149	98	100	80	60	250	122	900	320	87	50	80
3	117	99	95	80	60	150	120	575	260	70	47	96
4	110	111	95	70	65	100	117	450	245	62	44	115
5	177	107	95	60	65	80	110	375	226	56	44	88
6	148	108	95	50	65	70	106	300	204	60	49	87
7	122	111	90	45	65	60	102	425	191	55	52	111
8	117	110	90	42	65	50	98	525	175	53	76	175
9	110	113	90	42	65	45	96	700	165	70	79	127
10	110	113	90	45	65	45	94	650	156	60	74	112
11	106	116	95	50	60	45	96	750	151	58	68	106
12	110	112	100	48	58	50	137	1,000	597	62	67	115
13	120	110	110	46	55	55	272	363	2,290	269	66	124
14	178	110	110	45	60	60	664	410	795	246	60	504
15	212	120	110	45	70	70	507	454	747	80	59	522
16	185	120	100	45	80	80	599	438	611	70	55	260
17	184	120	100	44	90	90	2,360	389	525	63	50	204
18	144	115	95	40	110	95	1,200	379	483	61	47	198
19	134	119	90	35	110	100	460	363	454	61	46	184
20	131	164	95	40	150	110	564	349	426	59	45	175
21	126	196	100	45	200	120	1,430	294	416	51	44	162
22	123	163	100	50	250	200	2,670	400	353	51	43	162
23	114	128	100	55	300	236	2,880	389	315	56	49	162
24	110	135	100	60	350	236	5,200	320	272	57	52	148
25	108	130	100	65	400	217	7,290	290	264	73	53	151
26	106	120	95	70	450	179	6,380	260	218	60	54	154
27	102	100	90	70	400	135	5,160	237	181	54	58	159
28	103	110	85	70	350	126	3,500	226	159	50	61	154
29	105	120	80	70	------	144	2,550	222	132	50	67	154
30	105	160	80	70	------	155	2,850	248	120	59	70	178
31	104	------	80	70	------	127	------	518	------	60	73	------
TOTAL	3,960	3,640	2,995	1,727	4,183	3,780	47,857	14,499	11,851	2,323	1,756	5,040
MEAN	128	121	96.6	55.7	149	122	1,595	468	395	74.9	56.6	168
MAX	212	196	140	80	450	300	7,290	1,300	2,290	269	79	522
MIN	90	98	80	35	55	45	94	222	120	50	43	73
AC-FT	7,850	7,220	5,940	3,430	8,300	7,500	94,920	28,760	23,510	4,610	3,480	10,000

CAL YR 1969 TOTAL 86,180 MEAN 236 MAX 6,540 MIN 25 AC-FT 170,900
WTR YR 1970 TOTAL 103,611 MEAN 284 MAX 7,290 MIN 35 AC-FT 205,500

PEAK DISCHARGE (BASE, 3,300 CFS)

DATE	TIME	G.H.	DISCHARGE	DATE	TIME	G.H.	DISCHARGE
4-17	0700	4.99	3,910	4-25	0330	7.57	10,900
4-22	0900	4.73	3,940	4-27	0530	6.16	6,350

06425500 Elk Creek near Elm Springs, S. Dak.

LOCATION.--Lat 44°14'54", long 102°30'10", in SW¼NW¼ sec.1, T.3 N., R.13 E., Meade County, near center of span on downstream side of county highway bridge, 1.4 miles downstream from Hay Draw, 5.0 miles southeast of Elm Springs, and 7.0 miles upstream from mouth.

DRAINAGE AREA.--540 sq mi, approximately.

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

GAGE.--Nonrecording gage and crest-stage gage. Datum of gage is 2,304.49 ft above mean sea level. Prior to Jan. 31, 1967, at site 350 ft downstream at same datum.

AVERAGE DISCHARGE.--21 years, 23.4 cfs (16,950 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 2,920 cfs Apr. 26 (gage height, 9.55 ft); no flow for many days.
Period of record: Maximum discharge, 8,540 cfs Mar. 29, 1952 (gage height, 10.61 ft, from floodmark), from rating curve extended above 5,100 cfs; maximum gage height, 11.0 ft May 29, 1962, from floodmark; no flow for long periods in each year.
Maximum stage known, about 17 ft in May 1920, from information by local residents.

REMARKS.--Records fair.

Rating tables (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Apr. 1, 5-8; stage-discharge relation affected by ice Feb. 20 to Mar. 27)

Oct. 1 to Apr. 25				Apr. 26 to Sept. 30			
5.0	0	6.0	63	4.85	0	5.8	88
5.1	.70	6.2	106	4.9	.90	6.0	145
5.2	2.2	6.4	176	5.0	4.0	6.5	360
5.3	4.4	7.0	525	5.1	8.6	7.0	660
5.5	13	8.0	1,180	5.2	15	8.0	1,310
5.7	26	9.0	2,220	5.5	46	9.0	2,220

DISCHARGE IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1					0	0	0	122	14	16		
2					0	0	.06	81	14	12		
3					0	0	.50	62	14	12		
4					0	0	1.0	56	12	11		
5					0	0	4.0	43	12	7.7		
6					0	.02	7.2	32	14	5.4		
7					0	.50	8.9	28	11	5.4		
8					0	.10	14	27	14	4.5		
9					0	.04	15	25	14	3.4		
10					0	.01	20	27	14	3.4		
11					0	.01	40	57	17	1.5		
12					0	0	62	69	107	.90		
13					0	0	60	78	138	.90		
14					0	0	51	77	138	.18		
15					0	0	60	73	176	0		
16					0	0	26	69	166	0		
17					0	0	73	62	106	0		
18					0	0	92	62	77	0		
19					0	0	50	59	64	0		
20					.01	0	54	56	61	0		
21					.02	0	60	49	54	0		
22					.04	0	65	43	52	0		
23					.04	0	125	38	49	0		
24					.06	0	792	38	43	0		
25					.06	0	1,740	35	38	0		
26					.04	0	2,290	32	32	0		
27					.02	0	1,380	32	27	0		
28					.01	0	816	27	27	0		
29					------	0	478	26	22	0		
30					------	0	252	21	18	0		
31		------			------	0	------	18	------	0		------
TOTAL	0	0	0	0	.30	.68	8,636.66	1,524	1,545	84.28	0	0
MEAN	0	0	0	0	.011	.022	288	49.2	51.5	2.72	0	0
MAX	0	0	0	0	.06	.50	2,290	122	176	16	0	0
MIN	0	0	0	0	0	0	0	18	11	0	0	0
AC-FT	0	0	0	0	.6	1.4	17,130	3,020	3,060	167	0	0

CAL YR 1969 TOTAL 4,614.18 MEAN 12.6 MAX 575 MIN 0 ACFT 9,150
WAT YR 1970 TOTAL 11,790.92 MEAN 32.3 MAX 2,290 MIN 0 ACFT 23,390

PEAK DISCHARGE (BASE, 400 CFS)

DATE	TIME	G.H.	DISCHARGE
4-26	0930	9.55	2,920

06428500 Belle Fourche River at Wyoming-South Dakota State line

LOCATION.--Lat 44°44'59", long 104°02'49", in NE¼NW¼NW¼ sec.18, T.9 N., R.1 E., Butte County, on left bank 0.3 mile downstream from State line, 3.7 miles downstream from Oak Creek, and 11 miles northwest of Belle Fourche, S. Dak.

DRAINAGE AREA.--3,280 sq mi, approximately.

PERIOD OF RECORD.--December 1946 to current year. Records for water year 1947 incomplete, yearly estimate published in WSP 1729.

GAGE.--Water-stage recorder. Datum of gage is 3,095.7 ft above mean sea level.

AVERAGE DISCHARGE.--24 years, 79.4 cfs (57,530 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 1,810 cfs May 14 (gage height, 10.07 ft); minimum daily, 10 cfs Nov. 26, Jan. 9, 17, 18.
Period of record: Maximum discharge, 4,400 cfs June 18, 1962 (gage height, 15.59 ft); no flow at times most years.

REMARKS.--Records good except those for winter periods, which are poor. Small diversions above station for irrigation. Flow regulated by Keyhole reservoir since Oct. 25, 1952. Water-quality records for the water year 1970 are published in Part 2 of this report.

Rating table (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Oct. 1-3; stage-discharge relation affected by ice Nov. 13, 14, 17-19, 21-29, Dec. 1 to Mar. 29)

2.4	12
2.7	34
3.0	61
4.0	175
5.0	335
7.0	765
9.0	1,400

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	13	24	34	14	18	35	75	246	644	70	85	43
2	13	24	32	14	17	40	79	220	410	67	85	43
3	15	24	21	14	15	45	68	177	333	63	83	43
4	14	25	21	13	16	50	67	152	268	60	80	42
5	14	25	20	13	16	55	59	167	230	55	84	32
6	14	24	18	13	16	60	62	200	192	52	130	25
7	14	24	17	12	16	70	88	246	164	49	126	21
8	14	24	16	11	15	60	311	324	138	46	114	17
9	16	23	15	10	15	50	523	359	130	49	108	15
10	17	22	15	12	15	40	472	439	115	70	98	14
11	17	23	17	12	15	35	447	561	109	96	98	13
12	19	23	20	12	14	35	430	485	205	98	91	12
13	22	15	20	11	13	30	460	424	488	97	90	13
14	24	12	20	12	14	30	414	1,160	564	89	87	15
15	24	17	20	12	14	30	337	860	368	90	85	17
16	24	20	20	11	15	35	257	1,030	263	91	85	16
17	23	24	19	10	16	30	196	967	215	94	85	17
18	23	20	18	10	15	30	161	613	187	90	84	16
19	23	23	17	11	15	30	120	457	167	91	82	15
20	22	26	18	11	16	35	132	392	146	89	80	15
21	22	26	18	12	18	40	125	355	137	82	63	15
22	22	27	19	14	20	40	181	323	126	87	51	15
23	22	18	19	16	23	45	225	292	118	94	41	15
24	21	20	19	18	27	50	300	272	110	108	44	14
25	22	17	19	20	30	50	262	240	100	111	43	17
26	22	10	17	19	35	60	251	220	92	104	42	16
27	20	20	15	19	30	75	258	206	87	98	41	15
28	21	23	13	18	30	90	241	206	83	93	40	14
29	25	34	11	18	------	100	251	168	78	91	41	14
30	24	32	13	19	------	135	243	222	74	91	42	13
31	24	------	14	19	------	88	------	629	------	87	42	------
TOTAL	610	669	575	430	519	1,598	7,095	12,612	6,341	2,552	2,350	592
MEAN	19.7	22.3	18.5	13.9	18.5	51.5	237	407	211	82.3	75.8	19.7
MAX	25	34	34	20	35	135	523	1,160	644	111	130	43
MIN	13	10	11	10	13	30	59	152	74	46	40	12
AC-FT	1,210	1,330	1,140	853	1,030	3,170	14,070	25,020	12,580	5,060	4,660	1,170

CAL YR 1969 TOTAL 34,818.00 MEAN 95.4 MAX 1,260 MIN 0 AC-FT 69,060
WTR YR 1970 TOTAL 35,943 MEAN 98.5 MAX 1,160 MIN 10 AC-FT 71,290

06430000 Murray ditch at Wyoming-South Dakota State line

LOCATION.--Lat 44°34'35", long 104°02'58", in SW¼SW¼ sec.7, T.7 N., R.1 E., Butte County, on right bank 15 ft downstream from State line, and 12 miles southwest of Belle Fourche.

PERIOD OF RECORD.--June 1954 to current year (irrigation seasons only prior to October 1959).

GAGE.--Water-stage recorder. Altitude of gage is 3,440 ft (from topographic map).

EXTREMES.--Period of record: Maximum daily discharge, 33 cfs Oct. 4-6, 1970; no flow for long periods in each year.

REMARKS.--Records fair. Ditch diverts water from left bank of Redwater Creek, 2 miles upstream, for irrigation of about 700 acres. Flow maintained during irrigation season only.

DISCHARGE IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	30	.50						0	.24	1.2	21	16
2	31	.50						0	.09	1.2	21	12
3	32	.45						0	0	1.2	22	14
4	33	.64						0	0	1.2	23	11
5	33	.09						0	0	1.1	23	8.7
6	33	.09						0	0	1.1	13	6.9
7	32	.06						0	0	3.0	13	6.8
8	27	0						0	0	3.3	12	6.8
9	25	0						0	0	3.6	12	6.7
10	24	.38						0	0	4.0	11	6.4
11	22	1.0						0	0	2.8	11	5.8
12	20	1.1						0	2.5	2.9	11	5.8
13	18	.90						0	.65	5.6	11	5.7
14	16	1.0						.50	.21	6.2	11	5.7
15	16	.45						.08	.02	19	11	5.6
16	16	.40						0	0	16	11	5.2
17	13	.40						0	0	11	9.5	5.1
18	12	.40						0	0	22	6.7	4.7
19	10	1.0						0	0	26	9.6	5.3
20	10	.40						0	0	23	12	5.1
21	10	.30						0	0	22	9.7	4.9
22	10	.27						0	0	20	13	4.7
23	6.0	0						0	0	24	15	4.5
24	5.0	0						0	0	24	17	4.5
25	3.0	0						0	0	22	17	4.3
26	2.0	0						0	0	20	17	4.1
27	1.0	0						0	0	20	17	4.1
28	1.0	0						0	.50	21	17	4.0
29	.50	0			------			0	1.0	12	17	3.9
30	.50	0			------			.22	1.2	17	16	3.8
31	.50	------			------		------	.50	------	21	17	------
TOTAL	492.50	10.33	0	0	0	0	0	1.30	6.41	378.4	447.5	192.1
MEAN	15.9	.34	0	0	0	0	0	.042	.21	12.2	14.4	6.40
MAX	33	1.1	0	0	0	0	0	.50	2.5	26	23	16
MIN	.50	0	0	0	0	0	0	0	0	1.1	6.7	3.8
AC-FT	977	20	0	0	0	0	0	2.6	13	751	888	381

CAL YR 1969 TOTAL 1,985.36 MEAN 5.44 MAX 33 MIN 0 ACFT 3,940
WAT YR 1970 TOTAL 1,528.54 MEAN 4.19 MAX 33 MIN 0 ACFT 3,030

06430500 Redwater Creek at Wyoming-South Dakota State line

LOCATION.--Lat 44°34'26", long 104°02'54", in NW¼NW¼ sec.18, T.7 N., R.1 E., Butte County, on left bank 800 ft downstream from State line, 5.7 miles upstream from Crow Creek, and 12 miles southwest of Belle Fourche, S. Dak.

DRAINAGE AREA.--471 sq mi.

PERIOD OF RECORD.--April 1929 to September 1931 and February 1936 to July 1937 (published as "near Beulah, Wyo."), June 1954 to current year.

GAGE.--Water-stage recorder. Altitude of gage is 3,410 ft (from topographic map). Apr. 25, 1929, to Sept. 30, 1931, and Feb. 28, 1936, to July 31, 1937, nonrecording gage at site 2 miles upstream at different datum.

AVERAGE DISCHARGE.--18 years (1929-31, 1954-70), 33.3 cfs (24,130 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 948 cfs June 12 (gage height, 7.61 ft); minimum, 7.9 cfs July 15 (gage height, 1.72 ft).
Period of record: Maximum discharge, 2,340 cfs June 16, 1962 (gage height, 11.95 ft, from floodmark), from rating curve extended above 320 cfs on basis of slope-area measurement of peak flow; no flow Aug. 13-15, 1929.

REMARKS.--Records good except those for winter periods, which are fair. Large diversions for irrigation above station. Total flow passing State line may be obtained by adding flow of Murray ditch. (See sta 6-4300.)

REVISIONS(WATER YEARS).--WSP 1309: 1931(M): 1936-37(M).

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	14	35	30	28	29	29	31	38	187	49	19	20
2	16	35	30	29	27	29	31	37	121	49	19	27
3	18	34	30	29	27	29	31	40	95	47	19	25
4	16	35	30	33	26	29	31	51	78	47	19	27
5	16	33	30	35	26	29	30	62	71	48	21	29
6	14	33	30	37	25	29	31	91	64	47	224	32
7	15	32	30	35	26	29	31	136	59	42	86	34
8	19	32	30	30	26	30	31	170	53	40	72	32
9	21	32	30	28	26	31	31	173	54	41	60	31
10	21	31	30	28	26	30	30	121	49	37	54	31
11	22	30	30	28	26	29	33	158	47	37	47	32
12	23	30	30	30	27	29	41	166	498	38	35	31
13	25	30	30	30	27	29	40	145	408	33	34	36
14	24	29	30	30	29	29	38	154	234	28	32	38
15	25	31	30	30	29	29	40	149	151	19	32	37
16	25	32	30	29	29	29	42	146	113	15	31	37
17	25	32	30	28	29	30	42	153	91	19	31	36
18	26	30	30	27	29	31	50	164	82	27	31	35
19	27	30	30	28	29	30	40	150	76	12	26	34
20	25	30	30	29	29	30	35	131	73	12	20	34
21	23	30	30	30	30	30	38	118	70	13	16	33
22	24	30	33	30	29	30	42	103	70	15	13	33
23	27	30	31	35	29	30	45	122	67	15	13	34
24	28	30	30	35	29	32	45	97	64	16	11	35
25	32	30	30	38	29	33	45	89	60	15	10	35
26	32	30	29	30	29	33	45	79	58	14	10	34
27	33	30	29	31	29	31	40	70	57	15	11	34
28	33	30	28	30	29	32	42	63	54	17	12	33
29	35	30	26	28	------	32	44	59	53	18	13	33
30	33	30	27	29	------	31	41	71	52	34	13	32
31	35	------	28	29	------	31	------	100	------	21	19	------
TOTAL	752	936	921	946	780	934	1,136	3,406	3,209	880	1,053	974
MEAN	24.3	31.2	29.7	30.5	27.9	30.1	37.9	110	107	28.4	34.0	32.5
MAX	35	35	33	38	30	33	50	173	498	49	224	38
MIN	14	29	26	27	25	29	30	37	47	12	10	20
AC-FT	1,490	1,860	1,830	1,880	1,550	1,850	2,250	6,760	6,370	1,750	2,090	1,930

CAL YR 1969 TOTAL 12,065.7 MEAN 33.1 MAX 268 MIN 6.2 AC-FT 23,930
WTR YR 1970 TOTAL 15,927 MEAN 43.6 MAX 498 MIN 10 AC-FT 31,590

PEAK DISCHARGE (BASE, 150 CFS)

DATE	TIME	G.H.	DISCHARGE	DATE	TIME	G.H.	DISCHARGE
5- 8	1930	3.75	198	6- 1	0145	4.11	262
5-12	0130	3.73	195	6-12	1445	7.61	948
5-18	0515	3.63	178	8- 6	0415	4.82	393
5-28	0315	3.45	151				

06431500 Spearfish Creek at Spearfish, S. Dak.

LOCATION.--Lat 44°28'57", long 103°51'40", in SE¼NW¼ sec.15, T.6 N., R.2 E., Lawrence County, on right bank in city park in Spearfish, 500 ft downstream from fish hatchery and nearest tributary, and 9.8 miles upstream from mouth.

DRAINAGE AREA.--168 sq mi.

PERIOD OF RECORD.--October 1946 to current year.

GAGE.--Water-stage recorder. Altitude of gage is 3,640 ft (from topographic map). Prior to Dec. 5, 1946, nonrecording gage at same site and datum.

AVERAGE DISCHARGE.--24 years, 47.8 cfs (34,630 acre-ft per year, unadjusted).

EXTREMES.--Current year: Maximum discharge, 884 cfs June 12 (gage height, 8.21 ft); minimum daily, 25 cfs Dec. 29.

Period of record: Maximum discharge, 4,240 cfs May 15, 1965 (gage height, 10.53 ft), from rating curve extended above 520 cfs on basis of slope-area measurement of peak flow; minimum discharge, 2.6 cfs Oct. 3, 1965 (gage height, 5.53 ft).

Flood of June 5, 1904, reached a stage of 7.00 ft, site and datum of former gage near Spearfish, 1 mile upstream (drainage area, 157 sq mi); discharge about 5,000 cfs.

REMARKS.--Records good except those for the winter periods, which are fair. Diurnal regulation caused by fish hatchery and hydroelectric plant 0.5 mile upstream. Figures of daily discharge do not include diversion by Homestake Mining Company.

REVISIONS.--WSP 1116: Drainage area.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	52	40	42	30	67	41	37	92	194	75	77	45
2	50	39	42	40	59	42	39	92	159	72	76	49
3	50	39	41	40	62	39	40	110	138	69	74	50
4	49	45	42	40	62	39	38	133	128	68	76	45
5	48	45	42	40	54	40	43	135	124	68	73	45
6	48	48	43	40	57	37	49	141	126	68	85	43
7	48	47	41	38	58	40	60	223	126	68	103	45
8	44	46	40	35	57	40	68	343	121	66	75	43
9	47	46	42	35	52	44	58	303	117	75	69	45
10	48	46	43	40	54	38	64	227	112	69	64	49
11	45	45	43	45	52	37	81	248	110	65	63	45
12	46	45	42	46	53	39	71	263	510	80	59	47
13	45	46	43	45	49	38	62	263	386	71	54	49
14	43	35	42	44	51	38	60	245	291	67	54	49
15	44	49	41	41	50	39	60	207	234	65	51	47
16	40	49	40	38	51	40	52	201	201	65	53	47
17	41	49	41	52	50	39	50	230	171	60	45	45
18	41	42	40	40	53	40	54	267	153	62	44	46
19	42	40	39	43	47	40	52	252	137	61	43	45
20	40	41	39	46	48	37	49	227	131	65	46	47
21	41	44	41	43	44	40	45	207	128	59	44	46
22	39	43	44	43	46	39	43	188	126	63	42	45
23	40	40	41	43	44	40	45	171	120	82	39	43
24	37	41	42	46	43	40	49	153	112	77	37	49
25	37	40	37	49	41	42	60	140	104	72	36	48
26	37	41	35	50	43	39	79	129	98	72	41	45
27	36	37	45	50	43	40	104	126	90	72	58	45
28	35	41	40	54	41	40	126	125	85	75	58	45
29	37	41	25	54	------	40	122	124	80	74	54	44
30	37	42	38	45	------	40	102	122	78	74	48	44
31	38	------	41	54	------	39	------	158	------	74	47	------
TOTAL	1,325	1,292	1,257	1,349	1,431	1,226	1,862	5,845	4,690	2,153	1,788	1,380
MEAN	42.7	43.1	40.5	43.5	51.1	39.5	62.1	189	156	69.5	57.7	46.0
MEAN‡	51.2	51.1	48.4	52.1	60.3	49.0	70.8	196	164	78.3	66.2	54.9
(+)	521	478	485	527	512	586	516	408	487	542	524	531
AC-FT	2,630	2,560	2,490	2,680	2,840	2,430	3,690	11,590	9,300	4,270	3,550	2,740
AC-FT‡	3,150	3,040	2,980	3,210	3,350	3,020	4,210	12,000	9,790	4,810	4,070	3,270
MAX	52	49	45	54	67	44	126	343	510	82	103	50
MIN	35	35	25	30	41	37	37	92	78	59	36	43

CAL YR 1969	TOTAL 19,287	MEAN 52.8	MEAN‡ 16.5	MAX 338	MIN 20	AC-FT 38,260	AC-FT‡ 44,530
WTR YR 1970	TOTAL 25,598	MEAN 70.1	MEAN‡ 78.6	MAX 510	MIN 25	AC-FT 50,770	AC-FT‡ 56,890

(+) Diversion, in acre-feet, by Homestake Mining Company.
(‡) Adjusted for diversion.

06433000 Redwater River above Belle Fourche, S. Dak.

LOCATION.--Lat 44°40'02", long 103°50'20", in NW¼SE¼ sec.11, T.8 N., R.2 E., Butte County, on right bank at upstream side of bridge on U.S. Highway 212 in Belle Fourche, 0.5 mile upstream from Hay Creek, and 0.9 mile upstream from mouth.

DRAINAGE AREA.--920 sq mi.

PERIOD OF RECORD.--November 1945 to current year. Records for water year 1946 incomplete, yearly discharge published in WSP 1309. Prior to October 1960, published as Redwater Creek above Belle Fourche.

GAGE.--Water-stage recorder. Altitude of gage is 3,000 ft (from topographic map). Prior to Dec. 13, 1946, nonrecording gage at same site and datum.

AVERAGE DISCHARGE.--25 years (1945-70), 125 cfs (90,560 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 1,890 cfs June 13 (gage height, 7.68 ft); minimum daily, 3.9 cfs July 18.

Period of record: Maximum discharge, 16,400 cfs June 16, 1962 (gage height, 11.69 ft), from rating curve extended above 6,000 cfs on basis of slope-area measurement of peak flow; no flow for part of Aug. 5, 1960, Aug. 8-10, 1968, Aug. 13, 1969.

REMARKS.--Records good except those for winter periods, which are poor. Diversions for irrigation of about 13,000 acres above station.

REVISIONS(WATER YEARS).--WSP 1389: 1954 (maximum gage height only).

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	59	154	154	140	110	131	150	240	571	97	22	57
2	62	161	154	140	125	133	150	230	530	85	22	68
3	68	156	152	140	130	133	160	225	461	69	27	71
4	74	152	152	130	130	136	150	226	420	66	24	76
5	76	154	154	120	133	136	150	241	399	63	44	77
6	82	152	154	110	140	133	150	302	383	53	126	76
7	77	150	154	100	140	138	140	498	371	49	214	82
8	71	147	150	90	136	140	150	638	362	43	107	84
9	82	150	150	100	136	145	160	830	351	41	90	82
10	88	152	150	110	140	145	160	611	344	40	82	88
11	97	150	152	120	136	138	170	586	332	32	76	97
12	109	150	154	110	133	138	210	636	912	40	74	100
13	126	152	154	110	130	145	240	624	1,490	38	66	109
14	138	154	152	120	130	143	250	791	687	32	58	114
15	143	159	152	120	136	143	210	678	477	28	57	117
16	133	156	150	110	136	147	200	571	399	18	56	114
17	127	161	150	100	136	150	190	577	344	4.2	54	112
18	124	154	147	90	140	152	190	616	305	3.9	49	107
19	147	150	145	100	136	154	220	619	282	4.8	42	107
20	159	154	145	100	133	154	190	580	262	4.8	40	107
21	145	152	147	110	133	154	190	538	249	4.8	32	107
22	140	154	154	130	136	156	210	508	239	6.0	24	131
23	143	152	152	150	138	159	450	493	230	10	24	150
24	145	152	150	160	138	177	380	477	214	45	26	152
25	147	152	145	150	133	182	360	445	188	47	28	157
26	150	152	140	150	133	168	300	417	167	40	28	153
27	150	150	140	140	133	166	260	401	144	31	29	153
28	147	152	135	140	133	167	260	392	126	26	41	152
29	150	152	130	140	------	167	250	383	116	25	44	148
30	152	154	135	150	------	167	250	436	100	21	43	148
31	154	------	140	150	------	167	------	454	------	22	43	------
TOTAL	3,665	4,590	4,593	3,830	3,743	4,664	6,500	15,263	11,455	1,089.5	1,692	3,296
MEAN	118	153	148	124	134	150	217	492	382	35.1	54.6	110
MAX	159	161	154	160	140	182	450	830	1,490	97	214	157
MIN	59	147	130	90	110	131	140	225	100	3.9	22	57
AC-FT	7,270	9,100	9,110	7,600	7,420	9,250	12,890	30,270	22,720	2,160	3,360	6,540

CAL YR 1969 TOTAL 48,862.17 MEAN 134 MAX 1,080 MIN .57 AC-FT 96,920
WTR YR 1970 TOTAL 64,380.5 MEAN 176 MAX 1,490 MIN 3.9 AC-FT 127,700

PEAK DISCHARGE (BASE, 500 CFS)

DATE	TIME	G.H.	DISCHARGE	DATE	TIME	G.H.	DISCHARGE
5- 8	2330	6.39	801	5-30	1815	6.06	694
5-14	1830	6.61	976	6-13	0115	7.68	1,890

06433500 Hay Creek at Belle Fourche, S. Dak.

LOCATION.--Lat 44°40'01", long 103°50'46", in NW¼SW¼ sec.11, T.8 N., R.2 E., Butte County, on right bank at intersection of Tenth Avenue and Jackson Street in Belle Fourche, 0.5 mile upstream from mouth.

DRAINAGE AREA.--121 sq mi.

PERIOD OF RECORD.--October 1953 to current year.

GAGE.--Water-stage recorder. Datum of gage is 3,005.18 ft above mean sea level (City of Belle Fourche bench mark). Prior to Dec. 8, 1953, nonrecording gage at site 300 ft downstream at same datum.

AVERAGE DISCHARGE.--17 years, 0.83 cfs (601 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 67 cfs May 15 (gage height, 5.24 ft); no flow for long periods. Period of record: Maximum discharge, 422 cfs June 22, 1964 (gage height, 7.12 ft), from rating curve extended above 150 cfs; no flow for long periods most years.

REMARKS.--Records fair except those for winter periods, which are poor. Minor diversion to the stream at times from city reservoir overflow, which enters stream above gage.

Rating table (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Oct. 31 to Nov. 6, Mar. 21 to May 11, June 28 to July 23;
stage-discharge relation affected by ice Nov. 13 to Mar. 20).

3.0	0	3.8	6.6
3.1	.42	4.0	9.8
3.2	1.0	4.5	25
3.4	2.6	5.0	50
3.6	4.5	5.5	91

DISCHARGE IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.43	1.3				0	.08	1.0	16	0	.63	0
2	.06	.54				.03	.17	.89	11	0	.95	.07
3	3.9	.13				.03	.13	.66	8.7	0	.66	0
4	1.5	.04				.03	.08	.48	5.6	0	.17	0
5	2.8	.04				.05	.25	.38	4.2	.14	.80	0
6	4.2	0				.10	.21	.29	3.5	.32	.65	0
7	4.3	0				.10	.38	.25	3.1	0	1.6	0
8	1.4	0				.15	.38	1.4	2.8	0	.95	0
9	1.6	.04				.05	.34	1.2	2.4	0	1.2	0
10	1.3	.08				0	.34	1.3	1.9	0	1.4	0
11	.03	.13				0	2.2	15	1.5	0	.42	0
12	1.9	.04				0	2.5	10	9.5	0	0	0
13	3.8	0				0	1.8	6.0	20	0	0	0
14	1.6	0				0	2.2	37	30	0	0	0
15	.21	.05				0	2.6	55	18	0	0	0
16	0	.05				.10	1.4	21	10	0	0	.02
17	0	.05				.50	.72	11	6.5	0	0	0
18	0	.03				1.0	.77	7.2	5.0	0	0	0
19	.42	.05				1.5	1.1	5.5	4.2	0	0	0
20	1.3	.05				2.0	1.1	4.3	3.5	0	0	0
21	1.1	.10				4.0	1.8	3.6	3.2	0	0	0
22	2.0	.10				2.3	2.3	3.1	3.0	0	0	0
23	1.4	.08				1.8	16	3.0	2.6	1.0	0	0
24	1.4	.05				1.5	16	3.0	2.3	.82	0	.32
25	1.2	.03				.83	7.6	2.9	1.8	1.8	0	.04
26	.08	.02				.54	3.8	2.4	1.1	.98	0	0
27	0	0				.38	2.8	4.6	.66	.39	0	0
28	1.2	0				.29	2.0	7.2	.29	.47	0	0
29	2.5	0			------	.34	1.5	2.7	.08	.08	0	0
30	1.3	0			------	.17	1.3	12	.02	.54	0	0
31	1.4	------			------	.04	------	38	------	.44	0	------
TOTAL	44.33	3.00	0	0	0	17.83	73.85	262.35	182.45	6.98	9.43	.45
MEAN	1.43	.10	0	0	0	.58	2.46	8.46	6.08	.23	.30	.015
MAX	4.3	1.3	0	0	0	4.0	16	55	30	1.8	1.6	.32
MIN	0	0	0	0	0	0	.08	.25	.02	0	0	0
AC-FT	88	6.0	0	0	0	35	146	520	362	14	19	.9

CAL YR 1969 TOTAL 203.28 MEAN .56 MAX 9.4 MIN 0 ACFT 403
WAT YR 1970 TOTAL 600.67 MEAN 1.65 MAX 55 MIN 0 ACFT 1,190

PEAK DISCHARGE (BASE, 50 CFS)

DATE	TIME	G.H.	DISCHARGE
5-15	0200	5.24	67

06434500 Inlet Canal near Belle Fourche, S. Dak.

LOCATION.--Lat 44°42'14", long 103°49'23", in NE¼NW¼ sec.36, T.9 N., R.2 E., Butte County, on right bank 0.5 mile downstream from Crow Creek, 0.9 mile downstream from diversion dam on Belle Fourche River, and 2.5 miles northeast of Belle Fourche.

PERIOD OF RECORD.--October 1945 to current year. Monthly diversions from Inlet Canal between station and reservoir for some periods, published in WSP 1309.

GAGE.--Water-stage recorder. Datum of gage is 2,985.22 ft above mean sea level. Prior to Dec. 10, 1946, nonrecording gage, and Dec. 10, 1946, to Nov. 26, 1949, water-stage recorder at site 0.8 mile upstream at same datum.

AVERAGE DISCHARGE.--25 years, 154 cfs (111,600 acre-ft per year).

EXTREMES.--Period of record: Maximum daily discharge, 1,340 cfs May 30, 1962; no flow for many days in 1946-49, 1963, 1966.

REMARKS.--Records good except those for winter periods, which are poor. Records show actual diversions to Belle Fourche Reservoir (see sta 6-4350), from Belle Fourche River and Crow Creek, except for 7,097 acre-ft which was diverted for irrigation from the canal between the station and reservoir. Water-quality records for the water year 1970 are published in Part 2 of this report.

COOPERATION.--Records of diversion from the canal furnished by Bureau of Reclamation.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	79	177	168	160	140	181	222	487	183	186	168	93
2	79	182	177	160	130	178	217	480	121	164	172	102
3	77	179	173	160	150	172	224	433	53	140	186	115
4	84	175	172	150	150	168	207	421	163	134	172	119
5	87	180	173	135	155	174	208	425	177	132	195	114
6	89	189	172	120	160	178	209	474	174	128	374	110
7	44	189	176	110	160	182	219	667	158	149	617	112
8	1.8	187	170	100	150	184	306	840	297	140	339	115
9	1.4	183	165	105	150	177	538	1,020	409	123	304	94
10	1.0	174	160	120	160	175	636	967	340	121	256	107
11	54	170	160	130	155	172	622	1,040	256	144	240	120
12	106	177	160	130	155	169	662	523	202	169	229	112
13	108	174	163	125	150	169	726	15	38	176	205	145
14	183	186	165	130	160	170	679	97	40	163	183	145
15	164	170	164	130	156	170	560	36	44	151	172	157
16	163	171	164	120	154	180	470	16	45	138	164	144
17	164	177	164	110	157	180	392	15	38	127	156	125
18	164	177	163	100	161	180	364	15	57	132	141	131
19	168	169	163	95	156	190	353	14	69	137	135	134
20	164	166	161	105	155	193	334	14	58	130	128	134
21	163	169	162	120	157	190	323	14	45	122	112	136
22	162	173	164	140	161	199	400	13	51	134	91	152
23	164	173	167	160	168	233	740	13	73	176	82	141
24	165	176	164	180	172	275	705	13	81	206	81	145
25	167	178	163	180	171	305	648	12	147	210	76	163
26	169	163	160	170	175	277	580	136	286	199	74	150
27	170	163	150	170	181	242	539	213	249	188	66	155
28	169	176	145	160	183	250	545	199	222	179	83	156
29	173	164	140	160	------	299	531	182	206	186	78	151
30	178	178	150	165	------	275	510	229	182	172	80	151
31	177	------	160	160	------	247	------	246	------	173	83	------
TOTAL	3,838.2	5,265	5,058	4,260	4,432	6,334	13,669	9,269	4,464	4,829	5,442	3,928
MEAN	124	176	163	137	158	204	456	299	149	156	176	131
MAX	183	189	177	180	183	305	740	1,040	409	210	617	163
MIN	1.0	163	140	95	130	168	207	12	38	121	66	93
AC-FT	7,610	10,440	10,030	8,450	8,790	12,560	27,110	18,390	8,850	9,580	10,790	7,790

CAL YR 1969 TOTAL 66,740.9 MEAN 183 MAX 823 MIN 1.0 AC-FT 132,400
WTR YR 1970 TOTAL 70,788.2 MEAN 194 MAX 1,040 MIN 1.0 AC-FT 140,400

06435000 Belle Fourche Reservoir near Belle Fourche, S. Dak.

LOCATION.--Lat 44°44'12", long 103°40'27", in SW¼SE¼ sec.18, T.9 N., R.4 E., Butte County, at dam on Owl Creek, 9.8 miles northeast of Belle Fourche.

RECORDS AVAILABLE.--January 1912 to current year.

GAGE.--Water-stage recorder. Datum of gage is at mean sea level, adjustment of 1912. Prior to June 6, 1967, nonrecording gage at present site and datum.

EXTREMES.--Current year: Maximum contents, 165,600 acre-ft June 10 (elevation, 2,972.50 ft); minimum, 46,850 acre-ft Oct. 1 (elevation, 2,951.70 ft).
Period of record: Maximum contents observed, 197,400 acre-ft Apr. 30, 1919, May 20, 1920 (elevation, 2,974.9 ft); minimum observed, -3,000 acre-ft Sept. 30, 1936 (water was lowered below dead storage level of 2,927.0 ft by opening holes in crib walls).

REMARKS.--Offstream reservoir formed by earthfill dam. Storage began in May 1910; dam completed in April 1911. Conservation capacity, 185,170 acre-ft (1949 survey) between elevations 2,927.0 ft (lowest outlet) and 2,975.0 ft (crest of spillway weir). Dead storage below elevation 2,927.0 ft, 6,800 acre-ft. Figures given herein represent contents above elevation 2,927.0 ft. Water diverted from Belle Fourche River through Inlet Canal (see sta 6-4345) is stored in Belle Fourche Reservoir for irrigation.

COOPERATION.--Elevations and contents furnished by Bureau of Reclamation.

MONTHEND ELEVATION AND CONTENTS AT 2400, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

Date	Elevation (feet)	Contents (acre-feet)	Change in contents (acre-feet)
Sept.30	2,951.7	46,850	-
Oct. 31	2,953.6	54,270	+7,420
Nov. 30	2,956.8	67,610	+13,340
Dec. 31	2,958.7	76,640	+9,030
CAL YR 1969	-	-	-11,870
Jan. 31	2,961.0	90,200	+13,560
Feb. 28	2,963.3	103,380	+13,180
Mar. 31	2,965.0	113,310	+9,930
Apr. 30	2,969.8	145,550	+32,240
May 31	2,972.1	162,560	+17,010
June 30	2,971.4	157,300	+5,260
July 31	2,963.8	106,180	-51,120
Aug. 31	2,956.3	65,640	-40,540
Sept.30	2,952.5	49,900	-15,740
WTR YR 1970	-	-	+3,050

06436000 Belle Fourche River near Fruitdale, S. Dak.

LOCATION.--Lat 44°41'27", long 103°44'14", in NW¼NE¼ sec.3, T.8 N., R.3 E., Butte County, on right bank 5 ft downstream from bridge on U.S. Highway 212, 2.5 miles northwest of Fruitdale, and 8.8 miles downstream from point of diversion to Belle Fourche Reservoir.

DRAINAGE AREA.--4,540 sq mi, approximately.

PERIOD OF RECORD.--October 1945 to current year. Monthly discharge only for October 1945, published in WSP 1309.

GAGE.--Water-stage recorder. Altitude of gage is 2,925 ft (from topographic map). Prior to Apr. 9, 1947, nonrecording gage and Apr. 10, 1947, to Oct. 14, 1948, water-stage recorder, at site 100 ft upstream at same datum. Oct. 15, 1948, to Dec. 30, 1958, water-stage recorder and Dec. 31, 1958, to Sept. 23, 1959, nonrecording gage, at present site and datum.

AVERAGE DISCHARGE.--25 years, 77.3 cfs (56,000 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 3,570 cfs May 15 (gage height, 7.57 ft); minimum daily, 1.4 cfs Feb. 28 to Mar. 4.
Period of record: Maximum discharge, 8,100 cfs May 15, 1965 (gage height, 10.53 ft); maximum gage height, 11.25 ft June 16, 1962; no flow at times in 1945, 1948, 1959-62.

REMARKS.--Records good except those for winter periods, which are poor. At a point 8.8 miles above station, water is diverted to Belle Fourche Reservoir (see sta 6-4350) through Inlet Canal (see sta 6-4345), with other smaller diversions from the main stem and tributaries for irrigation. Total diversions for irrigation of about 60,000 acres above station.

DISCHARGE IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	6.3	6.0	4.0	4.0	3.6	1.4	3.0	4.7	1,990	6.0	15	12
2	6.3	6.3	4.0	4.5	3.5	1.4	3.1	4.7	1,150	4.7	17	15
3	7.8	6.0	4.0	4.5	3.6	1.4	2.8	4.5	894	5.2	15	12
4	8.1	5.5	4.0	4.5	3.7	1.4	2.5	4.7	585	6.0	11	11
5	9.1	5.5	4.0	4.3	3.8	1.5	3.0	5.0	470	6.0	11	11
6	8.1	5.5	3.8	4.3	3.8	1.7	2.7	5.2	419	5.2	14	11
7	13	5.5	3.5	4.3	3.8	2.0	2.8	5.0	376	4.3	25	11
8	34	6.3	3.2	4.0	3.6	2.5	3.5	5.2	230	4.7	16	11
9	39	6.9	3.0	3.5	3.8	2.0	3.1	35	14	5.0	12	9.9
10	41	7.2	3.0	4.0	3.8	1.8	3.5	19	21	5.2	12	7.2
11	34	7.5	3.2	3.8	3.8	1.6	4.7	92	91	6.3	12	6.3
12	7.8	6.9	3.5	3.5	3.5	1.5	7.2	699	505	6.6	12	5.7
13	8.1	6.5	4.0	3.0	3.0	1.6	6.0	1,300	2,460	9.5	11	6.3
14	16	6.0	3.8	3.0	3.2	1.7	5.2	2,300	1,940	9.5	11	6.9
15	6.6	6.5	3.8	2.7	3.2	1.7	4.7	3,050	1,280	9.5	11	6.9
16	5.0	6.5	3.8	2.5	3.4	2.0	4.7	1,880	934	13	13	6.6
17	5.0	6.3	3.8	2.5	3.5	2.2	4.0	2,220	745	14	17	6.3
18	5.2	6.0	3.8	2.5	3.2	2.4	5.0	1,760	597	15	15	5.7
19	5.2	6.3	3.6	2.7	3.0	2.0	5.2	1,450	485	13	15	5.5
20	5.2	6.5	3.6	2.7	3.0	2.0	4.5	1,240	432	13	15	5.5
21	5.7	6.5	3.5	3.0	2.8	3.0	4.3	1,100	419	13	16	5.0
22	5.5	6.0	3.6	3.2	2.6	4.0	5.0	986	384	15	14	5.0
23	5.5	5.5	3.5	3.5	2.3	5.0	7.2	888	342	16	14	5.0
24	5.2	5.0	3.6	3.5	2.0	7.0	8.1	797	294	16	14	5.5
25	5.5	4.5	3.5	3.8	1.8	9.0	6.9	712	226	14	15	6.3
26	5.2	4.0	3.3	3.6	2.0	6.6	5.7	538	9.9	12	15	5.7
27	5.2	4.0	3.0	3.8	1.5	5.7	5.2	380	8.7	10	13	5.7
28	5.2	4.0	2.7	3.6	1.4	5.0	5.5	410	8.7	12	13	5.7
29	5.5	4.3	2.5	3.5	------	4.7	5.5	363	8.4	10	13	5.7
30	6.0	4.3	3.0	3.6	------	4.0	4.7	473	6.3	9.9	11	5.7
31	6.3	------	3.5	3.6	------	3.3	------	1,040	------	13	12	------
TOTAL	331.6	173.8	109.1	109.5	86.2	93.1	139.3	23,771.0	17,325.0	302.6	430	228.1
MEAN	10.7	5.79	3.52	3.53	3.08	3.00	4.64	767	578	9.76	13.9	7.60
MAX	41	7.5	4.0	4.5	3.8	9.0	8.1	3,050	2,460	16	25	15
MIN	5.0	4.0	2.5	2.5	1.4	1.4	2.5	4.5	6.3	4.3	11	5.0
AC-FT	658	345	216	217	171	185	276	47,150	34,360	600	853	452

CAL YR 1969 TOTAL 17,363.3 MEAN 47.6 MAX 2,120 MIN 2.0 ACFT 34,440
WAT YR 1970 TOTAL 43,099.3 MEAN 118 MAX 3,050 MIN 1.4 ACFT 85,490

06436700 Indian Creek near Arpan, S. Dak.

LOCATION.--Lat 44°48'51", long 103°41'22", in SE¼NE¼ sec.24, T.10 N., R.3 E., Butte County, on left bank 3,200 ft upstream from North Canal flume, 3.5 miles northwest of Arpan, and 6.9 miles downstream from Bitter Creek.

DRAINAGE AREA.--315 sq mi, approximately.

PERIOD OF RECORD.--August 1961 to current year.

GAGE.--Water-stage recorder.

AVERAGE DISCHARGE.--9 years, 15.8 cfs (11,450 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 594 cfs Apr. 24 (gage height, 9.85 ft); no flow for many days. Period of record: Maximum discharge, 2,690 cfs May 8, 1967 (gage height, 14.58 ft, from floodmarks); maximum gage height, 15.11 ft May 26, 1962 (from floodmarks); no flow for many days in most years.

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

DISCHARGE IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1							.02	11	10	0	.04	0
2							.04	7.4	15	0	.03	.02
3							.03	5.9	24	0	.02	0
4							.04	4.5	9.6	0	.02	0
5							.03	3.2	3.7	0	0	0
6							0	2.6	1.2	0	.06	0
7							0	1.6	.56	0	.12	.04
8							0	1.6	.27	0	.15	.03
9							0	1.6	.27	0	.27	.09
10							0	1.2	.35	0	.53	.10
11							.02	24	.23	0	1.0	.10
12							2.0	17	.33	0	1.3	.06
13							25	4.0	1.7	0	.90	.06
14							81	205	13	0	.47	.06
15							51	287	60	0	.38	.08
16							22	136	28	0	.35	.04
17							14	58	9.6	0	.38	.04
18							8.2	31	3.1	0	.33	0
19							13	16	.88	0	.27	0
20							8.4	7.8	.29	0	.27	0
21							7.6	6.0	.07	0	.21	0
22							24	5.5	.14	0	.12	0
23							186	4.7	.29	.05	.10	0
24							470	4.4	.25	.08	.10	0
25							468	2.7	.25	.08	.08	0
26							215	2.0	.15	.06	.03	0
27							92	2.0	.09	.03	0	.10
28							53	1.5	.06	.03	0	.12
29					------		29	1.5	0	.04	0	.14
30					------		18	3.0	.02	.04	0	.17
31		------			------		------	5.0	------	.04	.02	------
TOTAL	0	0	0	0	0	0	1,787.38	864.7	183.40	.45	7.55	1.25
MEAN	0	0	0	0	0	0	59.6	27.9	6.11	.015	.24	.042
MAX	0	0	0	0	0	0	470	287	60	.08	1.3	.17
MIN	0	0	0	0	0	0	0	1.2	0	0	0	0
AC-FT	0	0	0	0	0	0	3,550	1,720	364	.9	15	2.5

CAL YR 1969 TOTAL 2,240.92 MEAN 6.14 MAX 185 MIN 0 ACFT 4,440
WAT YR 1970 TOTAL 2,844.73 MEAN 7.79 MAX 470 MIN 0 ACFT 5,640

PEAK DISCHARGE (BASE, 350 CFS)

DATE	TIME	G.H.	DISCHARGE
4-24	2330	9.85	594
5-14	2330	9.25	471

06436800 Horse Creek near Vale, S. Dak.

LOCATION.--Lat 44°39'30", long 103°20'17", in SE¼NW¼ sec.13, T.8 N., R.6 E., Butte County, on right bank 600 ft downstream from Dry Creek, 2.9 miles upstream from mouth, and 4.0 miles northeast of Vale.

DRAINAGE AREA.--530 sq mi, approximately.

PERIOD OF RECORD.--April 1962 to current year.

GAGE.--Water-stage recorder. Datum of gage is 2,688.96 ft above mean sea level.

AVERAGE DISCHARGE.--8 years, 52.0 cfs (37,670 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 691 cfs May 15 (gage height, 7.06 ft); minimum daily, 0.2 cfs Jan. 17, 18.
Period of record: Maximum discharge, 2,380 cfs May 26, 1965 (gage height, 10.84 ft); minimum daily, 0.2 cfs May 7-9, 1962, Jan. 17, 18, 1970.

REMARKS.--Records good except those for winter periods, which are poor. Natural flow of stream affected by diversions for irrigation above station and by return flow from Belle Fourche Irrigation Project. Records of chemical analyses and water temperatures for the water year 1970 are published in Part 2 of this report.

Rating table (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Oct. 27 to Nov. 12, Nov. 16-22, May 12 to June 13, June 26 to July 2, Aug. 2-10; stage-discharge relation affected by ice Nov. 13-15, Nov. 23 to Mar. 23)

3.2	4.9	4.3	91
3.3	7.7	5.0	185
3.5	16	6.0	381
3.8	38	7.0	634

DISCHARGE IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	83	6.0	4.0	.80	3.8	4.0	6.0	34	43	21	109	107
2	79	5.7	4.0	.60	3.5	4.5	6.0	28	37	26	113	110
3	72	5.7	3.8	.90	4.0	4.4	5.5	23	35	37	108	108
4	54	5.5	3.8	.60	4.9	4.5	5.5	23	37	44	105	99
5	34	5.2	4.0	.50	5.0	5.0	5.5	20	57	61	100	99
6	24	5.2	3.8	.50	5.0	5.5	5.7	17	72	76	103	89
7	20	5.2	3.5	.40	5.0	6.0	6.9	20	52	70	143	91
8	18	5.2	3.2	.30	5.0	6.0	4.9	29	43	77	140	87
9	17	4.4	3.0	.30	6.0	5.0	4.0	59	22	85	120	89
10	15	4.2	3.0	1.0	6.0	4.0	3.3	28	24	92	117	87
11	12	4.2	3.2	.70	5.5	3.5	8.8	98	52	96	109	70
12	11	4.2	3.5	.50	5.0	3.2	21	176	65	89	107	59
13	11	4.0	3.8	.40	4.0	3.5	18	78	85	89	89	64
14	11	3.8	3.8	.40	4.0	3.5	25	108	61	42	89	66
15	11	4.0	3.6	.40	4.5	3.5	70	476	70	57	89	68
16	10	4.4	3.7	.30	5.0	4.0	54	310	79	91	94	53
17	10	4.7	3.8	.20	5.5	4.2	37	148	77	100	107	46
18	9.9	4.4	3.6	.20	4.5	4.0	30	84	58	113	105	40
19	9.2	4.4	3.5	.30	4.0	3.5	26	54	58	105	104	39
20	9.2	4.4	3.6	.30	4.5	4.0	30	41	60	108	103	36
21	8.4	4.4	3.6	.50	5.0	8.0	32	33	55	120	101	33
22	8.1	4.4	3.6	1.0	5.0	12	54	26	50	117	103	30
23	7.7	4.2	3.5	2.0	5.5	20	108	25	33	151	113	33
24	7.4	4.0	3.6	3.0	5.0	24	388	22	30	196	118	30
25	7.4	3.8	3.5	3.5	5.0	28	495	20	30	173	114	30
26	7.1	3.6	3.0	3.6	5.0	17	399	19	26	180	113	34
27	6.9	3.4	2.5	4.0	4.5	16	223	17	20	178	99	41
28	6.9	3.4	2.0	3.6	4.0	13	104	15	19	174	104	48
29	6.6	3.4	1.5	3.5	------	11	65	15	19	166	101	51
30	6.3	3.6	1.0	3.8	------	8.4	44	30	18	116	99	46
31	6.3	------	1.0	4.0	------	7.4	------	46	------	105	101	------
TOTAL	599.4	133.0	101.0	42.10	133.7	250.6	2,285.1	2,122	1,387	3,155	3,320	1,883
MEAN	19.3	4.43	3.26	1.36	4.78	8.08	76.2	68.5	46.2	102	107	62.8
MAX	83	6.0	4.0	4.0	6.0	28	495	476	85	196	143	110
MIN	6.3	3.4	1.0	.20	3.5	3.2	3.3	15	18	21	89	30
AC-FT	1,190	264	200	84	265	497	4,530	4,210	2,750	6,260	6,590	3,730

CAL YR 1969 TOTAL 15,405.50 MEAN 42.2 MAX 299 MIN 1.0 ACFT 30,560
WAT YR 1970 TOTAL 15,411.90 MEAN 42.2 MAX 495 MIN .20 ACFT 30,570

PEAK DISCHARGE (BASE, 400 CFS)

DATE	TIME	G.H.	DISCHARGE
4-25	1830	6.75	575
5-15	0930	7.06	691

06437000 Belle Fourche River near Sturgis, S. Dak.

LOCATION.--Lat 44°30'47", long 103°08'11", in SE¼NW¼ sec.3, T.6 N., R.8 E., Meade County, near right bank on downstream side of bridge on State Highway 34, 0.5 mile upstream from Bear Butte Creek, and 20 miles northeast of Sturgis.

DRAINAGE AREA.--5,870 sq mi, approximately.

PERIOD OF RECORD.--October 1945 to current year. Monthly discharge only for some periods, published in WSP 1309.

GAGE.--Water-stage recorder. Datum of gage is 2,526.13 ft above mean sea level. Prior to Oct. 31, 1946, nonrecording gage at same site and datum.

AVERAGE DISCHARGE.--25 years, 246 cfs (178,200 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 4,600 cfs May 15 (gage height, 8.87 ft); minimum daily, 6.0 cfs Jan. 18.
Period of record: Maximum discharge, 17,900 cfs May 24, 1946 (gage height, 13.86 ft), from rating curve extended above 11,000 cfs; no flow for many days in 1945, 1950, and Aug. 9, 1961.

REMARKS.--Records good except those for winter periods, which are poor. At a point 75 miles above station, water is diverted to Belle Fourche Reservoir (see sta 6-4350), through Inlet Canal (see sta 6-4345), with other small diversions from the main stem and tributaries for irrigation. Total diversion for irrigation of about 60,000 acres above station. Records of chemical analyses and water temperatures for the water year 1970 are published in Part 2 of this report.

Rating table (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Oct. 10-22, Apr. 5-24, May 22 to July 1;
stage-discharge relation affected by ice Nov. 13-20, Nov. 23 to Mar. 27)

2.9	27	5.0	795
3.1	62	6.5	1,790
3.5	173	8.0	3,230
4.0	340	9.0	4,700

DISCHARGE IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	268	44	45	14	8.0	24	58	251	1,530	228	316	336
2	271	46	43	13	7.0	25	78	212	1,730	208	330	336
3	248	48	40	15	8.0	24	54	202	1,150	202	344	322
4	202	56	40	13	9.0	24	50	225	1,010	215	340	312
5	149	50	38	12	10	25	48	254	795	264	308	312
6	118	50	38	12	11	28	50	305	779	285	326	295
7	107	52	36	11	11	32	60	390	696	274	394	305
8	104	54	34	11	12	32	70	439	651	278	482	312
9	107	48	33	11	15	30	65	671	525	285	414	288
10	152	46	32	14	14	27	56	598	348	278	414	305
11	164	48	35	13	12	25	96	869	326	264	398	298
12	158	46	40	12	10	26	231	1,300	644	278	351	268
13	110	43	44	11	10	26	254	1,320	2,400	278	308	288
14	80	42	45	11	15	25	225	2,040	2,860	228	330	302
15	82	45	45	11	25	25	241	4,190	2,050	212	319	316
16	93	45	45	10	29	30	251	2,590	1,490	305	326	285
17	78	44	45	8.0	32	40	222	2,010	1,230	316	359	248
18	54	43	44	6.0	28	50	200	1,920	1,060	336	351	241
19	48	43	40	7.0	25	60	160	1,570	894	322	319	225
20	54	45	41	7.0	26	60	146	1,380	795	322	330	205
21	62	48	41	8.0	28	60	167	1,230	732	363	348	195
22	44	65	38	9.0	29	60	275	1,130	701	370	344	179
23	36	65	33	10	30	60	534	1,020	646	394	359	167
24	38	33	34	10	28	75	1,740	971	561	521	363	146
25	46	26	32	9.0	28	95	1,360	888	521	503	378	183
26	45	26	25	8.0	28	110	1,080	812	469	464	340	228
27	44	26	20	9.0	27	110	742	661	312	443	333	228
28	46	30	15	8.0	25	104	521	556	251	443	319	235
29	52	35	10	7.0	------	88	426	593	228	426	322	245
30	50	40	12	8.0	------	75	326	646	248	359	319	225
31	48	------	14	9.0	------	72	------	1,030	------	322	319	------
TOTAL	3,158	1,332	1,077	317.0	540.0	1,547	9,786	32,273	27,632	9,986	10,803	7,830
MEAN	102	44.4	34.7	10.2	19.3	49.9	326	1,041	921	322	348	261
MAX	271	65	45	15	32	110	1,740	4,190	2,860	521	482	336
MIN	36	26	10	6.0	7.0	24	48	202	228	202	308	146
AC-FT	6,260	2,640	2,140	629	1,070	3,070	19,410	64,010	54,810	19,810	21,430	15,530

CAL YR 1969 TOTAL 83,237.5 MEAN 228 MAX 2,940 MIN 6.0 ACFT 165,100
WAT YR 1970 TOTAL 106,281.0 MEAN 291 MAX 4,190 MIN 6.0 ACFT 210,800

PEAK DISCHARGE (BASE, 1,500 CFS)

DATE	TIME	G.H.	DISCHARGE	DATE	TIME	G.H.	DISCHARGE
4-24	1300	7.26	2,420	6- 2	0600	6.67	2,040
5-12	0230	6.63	1,950	6-14	0400	7.93	3,320
5-15	0730	8.87	4,600				

06437500 Bear Butte Creek near Sturgis, S. Dak.

LOCATION.--Lat 44°28'53", long 103°16'31", in NW¼SE¼ sec.16, T.6 N., R.7 E., Meade County, on left bank 0.8 mile downstream from Spring Creek, 12.5 miles northeast of Sturgis, and 13.4 miles upstream from mouth.

DRAINAGE AREA.--192 sq mi.

PERIOD OF RECORD.--November 1945 to current year. Records for water year 1946 incomplete, yearly estimate published in WSP 1309.

GAGE.--Water-stage recorder. Datum of gage is 2,779.91 ft above mean sea level. Prior to June 24, 1962, nonrecording and crest-stage gage at site 1 mile downstream at datum 11.79 ft lower.

AVERAGE DISCHARGE.--25 years, 12.2 cfs (8,840 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 332 cfs May 15 (gage height, 7.02 ft); no flow for many days in August and September.

Period of record: Maximum discharge, 12,700 cfs June 16, 1962 (gage height, 12.45 ft, from floodmarks, site and datum then in use, 12.63 ft, from floodmarks, present site and datum), from rating curve extended above 2,400 cfs on basis of contracted-opening and flow-over-road measurement of peak flow; no flow for many days in each year.

Flood of May 20, 1883 (maximum known), and one in 1909 were greater than flood of June 16, 1962, from information by local residents.

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

REVISIONS(WATER YEARS).--WSP 1917: 1946-47, 1949(M), 1951(M).

DISCHARGE IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.60	1.1	.70	.90	.90	.90	3.0	47	87	12	.76	0
2	.60	.85	.70	.90	.75	.90	3.3	43	76	11	.51	0
3	.51	.76	.60	1.0	.85	.90	3.2	41	72	9.8	.26	0
4	.34	.68	.65	.90	1.0	.90	3.5	53	68	8.9	0	0
5	.68	.60	.60	.90	.85	.90	4.0	75	66	8.7	.17	0
6	1.1	.60	.60	.80	.75	1.0	4.9	99	65	8.4	.26	0
7	1.3	.68	.50	.80	.80	1.0	4.7	127	68	7.6	.85	0
8	1.3	1.4	.45	.80	.80	1.0	4.4	141	82	6.5	.42	0
9	1.9	1.9	.40	.60	.90	.90	4.0	181	107	6.7	0	0
10	2.2	2.2	.45	.80	.90	.90	3.5	161	142	6.0	0	0
11	2.3	2.5	.60	1.0	.85	.90	5.5	148	172	5.1	0	.08
12	2.2	2.5	.70	.90	.70	.80	10	150	179	5.3	0	.08
13	1.9	2.3	.80	.80	.60	.85	13	133	148	5.3	0	.34
14	1.3	2.2	.90	.80	.70	.85	9.8	167	132	4.7	.26	.34
15	1.1	2.4	1.0	.60	.75	.85	8.9	220	122	4.0	.34	.42
16	1.3	2.4	1.1	.40	.75	.90	8.9	131	107	3.5	.51	.42
17	1.3	2.2	1.0	.20	.80	.90	9.5	114	93	3.3	.34	.42
18	1.1	2.0	.70	.10	.75	.90	11	110	70	3.2	.34	.42
19	1.0	2.0	.55	.40	.75	.90	11	103	56	3.3	.17	.42
20	1.3	2.3	.60	.60	.75	.90	8.4	94	50	2.3	.34	.42
21	1.4	2.4	.70	.70	.80	1.0	6.7	83	47	2.0	.26	.42
22	1.4	1.8	.80	.80	.75	1.3	8.1	73	36	2.3	.34	.42
23	1.1	.70	.70	.90	.85	1.6	27	67	28	2.6	.26	.42
24	1.4	.80	.75	.90	.90	2.5	92	57	24	2.3	.08	.42
25	1.3	.70	.70	1.0	.90	3.0	147	53	21	1.7	.08	.42
26	1.1	.10	.60	.90	1.0	2.5	122	48	19	3.0	0	.42
27	1.0	.20	.55	.90	1.0	2.5	87	43	17	2.5	0	.42
28	.76	.20	.50	.80	.90	3.0	77	39	15	1.6	0	.42
29	1.0	.30	.40	.70	------	3.0	64	37	14	1.4	0	.42
30	1.0	.50	.70	.80	------	3.0	51	36	13	1.0	0	.42
31	1.0	------	1.0	.90	------	3.0	------	36	------	.85	0	------
TOTAL	37.79	41.27	21.00	23.50	23.00	44.45	816.3	2,910	2,196	146.85	6.55	7.56
MEAN	1.22	1.38	.68	.76	.82	1.43	27.2	93.9	73.2	4.74	.21	.25
MAX	2.3	2.5	1.1	1.0	1.0	3.0	147	220	179	12	.85	.42
MIN	.34	.10	.40	.10	.60	.80	3.0	36	13	.85	0	0
AC-FT	75	82	42	47	46	88	1,620	5,770	4,360	291	13	15

CAL YR 1969 TOTAL 3,610.80 MEAN 9.89 MAX 393 MIN 0 ACFT 7,160
WAT YR 1970 TOTAL 6,274.27 MEAN 17.2 MAX 220 MIN 0 ACFT 12,450

PEAK DISCHARGE (BASE, 200 CFS)

DATE	TIME	G.H.	DISCHARGE
4-25	0900	6.41	220
5-15	0200	7.02	332
6-12	0300	6.06	200

06438000 Belle Fourche River near Elm Springs, S. Dak.

LOCATION.--Lat 44°22'11", long 102°33'56", in NE¼NE¼ sec.29, T.5 N., R.13 E., Meade County, on right bank 10 ft downstream from highway bridge, 4.3 miles northwest of Elm Springs, and 4.7 miles downstream from Hay Creek.

DRAINAGE AREA.--7,210 sq mi, approximately.

PERIOD OF RECORD.--August 1928 to June 1932, March 1934 to current year. Monthly discharge only for some periods, published in WSP 1309.

GAGE.--Water-stage recorder. Datum of gage is 2,171.60 ft above mean sea level. Prior to July 27, 1939, nonrecording gage at same site and datum.

AVERAGE DISCHARGE.--39 years (1928-31, 1934-70), 352 cfs (255,000 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 5,960 cfs May 15 (gage height, 6.53 ft); maximum gage height, 6.60 ft Apr. 25; minimum daily discharge, 5.0 cfs Jan. 17-19.
Period of record: Maximum discharge, 45,100 cfs June 8, 1964 (gage height, 15.90 ft), from rating curve extended above 23,000 cfs; no flow for many days in 1936-37, 1939-40, 1961-62.
Maximum stage known, 21.8 ft in May 1927. Flood in spring of 1933 reached a stage of about 20 ft, from floodmarks.

REMARKS.--Records good except those for winter periods, which are poor. At a point 130 miles above station, water is diverted to Belle Fourche Reservoir (see sta 6-4350), through Inlet Canal near Belle Fourche (see sta 6-4345), with other smaller diversions from the main stem and tributaries for irrigation. Total diversion for irrigation of about 60,000 acres above station. Records of chemical analyses and water temperatures for the water year 1970 are published in Part 2 of this report.

REVISIONS(WATER YEARS).--WSP 786: Drainage area: WSP 926: 1929, 1931(M), 1935, 1937.

DISCHARGE IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	243	59	70	14	8.0	30	76	497	1,450	240	291	312
2	251	59	65	13	7.0	30	67	391	1,830	215	296	322
3	260	58	55	15	7.0	30	69	327	1,480	193	301	333
4	238	56	50	13	8.0	30	72	291	1,170	184	317	322
5	207	58	48	12	9.0	32	61	301	952	189	312	307
6	145	58	44	12	10	35	59	338	808	245	296	301
7	115	58	35	12	11	40	59	424	763	270	312	317
8	93	58	30	11	12	45	61	560	702	260	369	307
9	90	58	28	10	15	48	67	684	648	255	430	317
10	88	58	28	11	20	50	78	861	526	255	391	301
11	157	56	30	11	19	45	78	847	408	260	391	312
12	169	56	32	9.0	17	45	374	1,660	418	250	374	312
13	199	55	35	8.5	15	45	666	1,430	1,230	255	343	286
14	157	50	35	8.0	20	46	535	1,820	3,360	255	307	307
15	112	45	35	7.0	25	46	424	5,080	2,520	211	312	317
16	99	50	35	6.0	30	50	480	4,340	1,810	180	317	317
17	115	50	35	5.0	35	55	693	2,380	1,410	275	307	291
18	99	45	32	5.0	33	55	544	2,270	1,160	286	333	250
19	85	45	30	5.0	32	60	360	1,930	1,000	296	338	240
20	81	50	30	6.0	33	70	328	1,710	861	296	312	215
21	76	55	30	7.0	34	58	351	1,530	782	296	307	193
22	72	55	30	7.5	34	58	820	1,380	702	327	333	175
23	72	55	30	8.0	35	59	2,840	1,270	690	348	333	171
24	67	55	32	7.5	34	74	5,310	1,170	630	380	343	159
25	67	55	30	7.5	34	96	3,840	1,070	554	503	348	148
26	65	50	25	7.5	35	106	2,640	966	514	469	359	152
27	61	50	20	8.0	34	112	1,700	889	463	435	333	211
28	59	55	15	7.0	32	93	1,170	708	322	418	312	211
29	61	60	14	7.0	------	85	847	666	265	430	312	211
30	61	70	14	7.0	------	88	654	684	230	374	307	220
31	63	------	15	8.0	------	81	------	1,070	------	327	312	------
TOTAL	3,727	1,642	1,037	275.5	638.0	1,797	25,323	39,544	29,658	9,177	10,248	7,837
MEAN	120	54.7	33.5	8.89	22.8	58.0	844	1,276	989	296	331	261
MAX	260	70	70	15	35	112	5,310	5,080	3,360	503	430	333
MIN	59	45	14	5.0	7.0	30	59	291	230	180	291	148
AC-FT	7,390	3,260	2,060	546	1,270	3,560	50,230	78,440	58,830	18,200	20,330	15,540

CAL YR 1969 TOTAL 92,079.0 MEAN 252 MAX 3,220 MIN 1.0 ACFT 182,600
WAT YR 1970 TOTAL 130,903.5 MEAN 359 MAX 5,310 MIN 5.0 ACFT 259,600

PEAK DISCHARGE (BASE, 3,500 CFS)

DATE	TIME	G.H.	DISCHARGE	DATE	TIME	G.H.	DISCHARGE
4-25	0100	6.60	5,860	6-14	1800	5.29	3,620
5-15	2000	6.53	5,960				

06438500 Cheyenne River near Plainview, S. Dak.

LOCATION.--Lat 44°31'16", long 101°59'34", in NE¼SW¼ sec.31, T.7 N., R.18 E., Ziebach County, near left bank at downstream side of highway bridge, 1.0 mile downstream from Ash Creek, and 10 miles southeast of Plainview.

DRAINAGE AREA.--21,600 sq mi, approximately.

PERIOD OF RECORD.--October 1950 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,877.65 ft above mean sea level. Prior to Mar. 22, 1951, nonrecording gage at same site and datum.

AVERAGE DISCHARGE.--20 years, 585 cfs (423,800 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 15,500 cfs Apr. 25 (gage height, 9.05 ft); minimum daily, 45 cfs Jan. 19.

Period of record: Maximum discharge, 41,700 cfs May 26, 1957, from rating curve extended above 18,000 cfs; maximum gage height, 11.68 ft May 26, 1965; no flow Dec. 14, 19-21, 1961.

Maximum stage known, about 17.5 ft late in May 1920, from information by local residents. Flood in May 1927 reached a stage of about 14 ft, from information by local residents.

REMARKS.--Records good except those for winter periods, which are poor. Flow affected by storage reservoirs, diversions for irrigation of about 70,000 acres, and return flow from irrigated areas.

Rating tables (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Mar. 24-31, Apr. 22 to May 10; stage-discharge relation affected by ice Nov. 13-18, Nov. 28 to Mar. 23)

Oct. 1 to July 10				July 11 to Sept. 30	
3.3	93	6.0	2,930	4.0	265
3.5	150	7.0	4,780	4.3	448
4.0	373	8.0	7,740	4.6	690
4.5	785	9.0	12,600		
5.0	1,410				

DISCHARGE IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	310	214	150	110	120	300	286	2,150	1,720	373	344	326
2	331	214	140	120	110	300	258	1,660	2,010	346	344	320
3	379	210	120	130	100	250	245	1,300	2,230	336	326	344
4	391	206	100	110	110	200	240	979	1,690	320	332	369
5	357	219	100	100	110	180	240	796	1,510	315	336	369
6	357	182	90	90	110	150	227	690	1,170	315	332	357
7	331	182	75	80	110	140	219	670	955	315	338	363
8	267	182	80	70	120	130	206	800	851	320	338	357
9	236	174	80	60	130	120	210	1,060	722	315	369	357
10	219	171	90	60	130	110	227	1,380	632	309	381	350
11	210	185	100	70	120	100	249	1,510	544	309	357	350
12	262	210	110	70	110	110	325	1,690	475	309	350	338
13	291	200	130	65	100	130	845	2,310	1,600	304	344	338
14	310	190	140	65	110	140	1,240	2,150	3,380	449	344	344
15	296	190	150	65	120	150	1,470	3,250	3,500	506	320	676
16	346	180	160	60	150	160	1,150	4,470	2,960	357	332	623
17	310	170	160	55	200	180	2,050	3,380	2,450	309	320	421
18	315	150	150	50	190	200	2,640	2,770	2,120	350	314	369
19	281	115	140	45	190	230	1,690	2,610	1,880	350	314	357
20	245	157	130	50	200	250	1,120	2,270	1,630	363	320	350
21	227	178	140	60	250	300	1,140	2,020	1,450	357	314	332
22	219	240	140	70	300	350	2,160	1,820	1,300	357	314	320
23	210	253	140	80	350	400	4,100	1,770	1,140	394	326	309
24	214	286	150	90	400	427	7,670	1,660	1,030	394	326	304
25	202	214	140	100	450	397	11,000	1,470	873	428	357	304
26	198	189	130	110	500	397	11,000	1,310	732	537	363	287
27	193	168	120	120	400	373	8,680	1,100	630	477	375	292
28	198	170	110	120	350	315	6,200	943	600	435	344	326
29	202	170	110	110	------	310	4,310	774	550	388	344	320
30	210	150	110	120	------	305	2,940	774	400	375	332	320
31	219	------	110	120	------	325	------	1,220	------	344	344	------
TOTAL	8,336	5,719	3,795	2,625	5,640	7,429	74,337	52,756	42,734	11,356	10,496	10,792
MEAN	269	191	122	84.7	201	240	2,478	1,702	1,424	366	339	360
MAX	391	286	160	130	500	427	11,000	4,470	3,500	537	381	676
MIN	193	115	75	45	100	100	206	670	400	304	314	287
AC-FT	16,530	11,340	7,530	5,210	11,190	14,740	147,400	104,600	84,760	22,520	20,820	21,410

CAL YR 1969 TOTAL 191,183 MEAN 524 MAX 6,110 MIN 25 ACFT 379,200
WAT YR 1970 TOTAL 236,015 MEAN 647 MAX 11,000 MIN 45 ACFT 468,100

PEAK DISCHARGE (BASE, 5,300 CFS)

DATE	TIME	G.H.	DISCHARGE
4-25	1500	9.05	15,500

06439000 Cherry Creek near Plainview, S. Dak.

LOCATION.--Lat 44°44'38", long 102°03'11", in SW¼NE¼ sec.16, T.9 N., R.17 E., Meade County, on left bank 5 ft downstream from bridge on State Highway 73, 0.2 mile downstream from small right-bank tributary, 6.2 miles downstream from Red Owl Creek, and 11 miles northeast of Plainview.

DRAINAGE AREA.--1,190 sq mi, approximately.

PERIOD OF RECORD.--October 1945 to current year. Monthly discharge only for October and November 1945, published in WSP 1309.

GAGE.--Water-stage recorder. Datum of gage is 2,158.06 ft above mean sea level. Prior to June 8, 1948, nonrecording gage at same site and datum.

AVERAGE DISCHARGE.--25 years, 46.1 cfs (33,400 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 1,130 cfs Apr. 26 (gage height, 9.13 ft); no flow for several months.
Period of record: Maximum discharge, 17,500 cfs Apr. 1, 1952 (gage height, 22.63 ft); no flow for long periods in each year.

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

DISCHARGE IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1							0	259	11			
2							0	153	16			
3							0	72	23			
4							0	50	21			
5							0	38	23			
6							0	29	19			
7							0	31	15			
8							0	44	14			
9							0	26	12			
10							0	21	11			
11							0	367	9.8			
12							0	553	11			
13							0	310	10			
14							0	530	49			
15							0	300	31			
16							0	156	11			
17							0	203	10			
18							0	150	9.0			
19							0	86	7.8			
20							9.5	64	6.8			
21							9.3	50	5.4			
22							3.4	41	4.2			
23							33	33	3.2			
24							229	27	2.2			
25							693	20	1.4			
26							996	17	1.1			
27							960	15	.72			
28							612	13	.32			
29					------		319	12	.03			
30					------		190	11	0			
31		------			------		------	10	------			------
TOTAL	0	0	0	0	0	0	4,054.2	3,691	338.97	0	0	0
MEAN	0	0	0	0	0	0	135	119	11.3	0	0	0
MAX	0	0	0	0	0	0	996	553	49	0	0	0
MIN	0	0	0	0	0	0	0	10	0	0	0	0
AC-FT	0	0	0	0	0	0	8,040	7,320	672	0	0	0

CAL YR 1969 TOTAL 13,918.10 MEAN 38.1 MAX 1,250 MIN 0 ACFT 27,610
WAT YR 1970 TOTAL 8,084.17 MEAN 22.1 MAX 996 MIN 0 ACFT 16,030

PEAK DISCHARGE (BASE, 1,000 CFS)

DATE	TIME	G.H.	DISCHARGE
4-26	0300	9.13	1,130

06439300 Cheyenne River at Cherry Creek, S. Dak.

LOCATION.--Lat 44°36'10", long 101°29'24", in NE¼NW¼ sec.5, T.7 N., R.22 E., Ziebach County, on left bank 0.5 mile east of village of Cherry Creek, 0.5 mile downstream from Cherry Creek, and 1.7 miles upstream from Plum Creek.

DRAINAGE AREA.--23,900 sq mi, approximately.

PERIOD OF RECORD.--August 1960 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,699.29 ft above mean sea level. Prior to Oct. 17, 1960, nonrecording gage at present site and datum.

AVERAGE DISCHARGE.--10 years, 834 cfs (604,200 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 18,600 cfs Apr. 26 (gage height, 10.40 ft); minimum daily, 50 cfs Jan. 19.
Period of record: Maximum discharge, 43,800 cfs June 16, 1967 (gage height, 14.75 ft); no flow Jan. 6 to Feb. 2, 1962.

REMARKS.--Records good except those for winter periods, which are poor. Flow affected by storage reservoirs and diversions for irrigation of about 70,000 acres above station.

DISCHARGE IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	302	218	165	105	170	300	338	1,800	1,400	428	440	330
2	316	213	160	110	160	250	291	1,320	1,970	391	368	334
3	330	216	150	120	150	220	268	1,100	2,400	368	330	338
4	403	211	130	90	160	180	248	870	1,880	334	323	364
5	391	205	110	70	160	150	236	740	1,560	294	330	372
6	360	216	95	65	160	135	230	652	1,380	271	334	376
7	379	213	85	60	160	120	213	624	1,190	264	326	395
8	323	213	75	55	170	110	200	652	1,110	291	316	376
9	274	211	75	55	180	100	190	820	1,040	308	341	338
10	245	205	80	70	180	95	192	924	996	298	449	395
11	233	200	90	75	160	95	205	1,190	930	319	461	356
12	233	208	100	80	150	110	288	1,310	837	334	428	330
13	281	185	115	80	130	120	345	2,680	804	308	416	334
14	308	185	125	75	150	130	859	2,280	3,710	298	379	372
15	316	185	140	75	180	140	1,040	3,220	4,380	494	345	376
16	326	190	150	70	210	160	1,070	6,940	3,470	440	308	751
17	338	185	160	65	230	180	826	5,270	2,430	305	323	545
18	323	150	160	60	210	200	2,790	3,180	1,940	291	308	461
19	326	150	145	50	230	240	1,460	3,070	1,680	312	308	391
20	277	170	145	55	250	270	900	2,460	1,520	312	323	368
21	242	190	150	60	300	300	876	2,110	1,360	323	316	349
22	233	240	150	65	350	350	1,190	1,850	1,240	305	294	326
23	224	230	155	75	400	400	3,200	1,730	1,120	341	308	302
24	216	233	160	80	450	450	6,940	1,680	1,040	383	330	294
25	218	213	160	90	480	474	13,300	1,500	954	391	330	284
26	213	175	140	100	525	436	15,300	1,370	854	457	349	274
27	216	140	120	110	450	436	13,100	1,270	804	497	349	261
28	216	120	105	125	380	391	9,510	1,190	725	482	345	281
29	211	158	100	150	------	376	6,060	1,080	609	461	326	312
30	211	170	105	175	------	349	3,030	1,090	491	449	319	316
31	213	------	105	175	------	345	------	954	------	432	319	------
TOTAL	8,697	5,798	3,905	2,690	6,885	7,612	84,695	56,926	45,824	11,181	10,741	10,901
MEAN	281	193	126	86.8	246	246	2,823	1,836	1,527	361	346	363
MAX	403	240	165	175	525	474	15,300	6,940	4,380	497	461	751
MIN	211	120	75	50	130	95	190	624	491	264	294	261
AC-FT	17,250	11,500	7,750	5,340	13,660	15,100	168,000	112,900	90,890	22,180	21,300	21,620

CAL YR 1969 TOTAL 225,537 MEAN 618 MAX 8,940 MIN 30 ACFT 447,400
WAT YR 1970 TOTAL 255,855 MEAN 701 MAX 15,300 MIN 50 ACFT 507,500

PEAK DISCHARGE (BASE, 5,500 CFS)

DATE	TIME	G.H.	DISCHARGE
4-26	0030	10.40	18,600
5-16	1300	6.72	7,280
6-14	0600	6.32	6,440

06439980 Lake Oahe near Pierre, S. Dak.

LOCATION.--Lat 44°27'30", long 100°23'29", in NE¼ sec.1, T.111 N., R.80 W., 5th principal meridian, Hughes County, in Pier A of Control Tower No. 1 of powerhouse intake structure of dam on Missouri River, 6 miles northwest of Pierre, 7.1 miles upstream from Bad River, and at mile 1,072.3.

DRAINAGE AREA.--243,500 sq mi, approximately.

PERIOD OF RECORD.--August 1958 to current year. Prior to October 1967, published as Oahe Reservoir near Pierre.

GAGE.--Water-stage recorder. Datum of gage is at mean sea level. Prior to Jan. 14, 1959, nonrecording gages at various locations upstream from outlet works, Jan. 14, 1959, to Sept. 30, 1962, recorder in Tower No. 1 of outlet works, all at same datum.

EXTREMES.--Current year: Maximum contents, 21,264,000 acre-ft June 23 (elevation, 1,613.5 ft, affected by wind); minimum, 18,619,000 acre-ft Sept. 30 (elevation, 1,605.1 ft, affected by wind).
Period of record: Maximum contents, 22,138,000 acre-ft May 20, 1969 (elevation, 1,615.8 ft, affected by wind); minimum since initial filling, 16,984,000 acre-ft Sept. 24, 26, 1967 (elevation, 1,599.2 ft).

REMARKS.--Reservoir is formed by an earthfill dam; storage began in August 1958. Maximum capacity, 23,630,000 acre-ft below elevation 1,620.0 ft (top of spillway gates). Normal maximum, 22,530,000 acre-ft below 1,617.0 ft, of which about 2,390,000 acre-ft is designated for flood control. Inactive storage, 5,538,000 acre-ft below elevation 1,540.0 ft. Dead storage, 2,000 acre-ft below elevation 1,425.0 ft (invert of lowest outlet tunnel). Figures given herein represent elevations at powerhouse intake structure and total contents adjusted for wind effect.
The spillway consists of a gated chute with flat crest at elevation 1,596.5 ft, 8 gates, 50 by 23.5 ft each; design capacity, 300,000 cfs. The outlet works consist of 7 turbines with a generating capacity of 85,000 kilowatts each. Water is used for flood control, navigation, power, and incidental uses.

COOPERATION.--Elevation and contents furnished by Corps of Engineers.

MONTHEND ELEVATION AND CONTENTS AT 2400, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

Date	Elevation (feet)	Contents (acre-feet)	Change in contents (acre-feet)
Sept.30	1,607.6	19,307,000	-
Oct. 31	1,606.2	18,942,000	-365,000
Nov. 30	1,606.7	19,072,000	+130,000
Dec. 31	1,607.9	19,461,000	+389,000
CAL YR 1969	-	-	+960,000
Jan. 31	1,606.5	19,022,000	-439,000
Feb. 28	1,607.6	19,368,000	+346,000
Mar. 31	1,605.7	18,770,000	-598,000
Apr. 30	1,608.7	19,725,000	+955,000
May 31	1,612.5	20,953,000	+1,228,000
June 30	1,612.8	21,020,000	+67,000
July 31	1,610.0	20,139,000	-881,000
Aug. 31	1,607.5	19,352,000	-787,000
Sept.30	1,605.1	18,619,000	-733,000
WTR YR 1970	-	-	-688,000

06441000 Bad River near Midland, S. Dak.

LOCATION.--Lat 44°04'06", long 101°09'35", in SE¼SW¼ sec.6, T.1 N., R.25 E., Haakon County, on right bank 30 ft upstream from bridge on State Highway 63, 0.3 mile southwest of Midland, 2.0 miles upstream from Mitchell Creek, and 3.7 miles upstream from Ash Creek.

DRAINAGE AREA.--1,460 sq mi, approximately.

PERIOD OF RECORD.--October 1945 to current year. Prior to February 1946 monthly discharge only, published in WSP 1309.

GAGE.--Water-stage recorder. Datum of gage is 1,849.14 ft above mean sea level. Prior to Feb. 21, 1961, nonrecording gage, and Feb. 21, 1961, to June 14, 1967, water-stage recorder at site 4.2 miles downstream at datum 15.72 ft lower. June 15 to July 26, 1967, nonrecording gage at present site and datum.

AVERAGE DISCHARGE.--25 years, 70.9 cfs (51,370 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 2,680 cfs Apr. 25 (gage height, 13.14 ft); no flow for many days. Period of record: Maximum discharge, 29,400 cfs June 15, 1967 (gage height, 24.44 ft, from floodmarks, 20.10 ft, from floodmarks, at former site and datum), from rating curve extended above 16,000 cfs; no flow for many days in each year.

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

Rating table (gage height, in feet, and discharge, in cubic feet per second)
(Stage-discharge relation affected by ice Jan. 1-23; shifting-control method used Mar. 17 to Apr. 21, July 12-30)

3.66	0	5.0	98
3.7	.11	5.5	169
3.8	.82	6.0	263
3.9	2.3	7.0	508
4.0	5.1	9.0	1,150
4.2	15	11.0	1,840
4.5	39	13.0	2,620

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.07	.11	.07	1.2	4.1	15	5.1	244	3.3	.63		
2	.04	.07	.72	1.0	4.4	11	7.6	160	3.0	.47		
3	0	.11	.72	.90	5.1	9.0	7.1	108	24	.40		
4	.11	.16	.72	.80	5.1	7.1	6.6	76	13	.33		
5	.11	.11	.82	.70	3.8	6.6	6.6	56	7.1	.27		
6	.07	.11	.82	.50	3.3	6.1	5.1	43	4.1	.33		
7	.04	.07	.93	.40	2.8	6.1	5.1	34	3.2	.21		
8	.04	.11	.93	.30	2.8	6.1	3.8	27	2.8	.16		
9	.07	.16	.93	.20	2.5	4.4	3.3	24	1.8	.16		
10	.11	.07	.93	.10	3.0	5.1	3.0	20	2.1	.11		
11	.11	.11	.93	.08	3.3	5.6	2.8	19	2.3	.07		
12	.07	.16	.82	.06	2.8	5.1	6.6	16	2.8	74		
13	.07	.21	.82	.04	2.8	6.1	9.5	15	3.0	35		
14	.04	.21	.82	.03	2.5	5.6	9.0	19	3.5	19		
15	.04	.16	1.2	.03	2.5	5.6	13	17	74	9.5		
16	.04	.11	1.2	.02	2.5	6.1	12	16	45	5.1		
17	.04	.11	1.2	.02	2.8	6.6	14	15	19	3.3		
18	.04	.11	1.3	.01	3.0	7.1	47	14	11	2.3		
19	.04	.11	1.5	.01	3.0	7.6	205	13	8.5	1.6		
20	.04	.07	1.3	.05	3.0	7.1	129	12	5.1	1.2		
21	.04	.16	1.3	.30	3.0	9.0	128	11	3.8	.72		
22	.04	.16	1.6	.50	3.3	10	259	9.5	3.0	.55		
23	.07	.07	1.5	.80	3.3	10	704	7.6	2.8	.63		
24	.07	.07	1.5	1.0	4.1	11	1,820	6.6	2.1	.63		
25	.07	.07	1.6	1.5	4.8	59	2,520	5.6	1.6	.40		
26	.07	.07	1.6	2.0	6.1	30	2,510	4.8	1.5	.16		
27	.04	.07	1.6	2.5	5.1	26	2,380	4.4	1.5	.02		
28	.07	.07	1.6	3.0	14	16	1,420	4.4	1.1	0		
29	.07	.07	1.6	2.3	------	14	794	4.8	1.1	0		
30	.07	.07	1.3	3.5	------	6.1	423	3.5	.82	0		
31	.07	------	1.3	3.5	------	7.1	------	3.3	------	0		------
TOTAL	1.87	3.32	35.18	27.35	108.8	337.2	13,459.2	1,013.5	257.92	157.25	0	0
MEAN	.060	.11	1.13	.88	3.89	10.9	449	32.7	8.60	5.07	0	0
MAX	.11	.21	1.6	3.5	14	59	2,520	244	74	74	0	0
MIN	0	.07	.07	.01	2.5	4.4	2.8	3.3	.82	0	0	0
AC-FT	3.7	6.6	70	54	216	669	26,700	2,010	512	312	0	0

CAL YR 1969 TOTAL 14,543.73 MEAN 39.8 MAX 1,830 MIN 0 AC-FT 28,850
WTR YR 1970 TOTAL 15,401.59 MEAN 42.2 MAX 2,520 MIN 0 AC-FT 30,550

PEAK DISCHARGE (BASE, 500 CFS)

DATE	TIME	G.H.	DISCHARGE
4-25	1600	13.14	2,680

06441500 Bad River near Fort Pierre, S. Dak.

LOCATION.--Lat 44°19'36", long 100°23'02", in NW¼NW¼ sec.10, T.4 N., R.31 E., Stanley County, on right bank at downstream side of highway bridge, 2.1 miles south of Fort Pierre, 4.3 miles downstream from Willow Creek, and 5.0 miles upstream from mouth.

DRAINAGE AREA.--3,107 sq mi.

PERIOD OF RECORD.--August 1928 to current year. Monthly discharge only for July 1932 to February 1934, published in WSP 1309.

GAGE.--Water-stage recorder. Datum of gage is 1,427.83 ft above mean sea level. Prior to July 10, 1951, nonrecording gage at same site and datum.

AVERAGE DISCHARGE.--42 years, 156 cfs (113,000 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 3,800 cfs Apr. 27 (gage height, 12.30 ft); no flow for many days.
Period of record: Maximum discharge, 43,800 cfs June 18, 1967 (gage height, 29.55 ft); no flow for long periods in each year.
Flood in April 1927 reached a stage of 30.89 ft, from floodmark (discharge, about 55,000 cfs). Flood in July 1905 reached a stage about 2 ft higher than that in April 1927.

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

REVISIONS(WATER YEARS).--WSP 786: Drainage area. WSP 856: 1929(M), 1937.

Rating table (gage height, in feet, and discharge, in cubic feet per second)
(Stage-discharge relation affected by ice Nov. 20 to Mar. 26; shifting-control method used May 15 to Aug. 24)

1.74	0	2.2	5.2	3.5	148
1.8	.02	2.3	8.2	4.0	232
1.9	.25	2.5	20	5.0	449
2.0	1.2	2.7	37	7.0	1,160
2.1	2.9	3.0	73	9.0	2,150
				12.0	3,650

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1		0	.02		0	4.5	16	816	8.8	.20	1.0	
2		0	.01		0	4.5	14	520	8.2	.13	1.6	
3		0	.01		0	4.5	11	347	7.3	.04	.16	
4		0	.01		0	6.0	8.2	243	6.7	.02	.02	
5		0	.01		0	9.5	7.6	180	5.8	0	0	
6		0	.01		0	10	6.4	141	5.8	0	460	
7		0	.01		0	6.0	5.5	117	5.0	0	759	
8		0	.01		0	3.0	4.7	96	6.7	0	172	
9		0	.01		0	2.0	4.2	79	7.3	0	51	
10		0	.01		0	1.0	3.7	62	7.0	0	526	
11		0	.01		0	1.0	3.7	51	5.8	0	130	
12		0	.01		0	1.0	6.1	45	7.9	0	25	
13		0	.01		0	1.1	9.9	42	7.3	.07	8.2	
14		0	.02		0	1.2	15	43	5.8	.06	5.5	
15		0	.02		0	1.3	215	38	5.0	0	4.0	
16		0	.02		0	1.4	571	37	8.2	0	2.9	
17		.01	.02		0	1.5	957	34	5.8	0	2.2	
18		.01	.01		0	1.5	744	27	9.7	0	1.6	
19		.01	.01		0	2.0	1,100	22	24	0	.98	
20		.01	.01		0	3.0	1,490	19	17	0	.65	
21		.01	.01		0	4.0	1,320	18	11	0	.31	
22		.02	.01		0	5.0	2,210	17	7.9	0	.06	
23		.02	.01		0	5.5	1,610	18	6.4	0	.01	
24		.02	.01		45	5.5	2,480	18	5.2	0	0	
25		.02	.01		30	6.0	2,830	17	3.5	0	0	
26		.01	0		10	8.0	3,480	15	2.9	0	0	
27		.01	0		8.0	11	3,650	12	2.2	0	0	
28		.01	0		5.0	16	3,320	11	1.4	0	0	
29		.02	0		------	27	2,370	9.4	.75	0	0	
30		.02	0		------	24	1,380	9.4	.31	0	0	
31		------	0		------	21	------	8.8	------	0	0	------
TOTAL	0	0.20	0.30	0	98.0	199.0	29,843.0	3,112.6	206.66	0.52	2,152.19	0
MEAN	0	.007	.010	0	3.50	6.42	995	100	6.89	.017	69.4	0
MAX	0	.02	.02	0	45	27	3,650	816	24	.20	759	0
MIN	0	0	0	0	0	1.0	3.7	8.8	.31	0	0	0
AC-FT	0	.4	.6	0	194	395	59,190	6,170	410	1.0	4,270	0

CAL YR 1969 TOTAL 30,912.63 MEAN 84.7 MAX 3,580 MIN 0 AC-FT 61,320
WTR YR 1970 TOTAL 35,612.47 MEAN 97.6 MAX 3,650 MIN 0 AC-FT 70,640

PEAK DISCHARGE (BASE, 1,100 CFS)

DATE	TIME	G.H.	DISCHARGE	DATE	TIME	G.H.	DISCHARGE
4-27	0800	12.30	3,800	8-10	0800	7.99	1,640
8- 6	1500	8.52	1,860				

06442000 Medicine Knoll Creek near Blunt, S. Dak.

LOCATION.--Lat 44°33'46", long 99°54'50", in NW¼ sec.31, T.113 N., R.75 W., Sully County, on left bank at downstream side of highway bridge, 4.8 miles northeast of Blunt, and 5.5 miles upstream from South Fork Medicine Knoll Creek.

DRAINAGE AREA.--455 sq mi, approximately.

PERIOD OF RECORD.--March 1950 to current year. Prior to October 1959, published as Medicine Creek near Blunt.

GAGE.--Water-stage recorder. Altitude of gage is 1,612 ft (by barometer). Prior to Oct. 31, 1950, nonrecording gage at same site and datum.

AVERAGE DISCHARGE.--20 years, 5.73 cfs (4,150 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 39 cfs Apr. 19 (gage height, 8.65 ft); no flow for many days.
Period of record: Maximum discharge, 1,830 cfs Apr. 5, 1952 (gage height, 12.34 ft, from floodmarks); maximum gage height, 13.2 ft between Mar. 26-29, 1950, from floodmark (backwater from ice); no flow for long periods in each year.

REMARKS.--Records fair.

DISCHARGE IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1						0	.75	2.1	.58	.39		
2						0	.85	2.1	.58	.22		
3						0	1.0	1.5	.52	.06		
4						0	1.0	1.5	.39	.02		
5						0	1.5	.78	.28	.02		
6						0	1.0	1.4	.18	0		
7						0	.93	.93	.10	0		
8						0	.70	1.1	.03	0		
9						0	.30	1.2	.02	0		
10						0	.08	.85	0	0		
11						0	.04	.52	0	0		
12						0	.26	.39	.01	0		
13						.05	1.8	.34	.02	0		
14						.10	2.3	.78	.02	0		
15						.30	4.5	.93	.23	0		
16						.50	11	.93	4.2	0		
17						.72	9.4	1.1	4.6	0		
18						.75	17	.72	5.9	0		
19						.75	38	.34	7.7	0		
20						.75	32	.28	8.1	0		
21						.80	27	.22	7.2	0		
22						.80	20	.22	6.3	0		
23						.80	17	.28	4.9	0		
24						.75	12	.28	3.9	0		
25						.75	6.5	.34	3.3	0		
26						.75	4.6	.25	2.7	0		
27						.70	3.6	.10	2.1	0		
28						.70	3.3	.18	1.5	0		
29					------	.70	3.7	.39	.93	0		
30					------	.70	3.0	.65	.72	0		
31		------			------	.70	------	.58	------	0		------
TOTAL	0	0	0	0	0	12.07	225.11	23.28	67.01	.71	0	0
MEAN	0	0	0	0	0	.39	7.50	.75	2.23	.023	0	0
MAX	0	0	0	0	0	.80	38	2.1	8.1	.39	0	0
MIN	0	0	0	0	0	0	.04	.10	0	0	0	0
AC-FT	0	0	0	0	0	24	447	46	133	1.4	0	0

CAL YR 1969 TOTAL 3,996.28 MEAN 10.9 MAX 374 MIN 0 ACFT 7,930
WAT YR 1970 TOTAL 328.18 MEAN .90 MAX 38 MIN 0 ACFT 651

PEAK DISCHARGE (BASE, 50 CFS).--No peak above base.

06442500 Medicine Creek at Kennebec, S. Dak.

LOCATION.--Lat 43°54'17", long 99°52'35", in NW¼NE¼ sec.18, T.105 N., R.75 W., Lyman County, on right bank 4 ft downstream from highway bridge, 0.5 mile west of Kennebec, and 0.5 mile downstream from nearest tributary.

DRAINAGE AREA.--465 sq mi, approximately.

PERIOD OF RECORD.--July 1954 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,659.64 ft above mean sea level. Prior to Dec. 28, 1954, nonrecording gage at same site and datum.

AVERAGE DISCHARGE.--16 years, 17.1 cfs (12,390 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 362 cfs Apr. 19 (gage height, 5.15 ft); no flow for many days.
Period of record: Maximum discharge, 8,970 cfs Mar. 28, 1960 (gage height, 16.71 ft); no flow for many days.
Flood in April 1952 reached a stage of 17.0 ft, from floodmarks.

REMARKS.--Records fair.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1							0	15	42			
2							0	11	20			
3							0	8.1	9.5			
4							0	6.2	4.8			
5							0	4.8	2.1			
6							0	3.1	.80			
7							0	2.6	.37			
8							0	1.9	.10			
9							0	1.2	.03			
10							0	.80	.01			
11							0	.46	.01			
12							0	.60	.41			
13							0	.13	.10			
14							0	.06	.01			
15							2.5	.01	6.9			
16							10	.09	91			
17							17	.04	55			
18							19	0	26			
19							179	0	13			
20							90	0	8.1			
21							103	0	4.2			
22							73	0	1.6			
23							75	0	.80			
24							57	0	.81			
25							51	.17	.33			
26							44	.80	.09			
27							40	.28	.03			
28							32	14	0			
29					------		26	18	0			
30					------		21	79	0			
31		------			------		------	164	------			------
TOTAL	0	0	0	0	0	0	839.5	332.34	288.10	0	0	0
MEAN	0	0	0	0	0	0	28.0	10.7	9.60	0	0	0
MAX	0	0	0	0	0	0	179	164	91	0	0	0
MIN	0	0	0	0	0	0	0	0	0	0	0	0
AC-FT	0	0	0	0	0	0	1,670	659	571	0	0	0

CAL YR 1969 TOTAL 5,646.12 MEAN 15.5 MAX 634 MIN 0 AC-FT 11,200
WTR YR 1970 TOTAL 1,459.94 MEAN 4.00 MAX 179 MIN 0 AC-FT 2,900

PEAK DISCHARGE (BASE, 100 CFS)

DATE	TIME	G.H.	DISCHARGE	DATE	TIME	G.H.	DISCHARGE
4-19	0930	5.15	362	5-30	2200	4.39	260
4-21	1400	3.17	136	6-16	1530	3.01	124

06442700 Lake Sharpe near Fort Thompson, S. Dak.

LOCATION.--Lat 44°02'18", long 99°26'45", in SE¼ sec.27, T.107 N., R.72 W., Lyman County, at left approach wall of powerhouse at Big Bend Dam on Missouri River, 2.5 miles south of Fort Thompson, and at mile 987.4.

DRAINAGE AREA.--249,300 sq mi, approximately.

PERIOD OF RECORD.--July 1963 to current year.

GAGE.--Water-stage recorder. Datum of gage is at mean sea level.

EXTREMES.--Current year: Maximum contents, 1,781,000 acre-ft July 11 (elevation, 1,420.6 ft, affected by wind); minimum, 1,665,000 acre-ft July 27 (elevation, 1,419.0 ft, affected by wind).
Period of record: Maximum contents, 1,782,000 acre-ft Mar. 25, 1966 (elevation, 1,421.0 ft); minimum since initial filling, 1,448,000 acre-ft Sept. 17, 1967 (elevation, 1,414.7 ft, affected by wind).

REMARKS.--Reservoir is formed by earth-fill dam; closure made July 1963: intentional storage began November 1963. Maximum capacity, 1,900,000 acre-ft below elevation, 1,423.0 ft (top of spillway gates). Normal maximum, 1,725,000 acre-ft below elevation 1,420.0 ft. Inactive storage, 1,465,000 acre-ft below elevation 1,415.0 ft. Figures given herein represent elevations at powerhouse and total contents adjusted for wind effect.
The spillway consists of a concrete chute with flat crest at elevation 1,385.0 ft surmounted by 8 taintor gates, each 40 by 38 ft; design capacity, 390,000 cfs. Normal releases are through 8 power units (completed in July 1966), with a generating capacity of 58,500 kilowatts each. Maximum release through powerplant about 100,000 cfs. Water is used for flood control, navigation, power, and incidental uses.

COOPERATION.--Elevations and contents furnished by Corps of Engineers.

MONTHEND ELEVATION AND CONTENTS AT 2400, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

Date	Elevation (feet)	Contents (acre-feet)	Change in contents (acre-feet)
Sept.30	1,419.3	1,686,000	-
Oct. 31	1,420.2	1,735,000	+49,000
Nov. 30	1,419.4	1,693,000	-42,000
Dec. 31	1,419.8	1,715,000	+22,000
CAL YR 1969	-	-	+15,000
Jan. 31	1,420.2	1,738,000	+23,000
Feb. 28	1,420.0	1,725,000	-13,000
Mar. 31	1,419.9	1,721,000	-4,000
Apr. 30	1,420.1	1,735,000	+14,000
May 31	1,420.3	1,748,000	+13,000
June 30	1,420.3	1,727,000	-21,000
July 31	1,420.0	1,729,000	+2,000
Aug. 31	1,419.7	1,711,000	-18,000
Sept.30	1,420.3	1,742,000	+31,000
WTR YR 1970	-	-	+56,000

06445700 White River at Slim Butte, S. Dak.

LOCATION.--Lat 43°04'33", long 102°48'41", in SE¼SE¼ sec.23, T.36 N., R.47 W., Shannon County, on left bank 300 ft downstream from highway bridge, 1,300 ft downstream from Janis Creek, 0.5 mile east of village of Slim Butte, 8.8 miles southwest of Oglala, and 12.2 miles downstream from Nebraska-South Dakota State line.

DRAINAGE AREA.--1,500 sq mi, approximately.

RECORDS AVAILABLE.--July 1962 to September 1970 (discontinued as a continuous-record station; converted to a crest-stage partial-record station).

GAGE.--Water-stage recorder. Prior to Aug. 22, 1962, nonrecording gage at site 300 ft upstream at same datum.

AVERAGE DISCHARGE.--8 years, 42.6 cfs (30,860 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 558 cfs Apr. 25 (gage height, 9.17 ft); no flow for many days in August and September.

Period of record: Maximum discharge, 9,240 cfs June 16, 1967 (gage height, 19.92 ft), from rating curve extended above 1,500 cfs on basis of slope-area measurement of peak flow; no flow for many days in most years.

REMARKS.--Records good except those for winter periods, which are poor. Some diversions for irrigation above station.

Rating table (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Mar. 24 to Apr. 23, July 8 to Sept. 18; stage-discharge relation affected by ice Nov. 18 to Mar. 23)

4.5	0	5.1	11
4.6	.80	5.5	37
4.7	1.8	6.0	94
4.8	3.2	7.0	247
5.0	7.7	9.0	518

DISCHARGE IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.5	8.0	11	9.0	28	20	31	56	25	9.1	26	0
2	1.7	9.4	11	9.0	25	20	37	48	22	7.2	16	0
3	1.5	11	11	9.0	26	19	37	39	21	6.4	9.7	0
4	1.8	17	11	8.0	26	19	34	35	23	7.4	6.7	1.1
5	2.5	38	11	7.0	26	20	31	34	25	8.0	4.2	1.9
6	2.8	31	10	7.0	27	21	34	34	25	9.7	3.8	1.2
7	5.1	23	10	6.0	27	22	34	33	24	9.4	2.9	.64
8	10	20	10	5.0	26	23	32	32	22	14	2.8	.24
9	19	16	10	5.5	25	20	32	31	21	15	3.4	0
10	11	15	10	6.0	27	15	40	31	20	14	21	0
11	9.4	15	11	6.5	26	14	38	29	18	10	22	0
12	6.1	14	11	7.0	26	15	40	30	56	10	12	0
13	5.4	14	12	7.0	23	15	36	30	72	10	10	0
14	5.1	14	12	7.5	24	16	35	30	243	7.7	9.4	0
15	5.4	12	11	7.0	25	16	46	29	208	6.9	10	0
16	5.6	11	11	6.5	26	17	72	31	69	6.9	19	0
17	7.7	13	11	6.0	26	17	100	31	46	9.1	9.1	0
18	9.4	12	11	7.0	25	16	88	40	35	7.4	4.9	0
19	18	14	11	7.0	24	16	115	32	28	5.9	1.6	0
20	21	19	11	7.0	25	18	96	28	23	3.8	.90	0
21	17	17	11	8.0	26	20	106	27	22	2.9	.48	1.6
22	16	16	11	9.0	28	22	249	25	21	2.9	.08	2.9
23	17	16	11	10	30	21	342	24	18	4.9	0	2.1
24	16	12	11	13	30	40	479	22	17	3.8	0	1.6
25	13	20	10	20	30	41	490	23	14	4.0	0	.90
26	10	17	9.0	25	28	54	427	23	12	2.9	0	1.8
27	9.1	17	9.0	29	25	56	273	23	12	2.8	0	2.9
28	8.7	14	9.0	28	23	48	164	22	11	5.8	0	3.9
29	8.4	13	9.0	26	------	50	102	25	10	8.4	.07	4.9
30	8.0	11	9.0	26	------	41	73	26	10	6.7	.32	3.7
31	8.0	------	9.0	28	------	36	------	31	------	52	.02	------
TOTAL	282.2	479.4	325.0	362.0	733	788	3,713	954	1,173	275.0	196.37	31.38
MEAN	9.10	16.0	10.5	11.7	26.2	25.4	124	30.8	39.1	8.87	6.33	1.05
MAX	21	38	12	29	30	56	490	56	243	52	26	4.9
MIN	1.5	8.0	9.0	5.0	23	14	31	22	10	2.8	0	0
AC-FT	560	951	645	718	1,450	1,560	7,360	1,890	2,330	545	390	62

CAL YR 1969 TOTAL 13,282.90 MEAN 36.4 MAX 1,400 MIN 1.0 ACFT 26,350
WAT YR 1970 TOTAL 9,312.35 MEAN 25.5 MAX 490 MIN 0 ACFT 18,470

PEAK DISCHARGE (BASE, 400 CFS)

DATE	TIME	G.H.	DISCHARGE
4-25	0500	9.17	558

06445980 White Clay Creek near Oglala, S. Dak.

LOCATION.--Lat 43°08'46", long 102°40'58", in SE¼SE¼ sec.30, T.37 N., R.45 W., Shannon County, on left bank at downstream side of bridge on U.S. Highway 18, 4 miles southeast of Oglala, 11 miles northwest of Pine Ridge, and 5.5 miles upstream from Oglala Dam.

DRAINAGE AREA.--340 sq mi, approximately.

PERIOD OF RECORD.--August 1965 to current year.

GAGE.--Water-stage recorder.

AVERAGE DISCHARGE.--5 years, 15.8 cfs (11,450 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 33 cfs Mar. 26 (gage height, 6.11 ft); maximum gage height, 8.75 ft Jan. 27 (backwater from ice); no flow for many days in August and September.
Period of record: Maximum discharge, 659 cfs June 16, 1967 (gage height, 14.74 ft); maximum gage height, 15.02 ft Mar. 11, 1966 (backwater from ice); no flow Sept. 4, 1965, Aug. 20-28, Sept. 4-7, 9-12, 1970.

REMARKS.--Records good except those for winter periods, which are poor. Some storage and possible regulation above station.

DISCHARGE IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.4	9.6	9.0	6.0	16	9.0	16	19	17	6.0	.33	.22
2	3.0	8.2	9.0	6.0	12	10	16	19	15	5.7	.28	.22
3	2.6	8.1	8.5	6.0	13	9.0	15	18	13	5.7	.33	.10
4	3.6	8.1	8.5	5.5	13	8.0	15	18	13	5.2	.28	0
5	4.6	8.1	9.5	5.0	12	8.0	15	18	12	5.2	.33	0
6	5.4	9.4	10	5.0	12	9.0	14	17	12	5.4	.33	0
7	5.4	9.2	10	4.5	13	10	14	17	11	5.2	.33	0
8	4.7	9.1	11	4.0	11	10	15	17	10	4.9	.33	.02
9	4.6	9.1	11	4.5	10	8.0	14	16	10	4.9	.33	0
10	4.6	8.8	11	5.0	11	6.0	13	16	10	4.7	.33	0
11	4.0	8.8	11	6.0	11	6.0	13	16	11	3.1	.38	0
12	4.3	8.8	12	7.0	10	7.0	14	16	14	3.5	.38	0
13	5.0	9.4	12	7.5	9.0	7.5	15	17	19	4.3	.38	.50
14	6.5	9.0	12	8.0	9.5	8.0	16	16	19	4.5	.38	1.2
15	7.2	9.4	11	7.0	10	8.0	17	18	17	4.2	.38	2.0
16	7.2	9.2	11	6.5	11	9.0	17	19	15	3.8	.30	2.0
17	7.3	9.0	11	6.0	12	10	18	18	14	2.0	.20	1.6
18	7.6	8.0	10	6.0	12	11	19	17	12	1.4	.10	1.1
19	8.5	8.5	9.5	6.0	11	12	20	16	12	.80	.05	.80
20	8.8	9.0	9.5	6.0	10	13	20	16	11	.64	0	.50
21	8.1	9.0	9.5	6.5	12	16	19	15	11	.80	0	.33
22	7.6	9.0	9.5	7.0	11	16	20	15	10	.80	0	.22
23	7.2	9.0	9.0	8.0	12	15	23	16	9.6	.80	0	.05
24	7.0	9.0	8.0	10	11	16	23	15	9.4	.89	0	.55
25	7.2	9.0	7.0	12	10	17	23	15	8.3	.72	0	.64
26	7.0	8.5	6.5	15	11	28	23	15	7.8	.55	0	.80
27	6.8	8.5	6.5	20	10	23	23	14	7.0	.50	0	.98
28	6.9	9.0	6.0	18	9.0	20	22	13	6.6	.44	0	.80
29	7.0	9.0	6.0	15	------	19	21	13	6.5	.33	1.6	1.1
30	8.1	9.0	6.0	15	------	18	20	17	6.2	.28	.89	1.1
31	8.2	------	6.0	16	------	18	------	19	------	.28	.38	------
TOTAL	188.4	265.8	286.5	260.0	314.5	384.5	533	511	349.4	87.53	8.62	16.83
MEAN	6.08	8.86	9.24	8.39	11.2	12.4	17.8	16.5	11.6	2.82	.28	.56
MAX	8.8	9.6	12	20	16	28	23	19	19	6.0	1.6	2.0
MIN	2.4	8.0	6.0	4.0	9.0	6.0	13	13	6.2	.28	0	0
AC-FT	374	527	568	516	624	763	1,060	1,010	693	174	17	33

CAL YR 1969 TOTAL 5,227.50 MEAN 14.3 MAX 440 MIN .90 ACFT 10,370
WAT YR 1970 TOTAL 3,206.08 MEAN 8.78 MAX 28 MIN 0 ACFT 6,360

PEAK DISCHARGE (BASE, 150 CFS).--No peak above base.

06446000 White River near Oglala, S. Dak.

LOCATION.--Lat 43°15'17", long 102°49'29", in SW¼NE¼ sec.24, T.38 N., R.47 W., Shannon County, on right bank at downstream side of bridge, 3 miles downstream from Blacktail Creek, and 7 miles northwest of Oglala.

DRAINAGE AREA.--2,200 sq mi, approximately.

PERIOD OF RECORD.--May 1943 to current year.

GAGE.--Water-stage recorder. Datum of gage is 2,853.54 ft above mean sea level. Prior to May 6, 1947, nonrecording gage at same site and datum.

AVERAGE DISCHARGE.--27 years, 59.9 cfs (43,400 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 809 cfs Apr. 25 (gage height, 13.82 ft); no flow for many days. Period of record: Maximum discharge, 5,200 cfs June 21, 1947 (gage height, 23.50 ft), from rating curve extended above 2,800 cfs on basis of velocity-area studies; maximum gage height, 23.61 ft June 16, 1967; no flow at times in 1952, 1954, 1957, 1961, 1964, 1965, 1970.

REMARKS.--Records good except those for winter periods, which are poor. Some diversions for irrigation above station.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	6.0	17	12	7.8	20	24	53	83	44	13	27	0
2	7.3	8.6	11	7.6	17	25	47	69	43	12	24	0
3	5.2	8.7	10	7.4	18	24	43	59	40	10	15	0
4	7.6	12	10	7.2	19	23	46	49	38	8.3	9.7	0
5	8.8	15	9.5	6.5	19	24	44	48	38	6.9	6.6	0
6	6.0	36	9.0	5.5	20	26	42	46	43	8.0	3.2	0
7	4.2	37	8.5	5.0	22	28	42	45	45	10	.18	0
8	4.0	30	8.0	5.0	21	30	44	45	46	11	0	.03
9	3.8	23	8.0	5.2	22	26	41	44	43	13	0	.45
10	9.0	19	8.0	5.5	24	22	43	45	40	15	0	9.2
11	16	18	8.0	5.5	25	20	52	47	36	18	0	9.0
12	11	18	8.2	5.5	23	21	58	48	55	17	21	6.0
13	9.5	17	8.5	5.5	20	22	63	47	84	15	13	5.4
14	9.1	14	8.5	5.5	23	24	67	47	81	15	8.5	7.2
15	8.5	16	8.3	5.7	25	25	64	50	266	12	6.3	6.6
16	9.0	12	8.3	5.5	27	27	84	48	208	9.1	6.6	3.6
17	9.1	14	8.5	5.0	26	30	108	47	65	7.2	13	1.6
18	10	15	9.0	5.5	25	33	142	49	53	7.1	14	3.4
19	14	13	8.5	6.0	23	35	124	54	41	8.4	8.0	3.4
20	16	15	9.0	6.0	26	40	148	50	35	7.6	3.4	2.6
21	27	11	9.5	6.5	26	45	155	45	32	4.8	.28	2.2
22	21	22	10	7.0	25	44	277	43	26	2.2	0	1.6
23	20	21	9.8	8.0	26	44	500	43	24	1.2	0	.80
24	20	22	9.6	9.0	27	43	687	42	23	.10	0	0
25	22	14	9.6	10	27	48	710	40	21	0	0	0
26	21	12	9.5	12	26	51	604	41	19	.40	0	0
27	18	12	9.5	15	25	57	457	39	18	.03	0	0
28	16	16	9.5	20	24	69	272	39	19	0	0	0
29	16	14	10	18	------	68	157	38	22	0	0	0
30	17	14	8.0	18	------	64	109	39	15	.08	0	0
31	18	------	8.0	20	------	60	------	46	------	3.6	0	------
TOTAL	390.1	516.3	281.8	261.9	651	1,122	5,283	1,475	1,563	236.01	179.76	63.08
MEAN	12.6	17.2	9.09	8.45	23.3	36.2	176	47.6	52.1	7.61	5.80	2.10
MAX	27	37	12	20	27	69	710	83	266	18	27	9.2
MIN	3.8	8.6	8.0	5.0	17	20	41	38	15	0	0	0
AC-FT	774	1,020	559	519	1,290	2,230	10,480	2,930	3,100	468	357	125

CAL YR 1969 TOTAL 19,084.9 MEAN 52.3 MAX 1,280 MIN 3.6 AC-FT 37,850
WTR YR 1970 TOTAL 12,022.95 MEAN 32.9 MAX 710 MIN 0 AC-FT 23,850

PEAK DISCHARGE (BASE, 800 CFS)

DATE	TIME	G.H.	DISCHARGE
4-25	0115	13.82	809

06446200 White River near Rockyford, S. Dak.

LOCATION.--Lat 43°30'52", long 102°29'30", in SW¼NW¼ sec.19, T.41 N., R.43 W., Shannon County, on right bank at downstream side of highway bridge, 0.7 mile upstream from Porcupine Creek, and 1.8 miles northeast of village of Rockyford.

DRAINAGE AREA.--3,000 sq mi, approximately.

PERIOD OF RECORD.--August 1964 to September 1970 (discontinued as a continuous-record station; converted to a crest-stage partial-record station).

GAGE.--Water-stage recorder. Datum of gage is 2,593.34 ft above mean sea level.

AVERAGE DISCHARGE.--6 years, 125 cfs (90,560 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 3,130 cfs Apr. 24 (gage height, 7.97 ft); no flow for many days in August and September.
Period of record: Maximum discharge, 11,800 cfs June 17, 1967 (gage height, 14.19 ft) from rating curve extended above 4,700 cfs; no flow for many days in 1964, 1965, 1970.

REMARKS.--Records good except those for winter periods, which are poor. Some diversions for irrigation above station.

Rating table (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Mar. 18 to Apr. 2, Apr. 17-21, July 13;
stage-discharge relation affected by ice Nov. 13 to Mar. 17)

2.0	0	2.6	25	5.0	770
2.2	2.1	2.9	58	6.0	1,330
2.3	4.8	3.4	163	7.0	2,120
2.4	10	4.0	355	8.0	3,160

DISCHARGE IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.7	9.0	18	20	28	64	102	193	52	7.9	0	0
2	1.9	8.4	16	18	28	66	89	163	48	5.3	0	0
3	1.5	10	14	20	30	64	84	146	45	4.0	9.9	0
4	15	16	18	14	32	60	74	113	40	3.4	19	0
5	44	14	20	12	34	55	72	100	36	3.4	12	0
6	16	11	22	14	32	56	71	78	36	3.2	8.4	0
7	7.4	11	24	10	36	58	64	60	36	2.4	4.8	27
8	5.3	30	26	6.0	40	62	61	60	36	2.1	3.2	18
9	4.3	34	24	8.0	42	66	58	58	34	3.7	1.3	3.2
10	3.2	30	24	12	44	72	60	55	34	3.4	1.7	1.6
11	1.9	26	26	16	46	84	57	53	33	4.8	.81	.47
12	1.9	24	28	14	48	88	71	52	42	321	.36	0
13	23	18	26	14	46	92	146	52	306	342	.06	.34
14	52	20	24	16	44	96	254	93	171	29	0	41
15	30	20	22	18	48	100	182	102	124	21	2.4	35
16	32	22	23	14	52	100	497	74	308	11	4.5	14
17	26	15	24	12	56	140	800	69	220	4.0	2.0	4.8
18	18	14	25	16	60	176	270	60	146	2.9	1.4	2.4
19	16	16	26	20	64	140	199	64	93	3.2	.81	1.1
20	15	18	26	22	62	122	334	64	53	2.0	2.4	.56
21	14	19	24	26	66	183	810	66	45	1.6	3.2	.11
22	14	20	20	28	70	323	1,660	55	41	1.9	1.7	.14
23	23	15	18	30	72	284	1,780	53	36	7.1	1.1	.09
24	22	16	20	34	72	245	2,740	50	30	14	.63	.02
25	19	18	22	34	70	251	2,140	50	25	13	.27	0
26	17	13	22	36	68	133	1,400	45	21	5.3	.10	0
27	16	13	20	36	64	106	965	42	18	2.1	0	0
28	20	25	16	37	62	102	688	41	15	1.3	0	0
29	16	20	14	34	------	126	469	41	12	.72	0	0
30	14	21	16	32	------	124	284	38	11	.45	0	0
31	11	------	18	30	------	104	------	78	------	.06	0	------
TOTAL	502.1	546.4	666	653.0	1,416	3,742	16,481	2,268	2,147	827.23	82.04	149.83
MEAN	16.2	18.2	21.5	21.1	50.6	121	549	73.2	71.6	26.7	2.65	4.99
MAX	52	34	28	37	72	323	2,740	193	308	342	19	41
MIN	1.5	8.4	14	6.0	28	55	57	38	11	.06	0	0
AC-FT	996	1,080	1,320	1,300	2,810	7,420	32,690	4,500	4,260	1,640	163	297

CAL YR 1969 TOTAL 32,434.90 MEAN 88.9 MAX 3,060 MIN 1.1 ACFT 64,330
WAT YR 1970 TOTAL 29,480.60 MEAN 80.8 MAX 2,740 MIN 0 ACFT 58,470

PEAK DISCHARGE (BASE, 1,000 CFS)

DATE	TIME	G.H.	DISCHARGE
4-17	0600	5.77	1,180
4-24	0330	7.97	3,130

06447000 White River near Kadoka, S. Dak.

LOCATION.--Lat 43°45'09", long 101°31'28", in SE¼SE¼ sec.30, T.3 S., R.22 E., Black Hills meridian, Jackson County, near center of span on downstream side of bridge on State Highway 73, 5.0 miles upstream from Pass Creek, 5.5 miles downstream from Cottonwood Creek, and 5.8 miles south of Kadoka.

DRAINAGE AREA.--5,000 sq mi, approximately.

PERIOD OF RECORD.--July 1942 to current year.

GAGE.--Water-stage recorder. Datum of gage is 2,122.18 ft above mean sea level. Prior to June 14, 1949, nonrecording gage, and June 14, 1949, to Mar. 8, 1955, water-stage recorder at site 0.3 mile downstream at same datum. Mar. 9, 1955, to May 17, 1957, nonrecording gage at present site and datum.

AVERAGE DISCHARGE.--28 years, 292 cfs (211,600 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 7,190 cfs Apr. 25 (gage height, 10.25 ft); no flow for many days.

Period of record: Maximum discharge, 21,700 cfs June 7, 1951 (gage height, 13.83 ft, site then in use), from rating curve extended above 16,000 cfs; no flow at times in many years.

Flood of June 4, 1942, reached a stage of 16.24 ft, from floodmarks (discharge, about 32,000 cfs, from rating curve extended above 16,000 cfs). Floods of Mar. 8, 1905, and in spring of 1927 were 1 or 2 ft higher than flood of June 14, 1942, from information by local residents.

REMARKS.--Records good except those for winter periods, which are poor. Some diversions above station for irrigation. Water-quality records for the water year 1970 are published in Part 2 of this report.

REVISIONS(WATER YEARS).--WSP 1279: 1944(M), 1948.

Rating table (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Oct. 1-10, June 11 to July 12, Aug. 21-26, Sept. 22-30; stage-discharge relation affected by ice Nov. 16 to Mar. 23)

3.39	0	4.5	185
3.4	.40	5.0	390
3.5	4.6	5.5	690
3.6	9.5	6.0	1,050
3.8	26	7.0	2,150
4.0	56	8.0	3,550
4.2	100	10.0	6,850

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0	31	9.0	8.0	60	250	179	523	137	19	5.0	0
2	13	27	8.0	6.0	55	200	149	352	209	13	4.5	0
3	11	25	7.0	6.0	50	200	128	290	182	11	4.6	0
4	136	23	7.0	4.0	50	200	108	236	110	10	2.8	0
5	346	22	6.0	4.0	55	240	100	191	88	10	.40	0
6	250	23	5.0	3.0	60	150	90	167	76	11	.40	.31
7	155	23	4.0	3.0	60	50	72	155	64	8.4	.40	136
8	88	26	4.0	2.0	60	30	66	140	53	8.4	2.4	422
9	53	24	4.0	2.0	65	20	64	125	46	92	.80	270
10	36	24	4.0	3.0	65	15	60	130	66	172	0	128
11	25	23	6.0	3.0	60	13	76	134	74	53	0	54
12	21	41	10	4.0	50	10	250	123	399	45	83	29
13	31	21	15	4.0	48	10	229	134	2,340	34	35	20
14	161	12	25	5.0	48	10	563	424	1,270	392	15	11
15	179	18	30	5.0	50	13	1,140	209	523	313	11	83
16	222	20	30	4.0	55	30	1,700	243	304	179	6.0	247
17	134	22	28	3.0	50	100	2,880	215	209	93	3.2	134
18	110	20	26	3.0	50	400	1,930	155	179	51	1.6	64
19	88	15	26	3.0	50	450	1,040	128	278	35	0	38
20	64	17	25	3.0	50	300	931	110	209	30	7.7	25
21	46	20	25	4.0	55	200	2,670	95	155	30	1.6	14
22	35	25	25	5.0	75	300	4,720	95	125	21	.40	7.9
23	29	20	25	7.0	100	700	5,050	100	110	72	.40	7.4
24	26	15	25	10	200	651	5,850	115	81	146	.40	5.9
25	24	10	25	75	300	571	5,800	122	60	81	0	4.6
26	24	9.0	20	150	400	451	3,900	88	46	60	0	2.0
27	27	8.0	20	200	400	390	2,790	95	38	49	0	1.5
28	24	8.0	15	200	300	258	2,110	88	35	33	0	1.2
29	22	8.0	15	150	------	230	1,220	83	29	24	0	.80
30	26	9.0	10	100	------	226	797	85	23	14	0	.80
31	29	------	10	80	------	203	------	244	------	8.4	0	------
TOTAL	2,435	589.0	494.0	1,059.0	2,921	6,871	46,662	5,394	7,518	2,118.2	186.60	1,707.41
MEAN	78.5	19.6	15.9	34.2	104	222	1,555	174	251	68.3	6.02	56.9
MAX	346	41	30	200	400	700	5,850	523	2,340	392	83	422
MIN	0	8.0	4.0	2.0	48	10	60	83	23	8.4	0	0
AC-FT	4,830	1,170	980	2,100	5,790	13,630	92,550	10,700	14,910	4,200	370	3,390

CAL YR 1969 TOTAL 68,621.91 MEAN 188 MAX 4,160 MIN 0 AC-FT 136,100
WTR YR 1970 TOTAL 77,955.21 MEAN 214 MAX 5,850 MIN 0 AC-FT 154,600

PEAK DISCHARGE (BASE, 3,600 CFS)

DATE	TIME	G.H.	DISCHARGE
4-25	1700	10.25	7,190

06447500 Little White River near Martin, S. Dak.

LOCATION.--Lat 43°10'00", long 101°37'47", in NW¼ sec.19, T.37 N., R.36 W., Bennett County, on right bank 70 ft downstream from highway culvert, and 5.4 miles east of Martin.

DRAINAGE AREA.--310 sq mi, approximately, of which about 230 sq mi probably contributes directly to surface runoff.

PERIOD OF RECORD.--February 1938 to September 1940, July 1962 to current year. Prior to October 1965, published as South Fork White River near Martin.

GAGE.--Water-stage recorder. Altitude of gage is 3,045 ft (by barometer). Prior to Aug. 14, 1938, nonrecording gage at same site and datum.

AVERAGE DISCHARGE.--10 years, 20.6 cfs (14,920 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 140 cfs Apr. 26 (gage height, 4.13 ft); minimum daily, 2.9 cfs Sept. 1-4.

Period of record: Maximum discharge, 1,190 cfs July 19, 1965 (gage height, 12.90 ft), from rating curve extended above 340 cfs on basis of computation of peak flow through culvert and flow-over-road measurement of peak flow; maximum gage height, 13.21 ft Mar. 11, 1966 (backwater from ice); minimum daily discharge 0.6 cfs Aug. 14, 16, 18, 1940; no flow for part of each day Oct. 19, 20, 22, 1962 (regulation caused by construction work above station).

Maximum stage known, 13.3 ft May 5, 1932, from floodmarks.

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

Rating tables (gage height, in feet, and discharge, in cubic feet per second)
(Stage-discharge relation affected by backwater from ice Nov. 14 to Dec. 10,

Oct. 1 to Mar. 25		Mar. 26 to Sept. 30			
1.1	6.4	0.8	1.0	2.0	41
1.3	12	1.0	6.5	2.5	62
1.5	19	1.2	13	3.0	84
1.7	26	1.5	22	4.0	133

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	6.4	19	21	13	19	15	29	51	18	8.0	4.3	2.9
2	7.0	21	22	13	16	15	28	46	19	7.7	4.3	2.9
3	7.2	19	22	12	17	16	27	40	18	7.7	4.3	2.9
4	8.4	18	17	11	19	16	26	36	18	7.7	4.5	2.9
5	10	18	16	10	19	17	26	33	16	7.4	4.8	4.0
6	12	18	16	9.0	19	19	26	30	15	7.4	5.7	3.7
7	13	17	15	8.0	19	21	26	29	14	7.4	5.1	4.3
8	12	17	13	8.0	20	22	27	27	14	7.7	5.4	5.1
9	11	16	14	8.0	20	22	27	25	13	7.7	5.1	5.7
10	11	16	15	9.0	21	20	27	24	13	14	4.8	4.8
11	11	16	16	10	20	19	26	25	14	7.7	5.1	5.1
12	10	16	15	9.0	18	19	24	24	15	7.7	5.1	5.4
13	12	15	15	7.5	15	18	21	25	23	7.7	4.8	5.4
14	13	13	16	8.0	14	19	19	26	27	8.3	4.5	5.4
15	13	12	16	8.5	15	20	22	35	32	8.6	4.0	6.8
16	15	14	18	8.0	16	21	25	41	27	7.5	3.7	7.7
17	17	16	17	7.0	15	20	30	42	23	7.5	5.7	8.6
18	16	18	16	6.0	15	19	40	35	19	7.5	4.8	8.3
19	16	19	18	7.0	14	19	50	28	17	7.7	4.0	8.6
20	16	19	18	8.0	14	20	53	24	15	7.5	3.7	7.7
21	17	18	15	10	15	22	55	22	14	7.5	3.7	6.8
22	16	20	17	15	16	25	73	20	14	7.0	3.4	6.2
23	16	22	17	18	17	28	96	20	13	7.0	3.7	6.2
24	15	24	17	21	17	30	109	21	12	7.0	3.4	5.7
25	15	23	17	20	18	34	117	20	11	6.5	3.4	5.9
26	15	24	16	18	18	37	130	19	10	6.5	3.7	6.2
27	14	23	15	19	17	37	128	18	9.8	6.8	3.7	6.5
28	14	18	14	20	16	34	94	18	9.2	6.5	3.2	6.5
29	14	20	14	20	------	32	70	18	8.9	5.4	3.2	6.5
30	16	19	14	19	------	31	56	17	8.3	4.5	3.2	6.8
31	18	------	14	19	------	30	------	17	------	4.3	3.2	------
TOTAL	407.0	548	506	379.0	479	717	1,507	856	480.2	229.4	131.5	171.5
MEAN	13.1	18.3	16.3	12.2	17.1	23.1	50.2	27.6	16.0	7.40	4.24	5.72
MAX	18	24	22	21	21	37	130	51	32	14	5.7	8.6
MIN	6.4	12	13	6.0	14	15	19	17	8.3	4.3	3.2	2.9
AC-FT	807	1,090	1,000	752	950	1,420	2,990	1,700	952	455	261	340

CAL YR 1969 TOTAL 8,335.9 MEAN 22.8 MAX 170 MIN 5.9 AC-FT 16,530
WTR YR 1970 TOTAL 6,411.6 MEAN 17.6 MAX 130 MIN 2.9 AC-FT 12,720

PEAK DISCHARGE (BASE, 100 CFS)

DATE	TIME	G.H.	DISCHARGE
4-26	2400	4.13	140

06448000 Lake Creek above refuge, near Tuthill, S. Dak.

LOCATION.--Lat 43°05'07", long 101°36'04", in NE¼ sec.19, T.36 N., R.36 W., Bennett County, on left wingwall at upstream side of culvert, 80 ft downstream from west boundary of LaCreek game refuge, and 7.5 miles southwest of Tuthill.

DRAINAGE AREA.--58 sq mi, approximately, of which about 23 sq mi probably contributes directly to surface runoff.

PERIOD OF RECORD.--February 1938 to September 1940, July 1962 to current year.

GAGE.--Water-stage recorder. Altitude of gage is 3,090 ft (by barometer). Prior to Aug. 9, 1938, nonrecording gage and Aug. 10, 1938, to Sept. 30, 1940, water-stage recorder at site 110 ft upstream at same datum.

AVERAGE DISCHARGE.--10 years, 19.4 cfs (14,060 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 51 cfs Apr. 23 (gage height, 2.69 ft); maximum gage height observed, 3.23 ft Jan. 22 (backwater from ice); minimum daily discharge, 4.2 cfs Sept. 2.
Period of record: Maximum discharge, 154 cfs Mar. 9, 1966 (gage height, 2.83 ft); maximum gage height observed, 3.61 ft Jan. 2, 1969 (backwater from ice); no flow for part of June 5, 1939.

REMARKS.--Records good except those for winter periods, which are poor. A few small diversions for irrigation of hay meadows above station.

Rating table (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Oct. 1 to Nov. 12, Nov. 17, 18, Nov. 20 to Dec. 6, Dec. 11-25, Feb. 1, 7, 8, 10, 11, 13, 15-18, 20-26, Apr. 18 to May 22; stage-discharge relation affected by ice Nov. 13-16, 19, Dec. 7-10, Dec. 26 to Jan. 25, Jan. 29-31, Feb. 2-6, 9, 12, 14, 19, Mar. 10-12, Apr. 12-17)

1.7	2.8
1.9	7.3
2.1	14
2.4	27
2.8	51

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	13	24	22	19	23	24	24	24	26	14	9.1	4.4
2	16	23	22	18	23	25	24	23	22	14	9.4	4.2
3	16	22	22	18	22	25	24	23	20	15	9.7	4.8
4	16	22	22	18	22	23	24	23	16	14	9.7	5.1
5	21	23	22	17	23	23	23	23	12	14	9.7	5.1
6	19	23	22	16	24	23	23	22	11	13	9.7	5.1
7	17	23	21	16	25	24	24	21	11	13	9.7	6.6
8	16	23	21	15	25	24	23	21	10	12	9.7	7.6
9	16	23	22	17	25	23	23	22	11	13	10	7.3
10	16	23	22	18	25	27	23	23	13	13	10	7.3
11	17	23	22	18	25	27	24	22	18	13	9.4	7.6
12	17	22	22	18	25	26	23	22	29	13	9.4	7.6
13	19	21	23	17	25	25	18	25	31	13	9.4	12
14	22	22	22	18	25	24	19	33	22	13	9.4	14
15	22	23	22	18	26	24	20	28	19	12	9.4	21
16	21	23	21	17	28	24	25	24	20	13	9.4	20
17	19	23	21	16	32	25	30	22	18	13	9.4	19
18	18	24	20	16	28	24	38	21	18	12	8.8	17
19	21	24	20	17	28	26	39	21	18	12	9.1	16
20	20	24	20	19	27	29	45	20	18	12	9.1	16
21	18	23	20	21	28	28	42	21	18	12	9.4	16
22	15	23	22	23	28	31	45	22	16	12	8.8	16
23	15	22	22	25	28	32	46	21	15	14	8.5	13
24	16	22	21	27	27	33	39	21	15	14	8.5	13
25	16	22	21	27	26	30	33	20	15	12	5.1	14
26	16	22	20	26	26	28	29	19	15	10	5.3	14
27	16	23	20	26	25	26	27	17	15	9.7	5.3	13
28	17	22	20	26	25	26	26	17	14	9.4	5.3	13
29	18	23	19	26	------	26	27	21	15	9.4	5.1	13
30	21	22	19	25	------	25	26	20	15	9.1	5.1	13
31	24	------	19	24	------	24	------	21	------	9.1	4.4	------
TOTAL	554	682	654	622	719	804	856	683	516	381.7	260.3	345.7
MEAN	17.9	22.7	21.1	20.1	25.7	25.9	28.5	22.0	17.2	12.3	8.40	11.5
MAX	24	24	23	27	32	33	46	33	31	15	10	21
MIN	13	21	19	15	22	23	18	17	10	9.1	4.4	4.2
AC-FT	1,100	1,350	1,300	1,230	1,430	1,590	1,700	1,350	1,020	757	516	686

CAL YR 1969 TOTAL 7,338.1 MEAN 20.1 MAX 68 MIN 6.3 AC-FT 14,560
WTR YR 1970 TOTAL 7,077.7 MEAN 19.4 MAX 46 MIN 4.2 AC-FT 14,040

PEAK DISCHARGE (BASE, 50 CFS)

DATE	TIME	G.H.	DISCHARGE
4-23	0100	2.69	51

06449000 Lake Creek below refuge, near Tuthill, S. Dak.

LOCATION.--Lat 43°08'46", long 101°30'38", in SW¼ sec.30, T.37 N., R.35 W., Bennett County, on left bank 400 ft downstream from east boundary of LaCreek game refuge, 1.2 miles southwest of Tuthill, and 5.5 miles upstream from mouth.

DRAINAGE AREA.--120 sq mi, approximately, of which about 60 sq mi probably contributes directly to surface runoff.

PERIOD OF RECORD.--February 1938 to September 1940, July 1962 to current year.

GAGE.--Water-stage recorder. Altitude of gage is 3,055 ft (by barometer). Prior to Aug. 4, 1938, nonrecording gage at same site and datum.

AVERAGE DISCHARGE.--10 years, 14.9 cfs (10,800 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 79 cfs May 6; maximum gage height, 4.32 ft Apr. 29, May 2, 6; no flow Oct. 1-6, Aug. 27.
Period of record: Maximum discharge, 178 cfs June 18, 1967 (gage height, 5.17 ft); no flow for many days in most years.

REMARKS.--Records good above 10 cfs and poor below. Flow regulated by series of lakes above gage.

Rating table (gage height, in feet, and discharge, in cubic feet per second)
(Stage-discharge relation affected by backwater from beaver dam Oct. 1 to Dec. 1;
shifting-control method used Jan. 24 to Apr. 6, May 6-20, June 9 to July 4, Sept. 13-18)

1.0	0	1.5	2.5	3.0	26
1.1	.25	1.7	4.0	3.5	42
1.2	.65	2.0	6.9	4.0	60
1.3	1.2	2.5	14	4.5	83

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0	.90	1.9	8.5	12	34	48	77	13	2.3	.52	4.6
2	0	.80	2.0	7.1	13	34	48	78	2.8	2.2	1.4	4.1
3	0	.70	2.3	6.4	13	33	48	78	2.7	1.8	4.3	3.8
4	0	.60	2.0	6.5	13	33	48	78	1.6	2.8	6.1	3.1
5	0	.50	1.9	7.1	14	36	47	77	1.3	4.5	5.0	1.7
6	0	.40	1.9	7.5	14	41	47	79	1.4	4.8	2.0	1.5
7	.02	.30	2.0	8.1	13	40	47	77	1.4	3.0	1.9	1.7
8	.20	.20	2.2	17	13	41	46	76	2.4	2.8	1.5	1.3
9	.50	.10	1.9	26	13	40	46	74	6.2	2.4	1.4	.76
10	.70	.08	1.9	23	13	40	46	71	8.1	1.9	1.2	2.4
11	1.0	.05	1.9	22	13	40	45	70	9.0	1.4	2.5	3.3
12	1.1	.02	1.9	22	13	39	46	58	9.9	1.3	1.1	1.7
13	1.2	.02	1.7	22	13	39	45	31	10	1.4	.32	1.1
14	1.2	.03	1.7	20	13	39	43	30	11	1.3	.94	.87
15	1.3	.05	1.8	20	13	38	43	28	18	1.1	1.0	2.9
16	1.3	.07	1.8	21	13	38	43	28	22	1.0	.81	6.5
17	1.4	.09	1.6	22	13	38	43	27	23	.87	.98	6.1
18	1.4	.15	1.6	22	13	37	43	22	23	.87	.70	5.4
19	1.5	.30	1.6	21	13	39	43	6.6	25	.87	1.3	4.7
20	1.5	.50	1.5	21	13	40	41	6.4	32	.65	1.3	4.5
21	1.6	.70	1.4	21	13	40	50	6.0	35	.65	1.1	4.3
22	1.7	.90	1.4	21	13	40	71	5.6	36	1.1	1.5	3.8
23	1.6	1.0	1.5	21	13	41	72	5.5	37	1.4	1.7	3.0
24	1.5	1.1	1.4	21	13	42	72	5.8	30	.81	1.7	1.5
25	1.4	1.2	1.6	21	13	42	72	15	19	.56	1.5	.92
26	1.3	1.3	1.5	20	22	43	73	18	18	.36	.49	.81
27	1.3	1.4	1.6	20	33	45	74	19	17	.66	0	.81
28	1.2	1.6	1.7	20	34	45	75	19	17	.67	.84	1.5
29	1.2	1.7	1.9	15	------	45	76	18	8.4	.68	.50	4.3
30	1.1	1.8	1.7	12	------	45	77	18	2.6	.75	.02	4.9
31	1.0	------	4.7	12	------	46	------	18	------	.70	.67	------
TOTAL	29.22	18.56	57.5	534.2	415	1,233	1,618	1,219.9	443.8	47.60	46.29	87.87
MEAN	.94	.62	1.85	17.2	14.8	39.8	53.9	39.4	14.8	1.54	1.49	2.93
MAX	1.7	1.8	4.7	26	34	46	77	79	37	4.8	6.1	6.5
MIN	0	.02	1.4	6.4	12	33	41	5.5	1.3	.36	0	.76
AC-FT	58	37	114	1,060	823	2,450	3,210	2,420	880	94	92	174

CAL YR 1969 TOTAL 6,012.33 MEAN 16.5 MAX 60 MIN 0 AC-FT 11,930
WTR YR 1970 TOTAL 5,750.94 MEAN 15.8 MAX 79 MIN 0 AC-FT 11,410

06449100 Little White River near Vetal, S. Dak.

LOCATION.--Lat 43°06'03", long 101°13'49", in NE¼NW¼ sec.17, T.36 N., R.33 W., Bennett County, on left bank 120 ft downstream from highway bridge, 0.3 mile downstream from small right-bank tributary, 10.8 miles southeast of Vetal, and 15.3 miles upstream from Spring Creek.

DRAINAGE AREA.--590 sq mi, approximately, of which about 415 sq mi probably contributes directly to surface runoff.

PERIOD OF RECORD.--August 1959 to current year. Prior to October 1965, published as South Fork White River near Vetal.

GAGE.--Water-stage recorder. Datum of gage is 2,780.69 ft above mean sea level. Prior to Nov. 14, 1959, nonrecording gage at same site and datum.

AVERAGE DISCHARGE.--11 years, 56.3 cfs (40,790 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 260 cfs Apr. 24 (gage height, 4.39 ft); minimum daily, 15 cfs many days in August and September.
Period of record: Maximum discharge, 1,330 cfs Mar. 13, 1966 (gage height, 7.75 ft); minimum daily, 10 cfs Sept. 1-3, 10, 1961, Dec. 18, 1964.

REMARKS.--Records good except those for winter periods, which are poor. Some small diversions for irrigation and some storage in several small lakes above station.

Rating table (gage height, in feet, and discharge, in cubic feet per second)
(Stage-discharge relation affected by ice Nov. 14-19, Dec. 6 to Feb. 23, Mar. 10-12, Apr. 12-15)

2.4	9.0
2.5	17
2.7	34
3.0	62
3.5	118
4.0	184
4.5	268

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	24	38	32	27	40	103	94	217	60	31	17	15
2	24	37	31	26	40	103	98	217	44	30	17	15
3	25	37	31	26	40	102	98	214	31	29	17	18
4	28	37	31	26	42	101	97	211	26	27	18	20
5	27	35	31	25	44	101	98	208	25	28	22	18
6	25	35	29	25	44	101	99	201	24	29	26	17
7	24	37	28	25	44	105	99	162	21	27	24	19
8	25	36	28	25	44	105	97	114	20	22	19	16
9	25	35	27	26	44	107	97	106	20	22	19	15
10	28	35	27	27	42	95	97	103	28	22	20	16
11	57	34	28	28	40	90	99	99	31	20	20	16
12	61	34	29	28	38	95	85	97	35	20	20	17
13	62	35	30	28	38	99	65	97	32	22	19	20
14	52	30	32	28	38	97	80	74	40	20	17	20
15	33	33	30	27	40	95	110	63	42	20	16	20
16	31	35	30	26	40	95	130	58	50	20	16	20
17	30	33	29	26	40	92	125	56	56	19	16	20
18	31	30	30	26	40	87	125	55	65	20	15	22
19	30	33	29	27	40	86	147	52	68	19	15	21
20	29	35	29	28	40	86	146	64	68	18	16	21
21	28	30	30	33	44	93	142	66	75	18	16	21
22	28	31	33	45	50	95	176	66	80	17	15	21
23	28	28	32	60	55	94	243	68	80	20	15	21
24	30	29	32	65	58	97	248	68	80	22	17	21
25	37	28	32	70	56	92	246	67	77	20	16	21
26	37	29	30	65	56	93	235	71	67	18	15	20
27	38	30	29	65	60	94	234	61	64	17	15	20
28	39	28	29	60	83	98	230	62	60	17	15	20
29	39	33	28	50	------	98	230	64	49	18	15	20
30	40	31	27	45	------	96	227	62	44	17	15	20
31	39	------	27	40	------	95	------	61	------	17	16	------
TOTAL	1,054	991	920	1,128	1,280	2,990	4,297	3,184	1,462	666	539	571
MEAN	34.0	33.0	29.7	36.4	45.7	96.5	143	103	48.7	21.5	17.4	19.0
MAX	62	38	33	70	83	107	248	217	80	31	26	22
MIN	24	28	27	25	38	86	65	52	20	17	15	15
AC-FT	2,090	1,970	1,820	2,240	2,540	5,930	8,520	6,320	2,900	1,320	1,070	1,130

CAL YR 1969	TOTAL 20,230	MEAN 55.4	MAX 281	MIN 15	AC-FT 40,130
WTR YR 1970	TOTAL 19,082	MEAN 52.3	MAX 248	MIN 15	AC-FT 37,850

PEAK DISCHARGE (BASE, 150 CFS)

DATE	TIME	G.H.	DISCHARGE
4-24	0300	4.39	260

06449250 Spring Creek near St. Francis, S. Dak.

LOCATION.--Lat 43°04'21", long 101°01'49", in NW¼NE¼ sec.25, T.36 N., R.32 W., Todd County, on left bank 40 ft downstream from highway culvert, 4.1 miles upstream from mouth, and 8.0 miles southwest of St. Francis.

DRAINAGE AREA.--57 sq mi, approximately, of which about 10 sq mi probably contributes directly to surface runoff.

PERIOD OF RECORD.--August 1959 to current year.

GAGE.--Water-stage recorder. Datum of gage is 2,815.50 ft above mean sea level.

AVERAGE DISCHARGE.--11 years, 3.68 cfs (2,670 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 51 cfs Apr. 18 (gage height, 7.05 ft); no flow for many days. Period of record: Maximum discharge, 65 cfs June 21, 1962 (gage height, 7.41 ft); maximum gage height, 7.43 ft Mar. 19, 1969; no flow for many days in each year.

REMARKS.--Records good. Small diversions above station for irrigation of hay meadows.

Rating table (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used July 4-14)

3.94	0	4.5	5.0
4.0	.26	4.8	9.8
4.1	.93	5.5	22
4.3	2.5	7.0	49

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1		0	.03	.03	0	4.4	13	24	5.3	0		
2		0	.07	.07	0	5.8	12	23	4.9	0		
3		0	.03	.11	0	5.6	11	21	4.6	0		
4		0	0	.16	0	5.5	11	20	4.4	0		
5		0	.07	.11	0	5.6	11	19	3.7	0		
6		0	.11	.16	0	6.2	11	18	3.4	0		
7		0	.07	.07	0	7.0	11	16	2.9	0		
8		0	.03	0	0	8.1	11	14	2.5	0		
9		0	.03	0	0	7.1	11	12	2.1	.21		
10		0	0	.03	0	5.9	11	12	1.8	.46		
11		0	0	0	0	7.9	11	11	1.9	.26		
12		0	0	0	0	9.0	12	11	2.3	.21		
13		0	.03	0	0	9.0	11	10	2.0	.21		
14		0	0	0	0	8.6	13	11	1.7	0		
15		0	0	0	0	8.8	15	10	1.3	0		
16		0	0	0	0	9.1	17	10	.93	0		
17		.03	0	0	0	10	39	9.6	.73	0		
18		.03	0	0	0	10	49	9.3	.66	0		
19		.07	0	0	.03	7.1	42	8.4	.66	0		
20		.16	0	.03	.07	7.9	37	7.8	.73	0		
21		.07	0	0	.11	11	37	7.0	.59	0		
22		.11	0	0	.33	11	39	6.7	.46	0		
23		.07	0	0	.73	14	37	7.3	.21	0		
24		.07	0	0	.93	17	37	6.8	.07	0		
25		.07	0	0	1.5	16	36	6.5	.03	0		
26		.07	0	0	2.3	20	33	6.4	0	0		
27		.03	0	0	3.6	18	30	5.9	0	0		
28		0	0	0	4.0	18	28	6.1	0	0		
29		.03	0	0	------	16	27	7.0	0	0		
30		0	0	0	------	15	25	6.2	0	0		
31		------	0	.03	------	14	------	5.6	------	0		------
TOTAL	0	0.81	0.47	0.80	13.60	318.6	688	348.6	49.87	1.35	0	0
MEAN	0	.027	.015	.026	.49	10.3	22.9	11.2	1.66	.044	0	0
MAX	0	.16	.11	.16	4.0	20	49	24	5.3	.46	0	0
MIN	0	0	0	0	0	4.4	11	5.6	0	0	0	0
AC-FT	0	1.6	.9	1.6	27	632	1,360	691	99	2.7	0	0

CAL YR 1969 TOTAL 1,302.36 MEAN 3.57 MAX 48 MIN 0 AC-FT 2,580
WTR YR 1970 TOTAL 1,422.10 MEAN 3.90 MAX 49 MIN 0 AC-FT 2,820

PEAK DISCHARGE (BASE, 25 CFS)

DATE	TIME	G.H.	DISCHARGE
4-18	1900	7.05	51

06449500 Little White River near Rosebud, S. Dak.

LOCATION.--Lat 43°19'32", long 100°53'00", in SW¼NW¼ sec.28, T.39 N., R.30 W., Todd County, on left bank at downstream side of bridge on U.S. Highway 18, 0.3 mile downstream from Ti-Shena-Ze Creek, 0.7 mile downstream from Soldier Creek, and 6.4 miles north of Rosebud.

DRAINAGE AREA.--1,020 sq mi, approximately, of which about 760 sq mi probably contributes directly to surface runoff.

PERIOD OF RECORD.--May 1943 to current year. Prior to October 1965, published as South Fork White River near Rosebud.

GAGE.--Water-stage recorder. Datum of gage is 2,294.99 ft above mean sea level. Prior to May 11, 1948, nonrecording gage at same site and datum.

AVERAGE DISCHARGE.--27 years, 113 cfs (81,870 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 362 cfs Apr. 24 (gage height, 4.45 ft); maximum gage height, 5.91 ft Feb. 5 (backwater from ice); minimum daily, 39 cfs Aug. 17, 26.
Period of record: Maximum discharge, 4,640 cfs June 11, 1967 (gage height, 14.09 ft), from rating curve extended above 1,300 cfs; minimum daily, 10 cfs Jan. 4, 1949, Feb. 20, 1955.

REMARKS.--Records good except those for winter periods, which are poor. Some small diversions for irrigation and some storage in several small lakes above station.

REVISIONS(WATER YEARS).--WSP 1056: 1943, drainage area. WSP 1309: 1946(M).

Rating table (gage height, in feet, and discharge, in cubic feet per second)
(Stage-discharge relation affected by ice Dec. 30 to Feb. 28, Apr. 12, 13;
shifting-control method used May 9-26, July 30 to Aug. 19)

3.1	32
3.3	54
3.5	84
3.8	144
4.2	252
4.6	386

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	64	90	73	55	100	142	156	280	121	81	49	48
2	68	87	71	55	95	145	161	278	116	73	50	46
3	68	83	72	50	90	152	161	273	104	66	48	50
4	73	83	73	50	90	142	160	269	94	64	48	46
5	67	83	74	50	95	143	160	268	90	64	50	53
6	65	82	73	50	95	143	163	266	91	67	55	52
7	68	83	77	50	95	140	166	259	85	67	64	55
8	68	81	73	48	100	142	160	215	79	62	62	54
9	74	81	62	48	120	151	156	192	79	61	54	52
10	67	81	74	60	120	160	155	188	79	60	59	47
11	65	82	76	75	120	169	154	182	81	60	56	52
12	89	83	76	80	120	178	150	181	97	61	54	52
13	97	86	80	80	110	176	145	184	88	60	63	53
14	97	86	76	70	110	168	139	198	83	60	51	64
15	93	73	77	65	120	166	211	163	93	56	50	67
16	74	88	77	60	120	161	214	149	90	55	53	65
17	71	88	74	60	110	163	218	141	91	54	39	67
18	76	78	74	60	110	166	251	137	90	56	43	66
19	76	72	79	55	100	166	275	131	99	55	42	66
20	74	80	76	55	100	154	260	129	101	53	40	67
21	73	78	66	55	110	161	239	136	96	52	42	61
22	73	76	70	60	120	176	258	140	103	51	46	61
23	73	76	78	80	140	181	306	141	108	53	42	61
24	74	68	74	100	150	222	353	140	102	61	43	63
25	78	66	70	140	150	197	350	137	113	56	46	64
26	83	66	57	140	150	178	331	129	101	53	39	61
27	80	69	65	120	140	176	328	128	96	51	44	60
28	81	72	60	120	140	171	316	125	91	51	48	62
29	82	70	58	120	------	176	306	137	91	52	44	62
30	90	73	55	100	------	168	295	125	83	49	43	63
31	96	------	55	100	------	158	------	120	------	49	43	------
TOTAL	2,377	2,364	2,195	2,311	3,220	5,091	6,697	5,541	2,835	1,813	1,510	1,740
MEAN	76.7	78.8	70.8	74.5	115	164	223	179	94.5	58.5	48.7	58.0
MAX	97	90	80	140	150	222	353	280	121	81	64	67
MIN	64	66	55	48	90	140	139	120	79	49	39	46
AC-FT	4,710	4,690	4,350	4,580	6,390	10,100	13,280	10,990	5,620	3,600	3,000	3,450

CAL YR 1969 TOTAL 40,824 MEAN 112 MAX 500 MIN 50 AC-FT 80,970
WTR YR 1970 TOTAL 37,694 MEAN 103 MAX 353 MIN 39 AC-FT 74,770

PEAK DISCHARGE (BASE, 330 CFS)

DATE	TIME	G.H.	DISCHARGE
4-24	1000	4.45	362

06450500 Little White River below White River, S. Dak.

LOCATION.--Lat 43°36'04", long 100°44'52", in SW¼NW¼ sec.23, T.42 N., R.29 W., Mellette County, on left bank at downstream side of bridge on U.S. Highway 83, 1.3 miles downstream from Pine Creek, and 2.0 miles north of town of White River.

DRAINAGE AREA.--1,570 sq mi, approximately, of which about 1,310 sq mi probably contributes directly to surface runoff.

PERIOD OF RECORD.--October 1949 to current year. Prior to October 1965, published as South Fork White River below White River.

GAGE.--Water-stage recorder. Datum of gage is 1,912.78 ft above mean sea level. Prior to June 8, 1968, at site 0.8 mile downstream at datum 4.50 ft lower.

AVERAGE DISCHARGE.--21 years, 134 cfs (97,080 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 804 cfs Nov. 14 (gage height, 4.41 ft); maximum gage height, 6.46 ft Jan. 26 (backwater from ice); minimum daily discharge, 26 cfs Sept. 2.
Period of record: Maximum discharge, 13,700 cfs June 12, 1967 (gage height, 10.02 ft, site and datum then in use); maximum gage height, 11.21 ft June 7, 1968, site and datum then in use; maximum gage height at present site and datum, 15.46 ft June 7, 1968, from floodmarks; no flow for parts of several days in 1952, 1954, 1956; minimum daily discharge, 7 cfs July 31, Aug. 31, Sept. 1. 1952.

REMARKS.--Records fair except those for winter periods, which are poor. Diurnal fluctuations caused by small powerplant 2.2 miles upstream. Several small diversions for irrigation and some storage in several small lakes above station. Records of chemical analysis for the water year 1970 are published in Part 2 of this report.

Rating tables (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Oct. 1-8, Nov. 14 to Dec. 8, Mar. 9-31, Apr. 27 to May 16, June 2, Aug. 21 to Sept. 30; stage-discharge relation affected by ice Dec. 9 to Mar. 8)

Oct. 1 to Mar. 31		Apr. 1 to Sept. 30	
3.4	29	2.7	24
3.5	53	2.8	38
3.7	122	3.0	81
4.0	250	3.2	136
		3.5	253
		4.0	528

DISCHARGE IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	48	63	79	60	110	140	146	276	91	64	36	37
2	63	48	75	60	110	140	146	262	95	64	33	26
3	51	55	66	55	100	140	146	258	99	59	38	35
4	69	53	59	55	100	150	146	249	86	48	28	41
5	79	63	72	55	100	150	150	268	81	48	54	33
6	75	79	85	55	110	150	150	258	81	49	46	37
7	79	72	66	55	110	160	146	244	67	48	49	41
8	79	75	56	50	110	200	146	227	71	46	49	42
9	82	69	50	50	110	218	146	194	59	46	48	32
10	75	89	50	50	130	142	146	178	64	46	62	36
11	75	92	55	60	130	126	150	167	64	42	53	38
12	118	85	65	70	130	146	207	174	104	38	40	29
13	82	68	75	75	120	154	227	167	99	46	44	32
14	82	152	85	75	120	146	174	174	97	46	59	41
15	72	99	90	70	120	142	198	167	123	38	46	41
16	53	130	100	65	130	146	240	146	270	30	35	48
17	53	122	100	65	130	142	244	136	153	30	47	53
18	53	85	95	65	120	135	300	136	119	42	35	57
19	69	99	95	60	110	115	320	136	104	34	34	55
20	66	94	95	60	110	111	315	124	116	33	38	50
21	72	107	95	60	110	111	341	127	107	33	34	53
22	75	79	90	65	110	126	391	127	104	32	32	46
23	82	69	90	70	130	122	397	127	102	34	34	57
24	92	79	95	90	150	174	468	122	107	40	30	51
25	74	69	100	120	160	166	462	113	107	40	33	51
26	96	69	90	140	160	146	391	110	102	35	27	49
27	89	56	80	140	150	146	341	113	97	35	39	44
28	89	66	70	130	150	146	305	113	86	32	33	42
29	89	72	70	130	------	154	281	122	81	38	31	44
30	75	85	65	120	------	152	276	140	74	35	34	46
31	72	------	60	110	------	150	------	104	------	42	33	------
TOTAL	2,328	2,443	2,418	2,385	3,430	4,546	7,496	5,259	3,010	1,293	1,234	1,287
MEAN	75.1	81.4	78.0	76.9	123	147	250	170	100	41.7	39.8	42.9
MAX	118	152	100	140	160	218	468	276	270	64	62	57
MIN	48	48	50	50	100	111	146	104	59	30	27	26
AC-FT	4,620	4,850	4,800	4,730	6,800	9,020	14,870	10,430	5,970	2,560	2,450	2,550

CAL YR 1969 TOTAL 41,645 MEAN 114 MAX 700 MIN 39 ACFT 82,600
WAT YR 1970 TOTAL 37,129 MEAN 102 MAX 468 MIN 26 ACFT 73,650

06452000 White River near Oacoma, S. Dak.

LOCATION(revised).--Lat 43°44'54", long 99°33'22", in SE¼SW¼ sec.3, T.103 N., R.73 W., Lyman County, near center of span at downstream side of bridge on State Highway 47, 1.5 miles downstream from Wagner Draw, 1.8 miles upstream from high-water line of Lake Francis Case, and 8.8 miles southwest of Oacoma.

DRAINAGE AREA.--10,200 sq mi, approximately.

PERIOD OF RECORD.--August 1928 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,377.29 ft above mean sea level. See WSP 1709 or 1729 for history of changes prior to Feb. 27, 1960.

AVERAGE DISCHARGE.--42 years, 546 cfs (395,600 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 10,600 cfs Apr. 26 (gage height, 8.40 ft); minimum daily, 1.2 cfs Aug. 30.

Period of record: Maximum discharge, 51,900 cfs Mar. 30, 1952 (gage height, 15.40 ft, site and datum then in use); maximum gage height, 17.6 ft Mar. 31, 1950 (site and datum then in use), from floodmark (ice jam); minimum discharge, 0.5 cfs July 7, 8, 21, 23, Aug. 8, 10, 1936.

REMARKS.--Records good except those for winter periods, which are poor. Some diversions for irrigation above station. Water-quality records for the water year 1970 are published in Part 2 of this report.

REVISIONS(WATER YEARS).--WSP 786: Drainage area. WSP 1309: 1929-30(M).

Rating table (gage height, in feet, and discharge, in cubic feet per second)
(Stage-discharge relation affected by ice Nov. 13 to Mar. 19; shifting-control method used Apr. 7-25, June 13 to July 4)

1.4	1.0	3.0	294
1.6	2.0	3.5	570
1.8	3.9	4.0	940
1.9	6.0	4.5	1,490
2.0	18	5.0	2,290
2.2	49	6.0	4,310
2.5	116	8.0	9,600

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	36	113	140	70	160	400	518	3,210	396	111	82	1.4
2	30	108	130	65	200	450	451	2,110	469	100	90	1.3
3	29	103	120	65	160	450	418	1,720	350	100	59	1.5
4	41	106	120	60	100	500	396	1,200	286	90	44	1.3
5	46	106	100	55	100	600	365	1,020	331	79	33	1.5
6	59	103	100	50	120	600	331	815	281	66	59	1.3
7	57	98	100	45	140	450	294	718	265	64	59	1.6
8	46	95	95	45	160	350	265	633	214	55	21	1.5
9	55	93	90	40	180	200	256	538	176	49	18	1.5
10	65	93	95	40	170	100	248	457	153	35	18	1.5
11	163	93	100	35	160	90	241	445	156	29	17	1.5
12	176	90	110	35	140	80	277	401	257	21	14	1.6
13	169	50	120	30	130	75	365	355	183	16	41	66
14	149	30	120	25	130	70	345	355	153	24	46	183
15	140	25	120	15	140	75	440	401	697	16	32	134
16	153	35	110	15	160	80	591	380	3,240	17	26	113
17	137	40	100	15	180	90	710	355	1,970	41	5.4	103
18	125	35	100	10	180	100	2,630	542	1,200	38	5.6	90
19	125	30	100	10	170	200	3,600	544	1,030	38	5.4	93
20	166	40	100	10	180	248	2,580	407	703	185	8.4	106
21	207	50	95	10	200	434	2,090	375	591	166	8.4	140
22	207	70	95	15	250	475	1,920	340	390	122	9.6	156
23	172	80	95	20	300	570	4,820	303	350	106	9.6	122
24	149	90	100	30	400	661	6,350	269	355	86	5.0	77
25	131	100	95	40	450	661	7,630	252	290	75	3.1	75
26	113	110	90	50	450	815	8,690	233	244	90	2.6	59
27	106	120	85	60	450	876	8,300	229	214	131	2.0	44
28	100	120	80	65	400	830	5,800	222	193	72	1.5	39
29	98	130	75	60	------	845	5,500	281	176	41	1.4	38
30	100	140	75	80	------	748	3,430	317	149	36	1.2	38
31	122	------	75	100	------	640	------	286	------	36	1.5	------
TOTAL	3,472	2,496	3,130	1,265	5,960	12,763	69,851	19,713	15,462	2,135	729.7	1,693.5
MEAN	112	83.2	101	40.8	213	412	2,328	636	515	68.9	23.5	56.5
MAX	207	140	140	100	450	876	8,690	3,210	3,240	185	90	183
MIN	29	25	75	10	100	70	241	222	149	16	1.2	1.3
AC-FT	6,890	4,950	6,210	2,510	11,820	25,320	138,500	39,100	30,670	4,230	1,450	3,360

CAL YR 1969 TOTAL 155,140 MEAN 425 MAX 6,430 MIN 12 AC-FT 307,700
WTR YR 1970 TOTAL 138,670.2 MEAN 380 MAX 8,690 MIN 1.2 AC-FT 275,100

PEAK DISCHARGE (BASE, 5,500 CFS)

DATE	TIME	G.H.	DISCHARGE
4-^	0800	8.40	10,600
	2400	7.30	7,280

06452500 Lake Francis Case at Pickstown, S. Dak.

LOCATION.--Lat 43°04'05", long 98°33'15", in SE¼ sec.5, T.95 N., R.65 W., Charles Mix County, in tower 6 of outlet works at Fort Randall Dam on Missouri River at Pickstown, 1.0 mile upstream from Randall Creek, and at mile 880.0.

DRAINAGE AREA.--263,500 sq mi, approximately.

PERIOD OF RECORD.--December 1952 to current year. Prior to October 1964, published as Fort Randall Reservoir at Pickstown.

GAGE.--Water-stage recorder. Datum of gage is at mean sea level. Prior to Mar. 25, 1953, elevations determined from temporary nonrecording gages.

EXTREMES.--Current year: Maximum contents, 4,444,000 acre-ft Apr. 30 (elevation, 1,361.5 ft, affected by wind); minimum, 1,558,000 acre-ft Nov. 29 (elevation, 1,318.0 ft, affected by wind).
Period of record: Maximum contents, 5,087,000 acre-ft June 20, 1962 (elevation, 1,364.2 ft); minimum since initial filling, 1,450,000 acre-ft Oct. 23, 1956 (elevation, 1,311.5 ft).

REMARKS.--Reservoir is formed by earthfill dam; storage began in December 1952; initial closure made July 1952. Maximum capacity, 5,816,000 acre-ft below elevation 1,375.0 ft (top of spillway gates). Normal maximum, 4,834,000 acre-ft below elevation 1,365.0 ft. Inactive storage, 1,336,000 acre-ft below elevation 1,310.0 ft. No dead storage; elevation of invert of lowest outlet is 1,227.0 ft. Figures given herein represent elevations at outlet works and total contents adjusted for wind effect.
The spillway consists of 21 taintor gates, each 40 ft wide by 29 ft high; spillway capacity, 490,000 cfs at pool elevation 1,375 ft. Crest of spillway is at elevation 1,346 ft. Normal releases are through 12 tunnels 22 ft in diameter. Installation of power units in 8 of these tunnels was completed in January 1956; maximum release through power tunnels is 46,000 cfs; maximum release through 4 other tunnels is 130,000 cfs at pool elevation 1,375 ft. Water is used for flood control, navigation, power, and incidental uses.

COOPERATION.--Elevations and contents furnished by Corps of Engineers.

MONTHEND ELEVATION AND CONTENTS AT 2400, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

Date	Elevation (feet)	Contents (acre-feet)	Change in contents (acre-feet)
Sept.30	1,346.4	3,154,000	-
Oct. 31	1,333.2	2,285,000	-869,000
Nov. 30	1,318.2	1,559,000	-726,000
Dec. 31	1,323.9	1,821,000	+262,000
CAL YR 1969	-	-	-188,000
Jan. 31	1,343.4	2,943,000	+1,122,000
Feb. 28	1,351.5	3,566,000	+623,000
Mar. 31	1,360.6	4,329,000	+763,000
Apr. 30	1,361.5	4,444,000	+115,000
May 31	1,357.7	4,080,000	-364,000
June 30	1,356.0	3,912,000	-168,000
July 31	1,356.0	3,934,000	+22,000
Aug. 31	1,352.9	3,665,000	-269,000
Sept.30	1,347.7	3,252,000	-413,000
WTR YR 1970	-	-	+98,000

06453000 Missouri River at Fort Randall Dam, S. Dak.

LOCATION(revised).--Lat 43°03'54", long 98°33'11", in NW¼NE¼ sec.8, T.95 N., R.63 W., Charles Mix County, in powerhouse of Fort Randall Dam on Missouri River at Pickstown, 0.8 mile upstream from Randall Creek, and at mile 879.8.

DRAINAGE AREA.--263,500 sq mi, approximately.

PERIOD OF RECORD.--May 1947 to current year.

GAGE.--Totalizing flowmeters on each turbine in Fort Randall powerhouse. Prior to Nov. 10, 1966, water-stage recorder, datum of gage, 1,230.00 ft above mean sea level; Nov. 10, 1966, to June 30, 1969, water-stage recorder, datum of gage, 1,225.00 ft above mean sea level, at site 7.0 miles downstream.

AVERAGE DISCHARGE.--23 years, 23,430 cfs (16,980,000 acre-ft per year).

EXTREMES.--Current year: Maximum daily discharge during year, 48,000 cfs Oct. 1; minimum daily, 4,900 cfs Mar. 1.

Period of record: Maximum discharge, 447,000 cfs Apr. 12, 1952; maximum gage height, 20.82 ft Apr. 12, 1952 (site and datum then in use); minimum daily discharge, 100 cfs Mar. 29, 1962.

Flood in April 1943 reached a stage of about 16.5 ft. Maximum stage known, in April 1881, was about 5 ft higher than that of April 1943.

REMARKS.--Records good. Flow regulated by Lake Francis Case. (See sta 6-4525.) Many diversions for irrigation above station.

COOPERATION.--Daily discharge determined from flow through turbines furnished by Corps of Engineers. One discharge measurement made by Geological Survey.

DISCHARGE IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	48,000	39,100	21,900	17,300	14,100	4,900	31,500	25,500	30,900	38,200	43,200	43,500
2	47,700	39,300	28,700	18,000	14,200	14,800	31,600	22,800	31,400	39,400	43,200	43,700
3	47,700	39,100	29,200	17,300	14,600	16,600	31,900	15,800	32,700	34,400	43,400	41,500
4	47,500	39,100	28,800	17,000	13,800	15,100	32,000	27,000	33,500	33,700	43,600	38,900
5	43,100	39,000	25,000	17,000	14,400	14,800	27,000	28,000	33,300	30,600	42,300	39,000
6	40,400	38,900	23,100	15,200	13,900	12,600	30,400	27,800	36,700	37,800	43,800	41,000
7	42,400	38,700	18,600	15,500	13,900	9,800	26,300	27,700	29,900	40,800	43,000	40,900
8	45,500	38,600	17,700	16,300	13,800	9,300	25,500	30,900	36,300	41,200	42,800	40,800
9	45,400	38,400	17,500	14,700	14,600	22,200	29,900	28,700	34,700	41,900	43,000	41,700
10	45,400	37,400	16,600	14,600	15,000	22,400	30,000	22,300	36,500	41,900	43,100	41,400
11	45,200	38,800	16,800	14,600	15,500	22,100	31,200	32,100	34,200	40,400	43,200	42,100
12	45,600	38,800	17,200	14,600	16,000	21,900	24,500	24,200	33,900	40,800	43,100	42,200
13	45,500	38,900	16,800	14,700	15,500	21,900	33,000	25,800	33,100	41,000	43,200	37,600
14	45,400	38,800	16,900	14,300	15,800	21,600	33,000	26,300	25,800	40,700	43,200	42,300
15	42,700	39,200	17,500	13,900	15,400	22,000	25,200	25,300	32,900	39,000	43,200	42,400
16	39,600	39,100	17,100	14,100	15,400	24,000	22,400	22,100	33,000	39,200	43,100	39,900
17	39,600	38,800	17,400	14,200	15,100	24,900	21,900	22,200	30,600	40,100	42,900	37,900
18	39,600	37,800	17,300	14,300	15,500	29,100	26,200	30,300	30,500	41,200	43,000	38,100
19	39,600	36,500	17,300	14,500	15,600	29,300	20,800	30,600	35,100	40,400	43,100	37,900
20	39,500	36,400	17,600	14,800	15,300	23,400	26,600	29,700	34,500	40,300	43,100	38,000
21	39,500	36,300	17,000	15,000	15,100	23,400	20,500	35,100	33,500	39,700	43,200	37,900
22	39,300	36,300	15,400	14,600	15,100	21,400	22,400	36,400	36,500	41,400	43,200	38,000
23	38,500	36,200	15,700	14,200	15,800	24,500	21,500	28,800	34,000	40,400	43,000	38,500
24	39,500	34,100	14,600	14,700	15,700	26,600	19,800	28,000	37,500	42,700	43,000	38,500
25	39,500	31,700	14,300	14,600	10,300	27,800	16,700	31,100	37,400	42,900	43,200	39,000
26	39,300	32,100	14,300	14,500	9,900	27,700	14,300	27,400	40,300	43,000	43,400	39,000
27	39,200	29,100	14,600	14,000	7,400	25,900	24,100	27,400	34,100	43,000	43,400	39,100
28	39,100	29,000	14,800	14,500	5,100	24,700	21,400	27,500	32,800	43,100	43,400	39,000
29	39,100	31,600	15,600	14,400	------	20,600	22,400	30,400	34,600	43,100	43,800	39,000
30	39,200	32,500	17,100	13,800	------	26,800	22,700	30,500	35,200	40,500	43,700	39,000
31	39,200	------	17,500	13,500	------	27,900	------	23,500	------	41,000	43,600	------
TOTAL	306,800	099,600	569,900	464,700	391,800	660,000	766,700	851,200	015,400	243,800	339,400	197,800
MEAN	42,150	36,650	18,380	14,990	13,990	21,290	25,560	27,460	33,850	40,120	43,210	39,930
MAX	48,000	39,300	29,200	18,000	16,000	29,300	33,000	36,400	40,300	43,100	43,800	43,700
MIN	38,500	29,000	14,300	13,500	5,100	4,900	14,300	15,800	25,800	30,600	42,300	37,600
AC-FT	2,592M	2,181M	1,130M	921,700	777,100	1,309M	1,521M	1,688M	2,014M	2,467M	2,657M	2,376M

CAL YR 1969 TOTAL 10,338,770 MEAN 28,330 MAX 48,000 MIN 490 ACFT 20,510,000
WAT YR 1970 TOTAL 10,907,100 MEAN 29,880 MAX 48,000 MIN 900 ACFT 21,630,000

06464500 Keya Paha River at Wewela, S. Dak.

LOCATION.--Lat 43°01'42", long 99°46'45", in SE¼ sec.24, T.95 N., R.76 W., Tripp County, on left bank 13 ft downstream from bridge on U.S. Highway 183, 1.0 mile north of Wewela, 4.5 miles upstream from Holt Creek, and 11.5 miles downstream from Lost Creek.

DRAINAGE AREA.--1,070 sq mi, approximately.

PERIOD OF RECORD.--November 1937 to September 1940, October 1947 to current year. Monthly discharge only for October 1947, published in WSP 1309.

GAGE.--Water-stage recorder. Datum of gage is 2,049.78 ft above mean sea level. Prior to June 21, 1957, nonrecording gage at site 13 ft upstream at same datum.

AVERAGE DISCHARGE.--25 years (1938-40, 1947-70), 72.7 cfs (52,670 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 401 cfs Apr. 24 (gage height, 3.16 ft); minimum daily, 5.2 cfs Sept. 8.

Period of record: Maximum discharge, 5,430 cfs Mar. 31, 1952 (gage height, 13.08 ft); maximum gage height, 13.5 ft Mar. 25, 1950 (from floodmark, backwater from ice); no flow Jan. 10 to Feb. 15, 1949.

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

Rating table (gage height, in feet, and discharge, in cubic feet per second)
(Stage-discharge relation affected by ice Nov. 13 to Mar. 20, Apr. 12;
shifting-control method used Apr. 6-11, Apr. 13 to May 2, June 19-29)

1.0	4.0	2.0	118
1.1	8.0	2.5	210
1.2	13	3.0	325
1.4	29	3.5	475
1.7	68		

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	16	33	32	20	30	38	74	136	60	20	17	5.9
2	16	32	30	18	34	38	69	121	55	20	16	5.3
3	16	31	30	18	28	38	63	111	53	19	16	6.3
4	21	31	28	16	30	39	59	105	48	19	14	6.8
5	28	31	28	14	32	40	56	98	46	19	16	6.4
6	32	31	28	12	34	42	55	92	44	18	18	6.7
7	31	29	26	10	36	42	52	88	42	17	21	6.1
8	27	29	24	10	38	42	50	81	38	17	22	5.2
9	25	28	20	10	40	40	48	77	33	16	18	5.3
10	24	27	18	10	40	30	49	72	31	17	18	5.7
11	24	27	20	11	40	26	49	81	33	15	19	6.4
12	25	27	22	11	38	26	40	83	43	14	18	6.4
13	27	24	26	10	36	28	36	76	48	14	16	6.8
14	29	10	30	10	32	28	28	78	47	15	14	8.7
15	31	12	34	11	36	28	44	83	45	14	12	13
16	31	16	36	10	38	30	99	80	55	14	12	17
17	30	20	32	9.0	42	32	160	74	51	13	12	20
18	31	14	30	9.0	44	36	232	71	45	13	12	20
19	32	18	30	9.0	40	40	278	66	49	13	11	17
20	31	24	30	10	38	50	280	60	46	13	10	16
21	30	36	29	10	38	61	262	54	42	13	10	14
22	28	34	29	12	40	69	262	52	38	12	11	13
23	27	30	25	14	42	71	262	58	35	13	9.6	13
24	26	28	26	18	44	81	346	56	33	16	9.5	14
25	27	26	26	26	42	111	363	57	30	16	8.7	14
26	26	24	26	36	40	128	312	58	27	16	8.1	15
27	26	22	24	40	40	114	264	55	25	26	7.1	15
28	26	22	22	36	40	102	211	49	24	56	6.5	15
29	27	30	20	34	------	97	177	60	22	43	6.2	15
30	30	36	20	30	------	92	155	65	20	23	5.9	14
31	32	------	20	28	------	82	------	61	------	19	6.0	------
TOTAL	832	782	821	522.0	1,052	1,721	4,435	2,358	1,208	573	400.6	333.0
MEAN	26.8	26.1	26.5	16.8	37.6	55.5	148	76.1	40.3	18.5	12.9	11.1
MAX	32	36	36	40	44	128	363	136	60	56	22	20
MIN	16	10	18	9.0	28	26	28	49	20	12	5.9	5.2
AC-FT	1,650	1,550	1,630	1,040	2,090	3,410	8,800	4,680	2,400	1,140	795	661

CAL YR 1969 TOTAL 20,251.2 MEAN 55.5 MAX 1,200 MIN 7.0 AC-FT 40,170
WTR YR 1970 TOTAL 15,037.6 MEAN 41.2 MAX 363 MIN 5.2 AC-FT 29,830

PEAK DISCHARGE (BASE, 250 CFS)

DATE	TIME	G.H.	DISCHARGE
4-24	1930	3.16	401

06467000 Lewis and Clark Lake near Yankton, S. Dak.

LOCATION.--Lat 42°50'56", long 97°28'54", in SW¼ sec.7, T.33 N., R.1 W., Cedar County, Nebraska, in powerhouse of Gavins Point Dam on Missouri River, 3.75 miles southwest of Yankton, 13.6 miles upstream from James River, 32.5 miles downstream from Niobrara River, and at mile 811.0.

DRAINAGE AREA.--279,500 sq mi, approximately.

PERIOD OF RECORD.--July 1955 to current year. Prior to October 1955, published as Gavins Point Reservoir near Yankton.

GAGE.--Water-stage recorder. Datum of gage is at mean sea level. Prior to Dec. 9, 1955, recorder at temporary location on wall of intake structure unit 3.

EXTREMES.--Current year: Maximum contents, 483,000 acre-ft Sept. 4 (elevation, 1,208.3 ft, affected by wind); minimum, 370,000 acre-ft Dec. 3 (elevation, 1204.4 ft, affected by wind).
Period of record: Maximum contents, 565,000 acre-ft Apr. 1, 1960 (elevation, 1,210.7 ft); minimum since initial filling, 61,950 acre-ft Apr. 23, 1956 (elevation, 1,188.1 ft).

REMARKS.--Reservoir is formed by earthfill dam; storage began in July 1955. Maximum capacity, 541,000 acre-ft below elevation 1,210.0 ft (top of spillway gates). Normal maximum, 477,000 acre-ft below elevation 1,208.0 ft. Inactive storage, 156,000 acre-ft below elevation 1,195.0 ft. Dead storage, 18,000 acre-ft below elevation 1,180.0 ft (crest of spillway). Figures given herein represent elevations at powerhouse and total contents adjusted for wind effect.
The spillway consists of 14 taintor gates, each 40 ft wide by 30 ft high; spillway capacity, 280,000 cfs at pool elevation 1,210 ft. Crest of spillway is at elevation 1,180 ft. Normal releases are through 3 power units, installation completed in January 1957; maximum release through power units is 35,000 cfs at pool elevation, 1,210 ft. Water is used for flood control, navigation, power, and incidental uses.

COOPERATION.--Elevations and contents furnished by Corps of Engineers.

MONTHEND ELEVATION AND CONTENTS AT 2400, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

Date	Elevation (feet)	Contents (acre-feet)	Change in contents (acre-feet)
Sept.30	1,207.5	458,000	-
Oct. 31	1,206.6	431,000	-27,000
Nov. 30	1,205.2	391,000	-40,000
Dec. 31	1,205.9	413,000	+22,000
CAL YR 1969	-	-	-26,000
Jan. 31	1,207.5	460,000	+47,000
Feb. 28	1,206.8	438,000	-22,000
Mar. 31	1,204.7	379,000	-59,000
Apr. 30	1,205.4	398,000	+19,000
May 31	1,205.5	400,000	+2,000
June 30	1,206.6	432,000	+32,000
July 31	1,208.0	474,000	+42,000
Aug. 31	1,207.9	471,000	-3,000
Sept.30	1,207.9	471,000	0
WTR YR 1970	-	-	+13,000

06467500 Missouri River at Yankton, S. Dak.

LOCATION.--Lat 42°51'58", long 97°23'37", in SW¼SW¼ sec.18, T.93 N., R.55 W., Yankton County, near left bank in downstream end of left pier of Meridian Highway Bridge on U.S. Highway 81, 5.0 miles downstream from Gavins Point Dam, 6.0 miles upstream from James River, and at mile 805.8.

DRAINAGE AREA.--279,500 sq mi, approximately.

PERIOD OF RECORD.--October 1930 to current year. Monthly discharge only for some periods, published in WSP 1309. Gage-height records collected at same site March 1873 to November 1886, March 1905 to May 1908 (fragmentary), August 1921 to date (except winter months prior to 1932), are contained in reports of the U.S. Weather Bureau.

GAGE.--Water-stage recorder. Datum of gage is 1,139.68 ft above mean sea level. Prior to Sept. 29, 1932, non-recording gage and Sept. 20, 1932 to Mar. 9, 1967, water-stage recorder at present site and at datum 20 ft higher.

AVERAGE DISCHARGE.--40 years, 24,830 cfs (17,990,000 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 51,200 cfs Oct. 1 (gage height, 23.62 ft); minimum daily discharge, 15,000 cfs Jan. 6-13.
Period of record: Maximum discharge, 480,000 cfs Apr. 13, 1952; maximum gage height, 35.5 ft Apr. 13, 14, 1952; minimum daily discharge, 2,700 cfs Nov. 15, 16, 1940.
Maximum stage known, 50.5 ft Apr. 5, 1881 (ice jam), present datum.

REMARKS.--Records good. Flow regulated by Lewis and Clark Lake. (See sta 6-4670.) Many diversions for irrigation and water supply above station. Records of chemical analyses for the period July to September 1970 are published in Part 2 of this report.

REVISIONS.--WSP 761: Drainage area.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	49,700	43,700	34,100	17,100	15,300	17,700	31,600	26,400	31,500	34,700	45,200	44,700
2	49,800	43,600	33,700	17,400	16,500	17,700	31,400	26,800	31,900	34,800	45,400	44,200
3	50,000	43,300	33,100	17,100	16,500	15,300	31,400	26,900	33,000	35,500	45,400	43,200
4	49,700	43,300	29,800	17,100	16,500	17,300	31,600	27,100	33,600	36,000	45,600	42,700
5	49,900	43,200	26,700	16,500	17,100	16,800	31,400	28,000	34,800	37,300	45,300	43,100
6	48,900	43,100	23,800	15,000	16,600	18,000	31,400	28,100	35,400	38,200	44,800	43,400
7	49,100	43,000	20,900	15,000	16,700	17,200	31,600	28,000	35,700	39,900	45,000	43,600
8	49,200	43,000	18,200	15,000	16,800	17,600	28,800	29,100	36,200	41,700	45,500	43,700
9	49,300	43,000	16,600	15,000	17,100	18,900	29,000	29,600	37,200	41,900	45,700	43,500
10	49,400	43,200	16,400	15,000	17,100	21,300	29,800	29,500	37,500	40,800	45,600	43,400
11	48,300	43,200	16,200	15,000	17,600	24,600	30,400	28,900	36,200	40,600	45,800	43,600
12	48,000	43,200	16,100	15,000	17,700	25,000	31,200	28,400	34,600	40,400	45,800	42,900
13	47,900	42,800	16,200	15,000	17,500	24,400	30,700	28,100	34,700	40,600	45,800	43,100
14	47,700	42,800	16,300	16,000	17,400	24,600	30,100	28,200	35,000	40,400	45,800	42,600
15	47,500	42,800	16,400	16,000	17,400	25,800	30,400	28,900	35,100	40,600	46,100	41,200
16	45,500	42,700	16,500	16,000	17,600	27,100	28,800	30,200	35,300	40,400	45,900	40,600
17	45,300	42,600	16,600	16,100	17,100	28,100	27,800	30,200	35,500	41,300	45,700	40,900
18	44,100	42,600	16,300	16,000	17,000	28,200	28,200	30,800	35,300	42,000	45,200	40,900
19	43,800	41,400	16,100	16,000	17,000	27,100	28,000	31,100	35,200	42,300	45,100	40,800
20	43,800	40,500	16,000	16,000	17,100	26,600	27,600	31,900	35,000	41,600	44,900	40,800
21	43,600	39,100	15,800	16,000	17,100	26,700	27,000	33,100	35,000	40,700	45,200	40,700
22	43,900	37,600	15,800	16,000	17,200	27,000	26,500	33,700	34,800	40,500	44,900	40,700
23	43,900	36,500	15,900	16,000	17,200	27,500	26,600	33,600	34,900	41,100	44,900	40,500
24	43,500	34,600	16,000	16,000	17,200	27,600	26,200	33,700	35,000	42,400	44,800	40,300
25	43,200	34,600	16,300	16,000	17,400	27,900	25,600	32,300	35,100	43,500	44,700	40,300
26	43,100	34,400	16,300	16,000	17,600	28,000	25,600	31,100	35,100	43,600	44,700	40,400
27	42,900	34,500	16,600	16,000	17,900	27,900	25,700	31,700	35,200	43,600	44,600	40,400
28	43,000	34,400	16,600	16,000	17,900	28,100	25,500	32,100	35,200	43,600	44,700	40,500
29	43,100	34,300	16,700	16,000	------	28,200	26,000	32,100	34,500	43,900	44,600	40,500
30	43,200	34,000	17,200	16,500	------	28,300	26,500	32,100	34,500	44,500	44,700	40,500
31	43,500	------	17,300	15,700	------	29,100	------	31,900	------	45,300	44,600	------
TOTAL	1,433.8M	1,211.0M	596,500	493,500	479,100	745,600	862,400	933,600	1,048.0M	1,263.7M	1,402.0M	1,257.7M
MEAN	46,250	40,370	19,240	15,920	17,110	24,050	28,750	30,120	34,930	40,760	45,230	41,920
MAX	50,000	43,700	34,100	17,400	17,900	29,100	31,600	33,700	37,500	45,300	46,100	44,700
MIN	42,900	34,000	15,800	15,000	15,300	15,300	25,500	26,400	31,500	34,700	44,600	40,300
AC-FT	2,844M	2,402M	1,183M	978,900	950,300	1,479M	1,711M	1,852M	2,079M	2,507M	2,781M	2,495M

CAL YR 1969 TOTAL 11,947,500 MEAN 32,730 MAX 55,700 MIN 6,000 AC-FT 23,700,000
WTR YR 1970 TOTAL 11,726,900 MEAN 32,130 MAX 50,000 MIN 15,000 AC-FT 23,260,000

06471000 James River at Columbia, S. Dak.

LOCATION.--Lat 45°37'05", long 98°19'30", in NE¼NW¼ sec.29, T.125 N., R.62 W., Brown County, on left bank 10 ft downstream from highway bridge, 0.8 mile northwest of Columbia, 2.4 miles upstream from Chicago and North Western Railway Co. bridge, 3.6 miles upstream from Elm River, and 9.4 miles downstream from Columbia Road Dam.

DRAINAGE AREA.--7,050 sq mi, approximately.

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

GAGE.--Water-stage recorder. Datum of gage is 1,275.01 ft (corrected) above mean sea level. Prior to Oct. 5, 1957, nonrecording gage at same site and datum.

AVERAGE DISCHARGE.--25 years, 109 cfs (78,970 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 417 cfs Dec. 10 (gage height, 9.88 ft); no flow for many days. Period of record: Maximum discharge, 5,420 cfs May 24, 25, 1950 (gage height, 16.89 ft, from graph based on gage readings); maximum gage height, 17.09 ft Apr. 22, 1969; maximum daily reverse flow, 1,860 cfs Apr. 8, 1952 (backwater from Elm River).

REMARKS.--Records good except those for winter periods, which are poor. Flow regulated by Sand Lake. Frequent backwater and occasional reverse flow caused by Elm River during most years. Records of chemical analyses and water temperatures for the water year 1970 are published in Part 2 of this report.

REVISIONS.--Corrected figure of discharge for Sept. 16, 1962 is 72 cfs, and minimum discharge for calendar year 1964 is -720 cfs, superseding figures published in WSP 1917.

DISCHARGE IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	34	144	20	60		0	45	264	147	16		
2	31	145	20	50		0	50	263	149	19		
3	25	146	25	48		0	75	260	148	18		
4	29	146	40	44		0	100	252	141	23		
5	32	146	100	42		0	150	247	133	18		
6	28	142	290	38		0	180	241	127	13		
7	26	112	384	36		0	200	231	121	12		
8	30	72	407	35		0	210	216	114	14		
9	25	41	415	35		0	214	212	102	11		
10	23	33	417	33		0	217	206	87	8.9		
11	30	30	412	30		0	220	201	81	8.9		
12	43	30	380	25		0	224	201	85	7.6		
13	47	20	340	20		0	237	204	90	7.3		
14	40	20	300	15		0	216	210	90	7.3		
15	30	20	280	6.0		0	223	212	92	7.1		
16	35	20	260	3.0		1.0	228	209	91	6.0		
17	35	20	240	1.0		3.0	225	203	84	5.6		
18	32	17	210	0		5.0	230	194	74	5.4		
19	33	15	180	0		6.0	252	181	69	6.7		
20	34	15	160	0		7.0	265	183	61	6.5		
21	37	15	140	0		7.0	273	188	58	3.4		
22	62	17	120	0		8.0	276	190	53	1.4		
23	84	17	110	0		8.0	277	190	35	.60		
24	101	20	100	0		9.0	274	186	35	.38		
25	117	20	95	0		9.0	270	177	40	0		
26	128	20	90	0		10	269	165	38	0		
27	135	18	85	0		15	273	159	36	0		
28	139	18	80	0		20	280	156	23	0		
29	141	18	75	0	------	25	280	154	20	0		
30	142	20	70	0	------	30	272	147	21	0		
31	143	------	65	0	------	40	------	146	------	0		------
TOTAL	1,871	1,517	5,910	521.0	0	203.0	6,505	6,248	2,445	227.08	0	0
MEAN	60.4	50.6	191	16.8	0	6.55	217	202	81.5	7.33	0	0
MAX	143	146	417	60	0	40	280	264	149	23	0	0
MIN	23	15	20	0	0	0	45	146	20	0	0	0
AC-FT	3,710	3,010	11,720	1,030	0	403	12,900	12,390	4,850	450	0	0

CAL YR 1969 TOTAL 135,506.60 MEAN 371 MAX 4,570 MIN -1,750 ACFT 268,800
WAT YR 1970 TOTAL 25,447.08 MEAN 69.7 MAX 417 MIN 0 ACFT 50,470

NOTE.--Negative figure indicates reverse flow.

06471200 Maple River at North Dakota-South Dakota State line

LOCATION (revised).--Lat 45°56'20", long 98°27'08", in SW¼SE¼ sec.33, T.129 N., R.62 W., Dickey County, N. Dak., on left bank 0.4 mile upstream from State line, 7.8 miles northeast of Frederick, S. Dak., and 15.7 miles upstream from mouth.

DRAINAGE AREA.--750 sq mi, approximately, of which about 270 sq mi is probably noncontributing.

PERIOD OF RECORD.--June 1956 to current year.

GAGE.--Water-stage recorder. Altitude of gage is 1,365 ft (from topographic map). Prior to June 14, 1962, nonrecording gage at site 0.4 mile downstream at datum 0.94 ft lower.

AVERAGE DISCHARGE.--14 years, 20.4 cfs (14,780 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 92 cfs Apr. 28 (gage height, 4.70 ft); no flow for many days. Period of record: Maximum discharge, 5,930 cfs Apr. 11, 1969 (gage height, 15.22 ft); maximum gage height, 16.05 ft Apr. 11, 1969 (backwater from ice); no flow for long periods in each year.

REMARKS.--Records good.

Rating table (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Apr. 21 to May 21)

2.92	0	3.4	4.9
3.0	.14	3.7	13
3.1	.70	4.0	26
3.2	1.7	4.5	59
3.3	3.1	5.0	114

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1						0	.22	73	12	1.6		
2						0	.49	60	12	1.2		
3						0	.63	52	11	1.2		
4						0	.43	37	9.6	.78		
5						0	.56	31	8.8	.56		
6						0	.49	25	8.0	.43		
7						0	2.1	25	7.5	.32		
8						0	3.8	22	6.7	.11		
9						0	5.4	19	7.0	.05		
10						0	8.0	17	7.2	.03		
11						0	9.6	16	7.7	.02		
12						0	11	15	7.5	.01		
13						0	13	14	7.7	0		
14						0	14	14	8.0	.01		
15						0	14	14	8.8	0		
16						0	14	12	8.8	0		
17						0	15	11	8.3	0		
18						0	15	11	7.5	0		
19						0	16	11	6.5	0		
20						0	16	10	6.7	0		
21						0	19	9.9	4.9	0		
22						0	29	8.8	4.5	0		
23						0	49	8.6	4.5	0		
24						0	66	8.6	4.1	0		
25						0	69	8.3	3.6	0		
26						0	70	8.0	3.3	0		
27						0	83	7.0	2.6	0		
28						0	84	7.2	2.3	0		
29					------	0	71	8.0	2.1	0		
30					------	0	73	8.3	1.6	0		
31		------			------	.07	------	10	------	0		------
TOTAL	0	0	0	0	0	0.07	772.72	581.7	200.8	6.32	0	0
MEAN	0	0	0	0	0	.002	25.8	18.8	6.69	.20	0	0
MAX	0	0	0	0	0	.07	84	73	12	1.6	0	0
MIN	0	0	0	0	0	0	.22	7.0	1.6	0	0	0
AC-FT	0	0	0	0	0	.1	1,530	1,150	398	13	0	0

CAL YR 1969 TOTAL 25,742.10 MEAN 70.5 MAX 5,500 MIN 0 AC-FT 51,060
WTR YR 1970 TOTAL 1,561.61 MEAN 4.28 MAX 84 MIN 0 AC-FT 3,100

PEAK DISCHARGE (BASE, 50 CFS)

DATE	TIME	G.H.	DISCHARGE
4-28	0400	4.70	92

06471500 Elm River at Westport, S. Dak.

LOCATION.--Lat 45°39'22", long 98°29'48", in SW¼NW¼ sec.12, T.125 N., R.64 W., Brown County, on right bank 12 ft downstream from highway bridge, 0.5 mile north of Westport, 0.7 mile upstream from Chicago, Milwaukee, St. Paul and Pacific Railroad bridge, 9.3 miles downstream from Willow Creek, and 30.4 miles upstream from mouth.

DRAINAGE AREA.--1,680 sq mi, approximately.

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

GAGE.--Water-stage recorder. Datum of gage is 1,309.3 ft above mean sea level. Prior to Aug. 6, 1951, and Apr. 8 to Sept. 9, 1952, nonrecording gage 12 ft upstream at same datum.

AVERAGE DISCHARGE.--25 years, 49.3 cfs (35,720 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 91 cfs Apr. 29 (gage height, 5.46 ft); minimum, 0.37 cfs Nov. 19 (gage height, 4.17 ft).
Period of record: Maximum discharge, 12,600 cfs Apr. 10, 1969 (gage height, 22.11 ft); no flow for many days in most years.

REMARKS.--Records good. Flow regulated for Aberdeen municipal water supply by Elm Lake and other small reservoirs (combined capacity, about 16,000 acre-ft).

Rating table (gage height, in feet, and discharge, in cubic feet per second)

4.1	.19
4.2	.78
4.3	1.8
4.4	3.4
4.5	5.6
4.6	9.3
4.8	21
5.1	46
5.5	92

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.5	.70	6.5	1.9	2.2	3.4	2.0	78	17	3.2	5.9	7.1
2	1.8	.63	6.2	1.8	2.2	3.8	2.8	78	15	2.2	6.2	4.7
3	7.5	.56	6.2	1.8	2.3	4.7	3.4	71	13	2.7	12	4.5
4	8.3	.49	6.5	1.8	2.8	3.8	3.4	64	14	2.5	15	3.4
5	8.8	.49	6.8	1.8	2.3	4.0	4.9	55	15	1.4	15	3.6
6	8.3	.56	6.8	1.8	1.9	4.0	9.0	46	15	1.8	15	4.0
7	7.9	.56	6.8	1.9	2.3	3.8	23	42	13	6.5	15	4.3
8	7.9	.56	6.5	1.9	2.5	3.8	29	41	11	6.5	16	3.8
9	7.9	.56	7.1	1.9	2.7	4.0	23	34	10	6.5	16	5.4
10	7.5	.49	7.1	1.9	2.8	4.0	18	29	9.3	6.5	16	9.3
11	7.1	.49	6.8	1.9	3.2	3.8	19	29	10	7.5	15	8.8
12	7.9	.49	6.5	1.8	3.4	3.4	21	27	14	10	11	7.9
13	7.9	.63	5.4	1.8	3.6	1.4	34	24	15	10	7.1	8.3
14	7.5	1.5	4.9	1.8	3.6	1.3	36	26	12	10	6.8	9.3
15	7.5	.78	4.5	2.0	3.6	1.2	33	25	14	9.3	5.2	8.8
16	7.5	.63	4.5	2.2	3.8	1.1	35	23	14	9.8	2.0	8.8
17	7.5	.56	4.3	2.0	3.6	1.4	35	19	14	8.3	1.8	8.8
18	7.1	.43	4.3	1.9	3.8	1.8	44	19	14	7.9	1.8	8.3
19	6.8	.49	4.3	1.9	4.0	1.3	58	17	11	6.8	1.8	8.3
20	6.5	5.1	4.0	1.9	4.3	1.5	59	17	12	6.5	1.6	8.3
21	5.9	6.2	4.3	1.8	4.0	1.6	55	15	9.3	5.9	1.5	7.9
22	5.9	6.2	4.3	1.8	3.8	1.3	52	14	8.8	5.4	1.5	7.5
23	5.6	5.9	4.5	2.2	3.8	1.0	50	14	8.3	4.9	1.5	5.4
24	2.7	5.9	4.3	2.5	3.6	1.0	55	14	6.5	4.0	1.5	5.4
25	1.5	6.2	3.8	2.5	3.4	1.7	73	15	6.8	3.0	4.3	5.6
26	1.1	6.2	3.6	2.3	3.4	3.6	82	12	5.6	2.7	7.5	5.4
27	.94	6.2	2.3	2.2	3.4	3.8	84	11	4.7	3.4	29	5.1
28	.78	6.2	2.3	2.2	3.4	3.2	84	12	4.5	3.8	26	4.9
29	.70	6.2	2.2	2.2	------	2.7	89	16	4.0	5.5	21	4.9
30	.78	6.5	1.9	2.2	------	2.3	83	15	3.6	5.1	15	5.1
31	.78	------	1.9	2.0	------	2.2	------	24	------	5.6	9.3	------
TOTAL	167.38	78.40	151.4	61.6	89.7	81.9	1,199.5	926	324.4	175.2	304.3	192.9
MEAN	5.40	2.61	4.88	1.99	3.20	2.64	40.0	29.9	10.8	5.65	9.82	6.43
MAX	8.8	6.5	7.1	2.5	4.3	4.7	89	78	17	10	29	9.3
MIN	.70	.43	1.9	1.8	1.9	1.0	2.0	11	3.6	1.4	1.5	3.4
AC-FT	332	156	300	122	178	162	2,380	1,840	643	348	604	383

CAL YR 1969 TOTAL 81,069.18 MEAN 222 MAX 11,900 MIN .43 AC-FT 160,800
WTR YR 1970 TOTAL 3,752.68 MEAN 10.3 MAX 89 MIN .43 AC-FT 7,440

PEAK DISCHARGE (BASE, 100 CFS).--No peak above base.

06472000 James River near Stratford, S. Dak.

LOCATION.--Lat 45°14'30", long 98°23'28", in NE¼NE¼NE¼ sec.3, T.120 N., R.63 W., Spink County, on right bank 30 ft downstream from highway bridge, 6.7 miles southwest of Stratford, and 9.0 miles (revised) upstream from Mud Creek.

DRAINAGE AREA.--9,990 sq mi, approximately.

PERIOD OF RECORD.--March 1950 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,254.29 ft above mean sea level. Prior to May 17, 1950, nonrecording gage at site 20.9 miles (revised) upstream at different datum. May 17, 1950, to Aug. 5, 1951, nonrecording gage at site 60 ft upstream at present datum.

AVERAGE DISCHARGE.--20 years, 131 cfs (94,910 acre-ft per year).

EXTREMES.--Water year 1969: Maximum discharge, 4,880 cfs Apr. 24 (gage height, 18.10 ft); maximum gage height, 18.18 ft Apr. 19 (backwater from Mud Creek); no flow for many days.
Water year 1970: Maximum discharge, 389 cfs Apr. 28 (gage height, 12.47 ft); no flow Aug. 18 to Sept. 30.
Period of record: Maximum discharge, 5,580 cfs May 14 or 15, 1950, estimated on basis of records at site 20.9 miles upstream; maximum gage height, 18.18 ft Apr. 19, 1969 (backwater from Mud Creek); no flow for many days in most years.

REMARKS.--Records fair except those for winter periods or periods of no gage-height record, which are poor.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1968 TO SEPTEMBER 1969

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.20	0	105	4.0			0	3,690	1,020	720	660	250
2	.14	8.7	105	2.0			0	3,500	1,000	710	660	240
3	.09	37	100	2.0			0	3,340	980	710	650	210
4	.07	53	100	1.0			0	3,230	960	700	640	180
5	.03	62	100	0			0	2,960	950	700	630	160
6	0	67	95	0			0	2,800	940	700	620	140
7	0	71	80	0			0	2,630	920	700	620	130
8	0	72	80	0			0	2,470	910	690	610	110
9	0	70	85	0			0	2,330	900	690	610	100
10	0	69	85	0			0	2,210	880	680	600	90
11	0	70	80	0			0	2,080	860	680	590	86
12	0	70	75	0			0	1,970	850	680	590	80
13	0	67	70	0			0	1,860	840	690	580	80
14	0	69	65	0			300	1,790	830	690	570	77
15	0	75	60	0			900	1,640	820	700	560	75
16	0	80	55	0			2,000	1,820	800	710	550	75
17	0	75	50	0			2,500	1,750	780	720	550	74
18	0	75	45	0			2,800	1,670	770	720	540	72
19	0	80	45	0			3,500	1,570	760	710	530	70
20	0	90	40	0			4,000	1,480	750	700	520	70
21	0	85	40	0			4,500	1,420	740	700	520	68
22	0	80	35	0			4,760	1,360	730	690	510	66
23	0	80	30	0			4,760	1,290	720	690	500	64
24	0	90	30	0			4,820	1,230	730	680	470	60
25	0	100	25	0			4,800	1,210	750	680	450	58
26	0	95	25	0			4,660	1,160	760	680	400	54
27	0	95	20	0			4,450	1,110	740	680	380	50
28	0	100	20	0			4,320	1,050	730	670	350	47
29	0	110	10	0	------		4,110	1,030	720	670	310	45
30	0	110	8.0	0	------		3,900	1,010	720	670	280	45
31	0	------	6.0	0	------		------	1,000	------	660	260	------
TOTAL	0.53	2,205.7	1,769.0	9.0	0	0	61,080	59,660	24,860	21,470	16,310	2,926
MEAN	.017	73.5	57.1	.29	0	0	2,036	1,925	829	693	526	97.5
MAX	.20	110	105	4.0	0	0	4,820	3,690	1,020	720	660	250
MIN	0	0	6.0	0	0	0	0	1,000	720	660	260	45
AC-FT	1.1	4,370	3,510	18	0	0	121,200	118,300	49,310	42,590	32,350	5,800

CAL YR 1968 TOTAL 22,844.02 MEAN 62.4 MAX 244 MIN 0 CFSM IN AC-FT 45,310
WTR YR 1969 TOTAL 190,290.23 MEAN 521 MAX 4,820 MIN 0 CFSM IN AC-FT 377,400

NOTE.--No gage-height record Nov. 15 to Feb. 4, June 2 to Sept. 30.

06472000 James River near Stratford, S. Dak.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	45	140	30	120	11	8.0	20	386	243	48	1.0	
2	45	150	30	110	10	9.0	22	387	236	42	.86	
3	43	160	29	100	10	10	24	388	228	37	.79	
4	43	170	28	95	10	18	30	388	222	31	.76	
5	43	170	28	90	10	20	40	386	218	27	.61	
6	40	170	28	90	10	20	50	384	213	23	.51	
7	40	170	28	85	10	20	90	381	209	20	.45	
8	40	170	50	85	10	18	141	378	202	18	.39	
9	40	160	90	80	9.0	18	163	374	192	17	.33	
10	40	150	150	75	9.0	18	171	371	181	14	.32	
11	40	130	250	70	9.0	16	177	366	172	12	.27	
12	41	110	300	60	9.0	16	193	362	168	10	.31	
13	41	100	320	55	8.0	14	208	358	160	8.3	.22	
14	42	80	330	50	8.0	14	191	355	147	7.3	.12	
15	42	70	340	46	8.0	16	221	351	141	6.7	.09	
16	42	60	340	43	7.0	16	253	344	146	6.1	.02	
17	42	55	340	40	7.0	18	271	336	144	5.7	.01	
18	42	50	330	36	7.0	18	293	327	141	5.2	0	
19	41	45	310	32	7.0	20	326	319	138	4.3	0	
20	40	40	300	28	7.0	20	346	314	132	3.8	0	
21	40	38	280	24	7.0	20	357	306	126	3.2	0	
22	39	36	260	20	8.0	20	366	299	118	2.8	0	
23	38	35	250	18	8.0	20	373	291	110	2.4	0	
24	38	34	240	16	8.0	19	380	283	101	1.9	0	
25	40	33	230	14	8.0	18	383	274	93	1.3	0	
26	50	33	220	13	8.0	18	385	265	85	.80	0	
27	70	32	200	12	8.0	17	388	267	77	.87	0	
28	80	32	180	12	8.0	17	389	261	69	.56	0	
29	100	31	160	12	------	18	388	259	60	.73	0	
30	110	31	150	11	------	18	387	254	54	.67	0	
31	120	------	130	11	------	18	------	251	------	.97	0	------
TOTAL	1,557	2,685	5,951	1,553	239.0	530.0	7,026	10,265	4,526	362.60	7.06	0
MEAN	50.2	89.5	192	50.1	8.54	17.1	234	331	151	11.7	.23	0
MAX	120	170	340	120	11	20	389	388	243	48	1.0	0
MIN	38	31	28	11	7.0	8.0	20	251	54	.56	0	0
AC-FT	3,090	5,330	11,800	3,080	474	1,050	13,940	20,360	8,980	719	14	0

CAL YR 1969 TOTAL 196,508.00 MEAN 538 MAX 4,820 MIN 0 AC-FT 389,800
WTR YR 1970 TOTAL 34,701.66 MEAN 95.1 MAX 389 MIN 0 AC-FT 68,830

NOTE.--No gage-height record Oct. 1 to Dec. 22.

06473000 James River at Ashton, S. Dak.

LOCATION.--Lat 45°00'02", long 98°28'57", in SE¼SW¼ sec.25, T.118 N., R.64 W., Spink County, on right bank 900 ft upstream from highway bridge, 0.9 mile (revised) east of Ashton, 6.3 miles upstream from Snake Creek, and 14.4 miles upstream from Turtle Creek.

DRAINAGE AREA.--11,000 sq mi, approximately.

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

GAGE.--Water-stage recorder. Datum of gage is 1,244.4 ft above mean sea level. Prior to Nov. 25, 1957, nonrecording gage at site 900 ft downstream at same datum.

AVERAGE DISCHARGE.--25 years, 162 cfs (117,400 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 444 cfs Apr. 28 (gage height, 7.66 ft); no flow Aug. 20 to Sept. 30.
Period of record: Maximum discharge, 5,680 cfs Apr. 24, 1969 (gage height, 20.63 ft); maximum gage height, 21.17 ft Apr. 13, 1969 (backwater from Snake Creek); maximum daily reverse flow, 2,100 cfs Apr. 9, 1969 (backwater from Snake Creek).

REMARKS.--Records fair. Occasional backwater and reverse flow caused by Snake Creek during most years.

REVISIONS(WATER YEARS).--WSP 1209: 1947. Corrected figure of mean discharge for 1969 water year is 639 cfs, superseding figure published in WRD S. Dak. 1969.

DISCHARGE IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	47	96	44	210	18	15	60	428	303	66	4.2	
2	47	112	43	180	17	20	60	422	292	59	4.0	
3	47	126	42	160	17	40	65	418	277	53	3.4	
4	49	135	41	145	16	50	70	416	266	48	2.8	
5	51	144	41	130	16	70	75	414	258	43	2.3	
6	50	149	40	120	16	70	85	416	251	39	1.9	
7	50	155	39	110	16	65	95	412	242	36	1.6	
8	50	157	39	110	16	65	114	414	235	32	1.5	
9	50	159	39	100	16	60	118	414	228	29	1.2	
10	49	161	39	100	15	60	132	411	218	28	1.0	
11	50	175	40	95	15	55	157	410	209	26	.83	
12	50	181	40	90	15	55	181	406	205	25	.65	
13	50	175	60	80	15	60	193	403	196	24	.56	
14	50	165	90	75	15	60	191	404	188	22	.48	
15	50	160	125	70	14	65	193	401	192	20	.29	
16	49	132	155	65	14	65	197	398	189	18	.16	
17	49	108	185	60	14	65	213	392	179	16	.10	
18	49	95	210	55	14	60	257	381	174	14	.06	
19	49	79	230	50	14	60	327	370	166	12	.02	
20	50	70	245	45	14	60	381	361	163	11	0	
21	53	61	265	42	14	55	416	356	154	9.8	0	
22	55	55	285	38	14	55	430	347	146	8.2	0	
23	56	52	305	34	15	55	430	339	137	7.3	0	
24	55	50	310	31	15	55	434	332	132	8.0	0	
25	54	48	310	27	15	55	436	322	122	7.9	0	
26	53	46	310	24	15	50	438	309	113	7.2	0	
27	53	45	305	21	15	50	441	301	104	5.8	0	
28	55	44	295	20	15	50	442	297	94	4.9	0	
29	59	44	280	20	------	55	441	297	85	4.4	0	
30	68	44	260	18	------	55	435	291	74	4.5	0	
31	81	------	235	18	------	55	------	299	------	4.9	0	------
TOTAL	1,628	3,223	4,947	2,343	425	1,710	7,507	11,581	5,592	693.9	27.05	0
MEAN	52.5	107	160	75.6	15.2	55.2	250	374	186	22.4	.87	0
MAX	81	181	310	210	18	70	442	428	303	66	4.2	0
MIN	47	44	39	18	14	15	60	291	74	4.4	0	0
AC-FT	3,230	6,390	9,810	4,650	843	3,390	14,890	22,970	11,090	1,380	54	0

CAL YR 1969 TOTAL 239,176.05 MEAN 655 MAX 5,670 MIN -2,100 ACFT 474,400
WAT YR 1970 TOTAL 39,676.95 MEAN 109 MAX 442 MIN 0 ACFT 78,700

NOTE.--Negative figure indicates reverse flow.

06473500 South Fork Snake Creek near Athol, S. Dak.

LOCATION.--Lat 45°03'04", long 98°44'14", in SE¼NE¼ sec.11, T.118 N., R.66 W., Faulk County, on left bank at upstream side of highway bridge, 2.9 miles downstream from Perry Creek, and 7.5 miles northwest of Athol.

DRAINAGE AREA.--1,820 sq mi, approximately, of which about 730 sq mi is probably noncontributing.

PERIOD OF RECORD.--March 1950 to current year. Prior to October 1967, published as West Branch Snake Creek near Athol.

GAGE.--Water-stage recorder. Datum of gage is 1,316.05 ft above mean sea level. Prior to May 1, 1951, nonrecording gage at site 0.6 mile upstream at datum 4.78 ft higher.

AVERAGE DISCHARGE.--20 years, 11.1 cfs (8,040 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 40 cfs Apr. 20 (gage height, 9.73 ft); no flow for many days. Period of record: Maximum discharge, 6,810 cfs Apr. 7, 1969 (gage height, 19.03 ft); maximum gage height, 19.15 ft Apr. 7, 1969 (backwater from ice); no flow for many days in each year.

REMARKS.--Records fair. Water-quality records for the water year 1970 are published in Part 2 of this report.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.34	1.3	.06		0	1.0	.72	7.9	5.1	.62		
2	.30	1.2	.06		0	.79	.79	6.9	3.4	.51		
3	.23	1.1	.05		0	4.6	.83	6.0	2.5	.37		
4	.20	1.0	.05		0	7.9	.83	4.9	2.2	.31		
5	.21	.90	.05		0	3.4	.96	3.9	2.1	.27		
6	.25	.79	.05		0	2.2	1.3	2.9	1.9	.23		
7	.22	.69	.05		0	1.7	1.9	2.4	1.9	.19		
8	.16	.62	.05		0	1.7	2.1	2.4	1.5	.15		
9	.14	.50	.05		0	1.6	2.4	2.4	1.3	.13		
10	.29	.40	.05		0	1.3	2.6	2.1	1.2	.11		
11	1.4	.20	.04		0	1.1	4.2	1.9	1.2	.09		
12	2.4	.01	.03		0	.76	7.4	1.9	1.9	.07		
13	2.5	0	.03		0	.65	9.2	1.9	1.8	.05		
14	2.5	0	.03		0	.62	8.4	3.4	2.4	.04		
15	2.2	0	.03		0	.65	9.5	4.6	3.4	.03		
16	2.1	0	.02		0	.58	15	4.9	4.0	.02		
17	2.2	0	.02		0	.55	18	4.9	4.9	.02		
18	2.3	0	.01		0	.62	20	4.0	5.1	.01		
19	2.4	0	.01		0	.65	28	3.2	4.0	.01		
20	2.4	0	0		0	.62	39	2.8	4.2	0		
21	2.4	.01	0		0	.62	33	2.6	4.0	0		
22	2.3	.01	0		0	.65	23	2.4	3.9	0		
23	2.1	.03	0		0	.62	19	2.1	3.2	0		
24	1.7	.04	0		.01	.65	18	1.9	2.5	0		
25	1.6	.04	0		.08	.69	18	2.2	2.1	0		
26	1.5	.03	0		.26	.72	17	2.3	1.5	0		
27	1.7	.03	0		.72	.76	15	2.1	1.4	0		
28	2.1	.03	0		1.1	.76	13	2.8	1.0	0		
29	2.1	.03	0		------	.76	11	4.9	.86	0		
30	1.9	.04	0		------	.72	9.2	5.1	.72	0		
31	1.6	------	0		------	.72	------	5.5	------	0		------
TOTAL	45.74	9.00	0.74	0	2.17	40.66	349.33	109.2	77.18	3.23	0	0
MEAN	1.48	.30	.024	0	.078	1.31	11.6	3.52	2.57	.10	0	0
MAX	2.5	1.3	.06	0	1.1	7.9	39	7.9	5.1	.62	0	0
MIN	.14	0	0	0	0	.55	.72	1.9	.72	0	0	0
AC-FT	91	18	1.5	0	4.3	81	693	217	153	6.4	0	0

CAL YR 1969 TOTAL 26,046.95 MEAN 71.4 MAX 5,510 MIN 0 AC-FT 51,660
WTR YR 1970 TOTAL 637.25 MEAN 1.75 MAX 39 MIN 0 AC-FT 1,260

PEAK DISCHARGE (BASE, 75 CFS).--No peak above base.

06473750 Wolf Creek near Ree Heights, S. Dak.

LOCATION.--Lat 44°36'25", long 99°13'54", in SW¼SW¼ sec.11, T.113 N., R.70 W., Hand County, near right bank on downstream side of highway bridge, 0.3 mile downstream from nearest tributary, 6.5 miles north of Ree Heights, and 13.8 miles upstream from Lake Louise dam.

DRAINAGE AREA.--265 sq mi, approximately.

PERIOD OF RECORD.--September 1959 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,614.16 ft above mean sea level.

AVERAGE DISCHARGE.--11 years, 5.51 cfs (3,990 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 51 cfs Apr. 19 (gage height, 6.16 ft); no flow for many days. Period of record: Maximum discharge, 990 cfs Apr. 5, 1969 (gage height, 9.33 ft); maximum gage height, 9.57 ft Mar. 14, 1966 (backwater from ice); no flow for many days each year.

REMARKS.--Records good. Flow regulated by small reservoir 0.5 mile upstream (capacity, about 1,100 acre-ft).

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1							0	48				
2							0	24				
3							0	7.7				
4							0	.96				
5							0	.29				
6							0	.05				
7							0	.01				
8							0	0				
9							0	0				
10							0	0				
11							0	0				
12							0	0				
13							0	0				
14							0	0				
15							0	0				
16							0	0				
17							0	0				
18							0	0				
19							5.9	0				
20							6.7	0				
21							.06	0				
22							.50	0				
23							.32	0				
24							.26	0				
25							.05	0				
26							.03	0				
27							0	0				
28							0	0				
29					------		0	0				
30					------		16	0				
31		------			------		------	0	------			------
TOTAL	0	0	0	0	0	0	29.82	81.01	0	0	0	0
MEAN	0	0	0	0	0	0	.99	2.61	0	0	0	0
MAX	0	0	0	0	0	0	16	48	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	59	161	0	0	0	0

CAL YR 1969 TOTAL 6,501.97 MEAN 17.8 MAX 901 MIN 0 ACFT 12,900
WAT YR 1970 TOTAL 110.83 MEAN .30 MAX 48 MIN 0 ACFT 220

PEAK DISCHARGE (BASE, 40 CFS)

DATE	TIME	G.H.	DISCHARGE
4-19	2200	6.16	51
4-30	2200	6.00	50

06474000 Turtle Creek near Tulare, S. Dak.

LOCATION.--Lat 44°44'06", long 98°35'09", in SE¼SE¼ sec.25, T.115 N., R.65 W., Spink County, on left bank at downstream side of highway bridge, 3.9 miles west of Tulare and 8.9 miles downstream from Wolf Creek.

DRAINAGE AREA.--1,120 sq mi, approximately.

PERIOD OF RECORD.--August 1953 to September 1956, September 1965 to current year.

GAGE.--Water-stage recorder. Altitude of gage is 1,300 ft (by barometer). Prior to Oct. 6, 1965, nonrecording gage at same site and datum.

AVERAGE DISCHARGE.--8 years, 18.8 cfs (13,620 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 132 cfs Mar. 4 (gage height, 6.14 ft); no flow for many days.
Period of record: Maximum discharge, about 6,000 cfs Apr. 5, 1969; maximum gage height, 18.51 ft Apr. 5, 1969 (backwater from ice); no flow for many days each year.

REMARKS.--Records fair.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.14	.18	.25	.30	.40	.44	2.2	35	3.2	.22	0	
2	.16	.15	.25	.29	.38	.51	2.1	34	3.0	.19	0	
3	.16	.17	.25	.30	.37	32	2.1	32	3.0	.17	0	
4	.18	.18	.26	.30	.36	111	1.9	28	3.2	.14	0	
5	.15	.18	.26	.30	.36	54	2.0	22	2.8	.11	0	
6	.17	.17	.26	.30	.37	27	1.9	13	2.5	.10	0	
7	.18	.17	.26	.30	.37	16	1.7	12	1.9	.09	0	
8	.18	.16	.27	.30	.37	11	2.0	11	1.4	.08	0	
9	.18	.16	.28	.30	.37	11	1.8	9.2	1.1	.07	0	
10	.19	.16	.28	.30	.37	22	1.6	8.4	.92	.07	0	
11	.20	.15	.28	.31	.37	25	1.6	7.6	.81	.06	0	
12	.22	.15	.27	.31	.38	23	3.8	6.8	.96	.06	0	
13	.22	.13	.27	.31	.39	16	8.4	6.8	.96	.06	0	
14	.22	.10	.27	.32	.39	11	5.5	9.2	.88	.06	.04	
15	.25	.11	.28	.33	.39	9.2	5.5	9.2	1.0	.06	.05	
16	.26	.14	.25	.34	.39	6.1	7.6	6.8	1.4	.05	.04	
17	.25	.16	.24	.34	.40	4.6	6.8	5.0	1.3	.04	.04	
18	.25	.16	.25	.32	.44	4.6	7.6	5.5	1.2	.04	.05	
19	.24	.16	.27	.28	.44	3.9	12	4.2	1.1	.03	.01	
20	.24	.17	.27	.26	.44	3.9	13	3.9	1.1	.03	0	
21	.24	.18	.27	.26	.43	3.4	13	4.2	1.0	.02	0	
22	.23	.20	.26	.28	.43	3.2	23	3.9	.78	.01	0	
23	.22	.20	.26	.30	.44	3.0	76	3.6	.65	.01	0	
24	.22	.21	.26	.32	.49	2.8	97	3.9	.58	.01	0	
25	.22	.21	.26	.34	.47	2.8	74	3.6	.47	.01	0	
26	.22	.21	.27	.36	.44	2.8	58	3.0	.40	.01	0	
27	.22	.22	.27	.36	.43	2.5	50	2.5	.33	.01	0	
28	.22	.22	.28	.36	.43	2.6	43	2.3	.31	0	0	
29	.22	.23	.28	.38	------	2.5	39	3.4	.27	0	0	
30	.22	.24	.29	.40	------	2.3	36	3.2	.24	0	0	
31	.23	------	.29	.40	------	2.2	------	3.4	------	0	0	------
TOTAL	6.50	5.23	8.26	9.87	11.31	422.35	600.1	306.6	38.76	1.81	0.23	0
MEAN	.21	.17	.27	.32	.40	13.6	20.0	9.89	1.29	.058	.007	0
MAX	.26	.24	.29	.40	.49	111	97	35	3.2	.22	.05	0
MIN	.14	.10	.24	.26	.36	.44	1.6	2.3	.24	0	0	0
AC-FT	13	10	16	20	22	838	1,190	608	77	3.6	.5	0

CAL YR 1969 TOTAL 31,326.07 MEAN 85.8 MAX 5,500 MIN 0 AC-FT 62,140
WTR YR 1970 TOTAL 1,411.02 MEAN 3.87 MAX 111 MIN 0 AC-FT 2,800

PEAK DISCHARGE (BASE, 50 CFS)

DATE	TIME	G.H.	DISCHARGE
3- 4	1600	6.14	132
4-23	2400	6.09	129

06474300 Medicine Creek near Zell, S. Dak.

LOCATION.--Lat 44°45'52", long 98°42'13", in NW¼NW¼ sec.19, T.115 N., R.65 W., Spink County, on downstream side at center of bridge on State Highway 26, 3.8 miles upstream from Cottonwood Lake and 9.2 miles south of Zell.

DRAINAGE AREA.--210 sq mi, approximately.

PERIOD OF RECORD.--September 1959 to current year.

GAGE.--Water-stage recorder. Altitude of gage is 1,320 ft (from topographic map).

AVERAGE DISCHARGE.--11 years, 7.55 cfs (5,470 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 90 cfs Apr. 20 (gage height, 5.69 ft); no flow Jan. 17 to Feb. 20.
Period of record: Maximum discharge, 2,210 cfs Apr. 5, 1969 (gage height, 12.41 ft); no flow for many days in most years.

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

Rating tables (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Nov. 2 to Dec. 12, Mar. 15-27, Apr. 18-28, Aug. 12 to Sept. 30; stage-discharge relation affected by ice Dec. 21 to Feb. 23)

Oct. 1 to Apr. 20				Apr. 21 to Sept. 30			
2.7	0	3.5	4.9	2.32	0	3.1	4.1
2.8	.10	4.0	11	2.4	.04	3.5	9.5
2.9	.30	4.5	19	2.5	.10	4.0	18
3.0	.70	5.0	33	2.6	.30	4.5	30
3.1	1.2	5.5	54	2.7	.70	5.0	46
3.2	1.9	6.0	82	2.8	1.2	5.5	70

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.04	.07	.02	.01	0	.12	1.2	7.7	.75	.14	.06	.02
2	.03	.05	.02	.01	0	.16	1.2	6.6	.70	.09	.06	.02
3	.03	.05	.02	.01	0	19	1.0	6.0	.62	.08	.06	.02
4	.05	.04	.01	.01	0	15	1.0	5.1	.58	.08	.06	.01
5	.07	.04	.02	.01	0	16	1.1	4.3	.54	.07	.05	.01
6	.06	.04	.02	.01	0	22	1.1	3.7	.46	.07	.05	.01
7	.06	.03	.02	.02	0	13	1.1	3.2	.34	.08	.06	.01
8	.05	.03	.02	.02	0	9.7	1.2	3.0	.28	.07	.05	.01
9	.04	.02	.02	.02	0	7.3	1.1	2.6	.24	.07	.05	.01
10	.05	.02	.03	.02	0	7.9	.95	2.4	.22	.08	.05	.01
11	.05	.02	.02	.01	0	7.3	.95	2.2	.22	.07	.05	.01
12	.05	.02	.03	.01	0	3.9	.85	2.1	.38	.07	.04	.01
13	.06	.02	.04	.01	0	3.0	.28	1.8	.38	.08	.04	.01
14	.06	.02	.04	.01	0	2.4	5.5	2.3	.30	.07	.03	.02
15	.06	.02	.04	.01	0	2.2	2.4	2.5	.40	.07	.04	.03
16	.05	.04	.02	.01	0	2.1	3.0	2.4	1.1	.07	.03	.02
17	.05	.04	.03	0	0	1.8	8.8	2.3	1.1	.07	.03	.02
18	.04	.04	.02	0	0	1.8	34	2.0	2.2	.07	.04	.02
19	.04	.03	.01	0	0	1.6	48	1.7	3.6	.07	.03	.02
20	.04	.03	.01	0	0	1.6	65	1.4	4.9	.06	.03	.02
21	.04	.03	.01	0	.01	1.6	64	1.4	6.5	.06	.03	.02
22	.03	.04	.01	0	.03	1.5	48	1.4	6.3	.05	.03	.01
23	.03	.04	.01	0	.08	1.3	43	1.4	4.7	.06	.03	.01
24	.03	.04	.01	0	.14	1.5	31	1.6	3.3	.06	.02	.01
25	.03	.04	.01	0	.14	1.5	23	1.4	2.1	.06	.03	.02
26	.03	.02	.01	0	.12	1.3	19	1.1	1.2	.06	.02	.02
27	.03	.02	.01	0	.12	1.2	16	.90	.80	.06	.02	.02
28	.04	.02	.01	0	.10	1.2	14	.80	.50	.06	.02	.02
29	.05	.02	.01	0	------	1.2	11	1.0	.28	.05	.02	.02
30	.06	.02	.01	0	------	1.2	8.9	.90	.20	.06	.02	.02
31	.07	------	.01	0	------	1.1	------	.85	------	.06	.02	------
TOTAL	1.42	0.96	0.57	0.20	0.74	152.48	457.63	78.05	45.19	2.17	1.17	0.48
MEAN	.046	.032	.018	.007	.026	4.92	15.3	2.52	1.51	.070	.038	.016
MAX	.07	.07	.04	.02	.14	22	65	7.7	6.5	.14	.06	.03
MIN	.03	.02	.01	0	0	.12	.28	.80	.20	.05	.02	.01
AC-FT	2.8	1.9	1.1	.4	1.5	302	908	155	90	4.3	2.3	1.0

CAL YR 1969 TOTAL 8,259.23 MEAN 22.6 MAX 1,750 MIN 0 AC-FT 16,380
WTR YR 1970 TOTAL 741.06 MEAN 2.03 MAX 65 MIN 0 AC-FT 1,470

PEAK DISCHARGE (BASE, 40 CFS)

DATE	TIME	G.H.	DISCHARGE
4-20	2300	5.69	90

06474500 Turtle Creek at Redfield, S. Dak.

LOCATION.--Lat 44°53'00", long 98°30'46", in SW¼SE¼ sec.3, T.116 N., R.64 W., Spink County, on right bank at downstream side of bridge on U.S. Highway 281 at north edge of Redfield, 6.8 miles upstream from mouth.

DRAINAGE AREA.--1,540 sq mi, approximately.

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

GAGE.--Water-stage recorder. Datum of gage is 1,259.3 ft above mean sea level. Prior to May 25, 1951, nonrecording gage and May 25, 1951, to Sept. 30, 1962, water-stage recorder at site 100 ft upstream at same datum. Oct. 1, 1962, to July 29, 1963, nonrecording gage at site 500 ft downstream at same datum. July 30, 1963, to Apr. 20, 1964, nonrecording gage at present site and datum.

AVERAGE DISCHARGE.--25 years, 25.3 cfs (18,330 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 96 cfs Apr. 20 (gage height, 4.36 ft); maximum gage height, 4.37 ft Mar. 4 (backwater from ice); no flow for many days.
Period of record: Maximum discharge, 7,660 cfs Apr. 7, 1969 (gage height, 15.94 ft); no flow for many days in most years.

REMARKS.--Records fair. Some regulation at times by Lake Redfield 1.6 miles upstream from station (capacity, 1,570 acre-ft).

Rating table (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Oct. 1-7, Nov. 9-11, June 30 to July 11, July 15-18, 22-26, July 29 to Sept. 30; stage-discharge relation affected by ice Dec. 18 to Mar. 4)

Oct. 8 to Sept. 30

2.7	0	3.3	4.5
2.8	.06	3.4	7.2
2.9	.29	3.6	15
3.0	.70	3.8	28
3.1	1.4	4.0	47
3.2	2.6	4.4	101

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.01	.07	0			.01	4.5	38	12	.17	.07	0
2	.01	.06	0			.02	4.3	36	10	.09	.05	0
3	.02	.07	0			40	4.3	37	7.9	.05	.04	0
4	.02	.07	0			60	3.9	35	6.9	.04	.02	0
5	.05	.05	0			69	3.9	31	6.0	.03	.05	0
6	.02	.04	0			67	3.9	29	5.5	.02	.26	0
7	.01	.04	0			50	3.7	26	4.5	0	.20	0
8	0	.04	.01			37	4.8	24	3.3	0	.09	0
9	0	.03	.01			29	3.3	20	1.8	0	.03	0
10	0	.02	.01			23	1.7	16	1.1	0	0	0
11	0	.01	.01			19	1.3	13	.95	13	0	0
12	0	.03	.02			19	2.4	12	3.8	17	0	0
13	.02	.01	.03			19	17	11	5.7	13	0	0
14	.04	0	.03			19	16	13	5.2	1.6	0	0
15	.04	0	.02			18	22	14	11	.38	0	0
16	.06	0	.02			16	33	12	33	.13	0	0
17	.07	0	.02			18	37	11	24	.05	0	0
18	.06	0	.02			19	43	9.8	16	2.4	0	0
19	.06	0	.01			16	73	7.2	13	4.5	0	0
20	.07	0	.01			14	92	6.0	11	3.5	0	0
21	.09	0	.01			13	73	5.5	8.6	.55	0	0
22	.17	0	0			11	52	4.7	7.2	.20	0	0
23	.13	0	0			9.4	44	5.2	5.5	.07	0	0
24	.09	.01	0			8.6	46	5.7	3.5	.06	0	.07
25	.09	.01	0			8.6	75	6.6	2.2	.03	0	.06
26	.09	.01	0			7.9	77	4.3	1.8	5.6	0	.07
27	.06	.01	0			7.2	69	2.3	1.0	2.5	0	.06
28	.07	.02	0			6.6	61	2.0	.81	.55	0	.02
29	.11	.02	0		------	6.3	54	6.3	.55	.29	0	0
30	.13	0	0		------	5.5	46	9.1	.35	.15	0	.01
31	.09	------	0		------	5.0	------	17	------	.13	0	------
TOTAL	1.68	0.62	0.23	0	0	641.13	972.0	469.7	214.16	66.09	0.81	0.29
MEAN	.054	.021	.007	0	0	20.7	32.4	15.2	7.14	2.13	.026	.010
MAX	.17	.07	.03	0	0	69	92	38	33	17	.26	.07
MIN	0	0	0	0	0	.01	1.3	2.0	.35	0	0	0
AC-FT	3.3	1.2	.5	0	0	1,270	1,930	932	425	131	1.6	.6

CAL YR 1969 TOTAL 37,611.03 MEAN 103 MAX 7,120 MIN 0 AC-FT 74,600
WTR YR 1970 TOTAL 2,366.71 MEAN 6.48 MAX 92 MIN 0 AC-FT 4,690

PEAK DISCHARGE (BASE, 50 CFS)

DATE	TIME	G.H.	DISCHARGE	DATE	TIME	G.H.	DISCHARGE
3- 5	2300	4.21	73	4-25	2200	4.24	80
4-20	0600	4.36	96				

06475000 James River near Redfield, S. Dak.

LOCATION.--Lat 44°55'13", long 98°25'52", in SW¼NW¼ sec.28, T.117 N., R.63 W., Spink County, on right bank at downstream side of highway bridge, 5.2 miles (revised) northeast of Redfield, and 5.2 miles downstream from Turtle Creek.

DRAINAGE AREA.--14,800 sq mi, approximately.

PERIOD OF RECORD.--March 1950 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,236.3 ft above mean sea level. Prior to July 26, 1951, nonrecording gage at same site and datum.

AVERAGE DISCHARGE.--20 years, 196 cfs (142,000 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 642 cfs Apr. 22 (gage height, 8.49 ft); no flow Sept. 2, 4-30.
Period of record: Maximum discharge, 7,310 cfs Apr. 13, 1969 (gage height, 24.93 ft); no flow for many days in most year.

REMARKS.--Records good except those for winter periods, which are poor. Low flow affected by wind at times. Water quality records for the water year 1970 are published in Part 2 of this report.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	37	53	45	250	22	20	65	536	312	98	3.8	.08
2	49	63	45	230	20	30	65	524	300	86	3.4	0
3	44	84	44	210	20	120	65	510	287	66	3.4	.12
4	41	105	44	190	20	200	70	498	272	64	3.3	0
5	49	126	44	160	18	250	80	490	258	65	3.1	0
6	52	135	44	140	18	140	90	496	250	58	2.9	0
7	46	149	43	130	18	120	100	492	242	44	2.6	0
8	57	169	44	130	18	100	111	486	243	43	2.4	0
9	53	165	43	120	18	90	126	476	250	51	2.2	0
10	47	170	43	120	18	85	147	460	246	53	2.0	0
11	37	167	42	110	17	85	163	452	226	60	1.8	0
12	38	172	43	110	17	80	205	443	238	54	1.7	0
13	37	140	43	100	17	85	255	433	228	51	1.6	0
14	45	145	44	100	17	85	281	437	223	51	1.5	0
15	41	178	44	95	17	90	306	434	239	40	1.4	0
16	38	181	45	90	17	95	323	434	280	46	1.3	0
17	41	135	60	85	17	95	354	434	259	47	1.2	0
18	42	104	80	80	17	95	399	420	224	40	1.0	0
19	41	108	100	75	17	100	500	399	222	29	.92	0
20	40	94	150	70	17	100	600	384	233	34	.92	0
21	34	82	200	60	18	100	628	366	218	42	.98	0
22	41	71	220	55	18	95	640	355	213	49	.86	0
23	53	66	250	50	18	90	634	350	209	38	.77	0
24	61	59	270	45	18	90	622	347	180	23	.68	0
25	41	56	290	40	18	85	620	334	170	13	.68	0
26	35	52	300	35	18	85	622	326	147	11	.50	0
27	34	50	310	32	18	80	616	322	154	14	.56	0
28	52	47	310	28	18	75	608	315	139	9.6	.32	0
29	57	47	300	26	------	70	588	309	118	6.9	.32	0
30	46	45	290	24	------	70	566	306	123	5.3	.27	0
31	46	------	280	22	------	70	------	321	------	4.1	.22	------
TOTAL	1,375	3,218	4,110	3,012	504	2,975	10,449	12,889	6,703	1,295.9	48.60	0.20
MEAN	44.4	107	133	97.2	18.0	96.0	348	416	223	41.8	1.57	.007
MAX	61	181	310	250	22	250	640	536	312	98	3.8	.12
MIN	34	45	42	22	17	20	65	306	118	4.1	.22	0
AC-FT	2,730	6,380	8,150	5,970	1,000	5,900	20,730	25,570	13,300	2,570	96	.4

CAL YR 1969 TOTAL 334,009.5 MEAN 915 MAX 7,280 MIN 1.0 AC-FT 662,500
WTR YR 1970 TOTAL 46,579.70 MEAN 128 MAX 640 MIN 0 AC-FT 92,390

06476000 James River at Huron, S. Dak.
(Irrigation network station)

LOCATION.--Lat 44°21'49", long 98°11'56", in SW¼SE¼NE¼ sec.6, T.110 N., R.61 W., Beadle County, on right bank 15 ft upstream from city dam at Huron, 135 ft downstream from Chicago and North Western Railway Co. bridge, and 165 ft upstream from bridge on business loop U.S. Highway 14.

DRAINAGE AREA.--16,800 sq mi, approximately.

PERIOD OF RECORD.--August 1928 to September 1932, August 1943 to current year. Monthly discharge only for some periods, published in WSP 1309. Gage-height records collected at site about 100 ft downstream for period of open water each year July 1902 to June 1914 and for period March to June 1915-23 are in reports of U.S. Weather Bureau.

GAGE.--Water-stage recorder and concrete dam. Datum of gage is 1,223.44 ft above mean sea level. Aug. 29, 1928, to Mar. 15, 1929, nonrecording gage at site 100 ft downstream at about same datum. Mar. 16, 1929, to June 30, 1932, nonrecording gage 165 ft downstream at present datum. Aug. 3, 1943, to Oct. 17, 1951, nonrecording gage at present site and datum.

AVERAGE DISCHARGE.--31 years, 243 cfs (176,100 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 1,840 cfs Mar. 5 (gage height, 9.97 ft); no flow for many days.
Period of record: Maximum discharge, 9,000 cfs Apr. 13, 1969; (gage height, 16.70 ft); no flow for long periods in most years.
Maximum stage known, 19.8 ft between Apr. 11 and 13, 1881, from U.S. Weather Bureau publication. Flood of Mar. 22, 1922, reached a stage of 16.5 ft.

REMARKS.--Records good above 100 cfs and fair below. The City of Huron and Armour and Company take water from the river immediately upstream from the gage. Average daily pumpage was about 5.0 cfs. Stage and discharge affected by wind at times. Records of chemical analyses and water temperatures for the water year 1970 are published in Part 2 of this report.

COOPERATION.--Average yearly pumpage figures furnished by City of Huron Water Department and by Armour and Company.

Rating table (gage height, in feet, and discharge, in cubic feet per second)
(Stage-discharge relation affected by ice Dec. 18, Jan. 17-22 and Feb. 2-4; backwater from return of overbank flow Mar. 6-13)

Oct. 1 to July 27

7.9	16	8.2	121
8.0	46	8.5	330
8.1	78	9.0	850
		10.0	1,860

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	70	89	78	310	54	78	162	795	500	109		
2	55	91	77	284	53	78	162	685	402	89		
3	55	90	76	270	51	608	162	663	348	98		
4	75	92	75	246	50	1,370	151	663	306	72		
5	80	95	75	255	47	1,810	168	652	287	64		
6	73	108	75	282	46	1,460	145	481	277	62		
7	79	115	75	294	45	1,100	122	538	258	62		
8	67	122	75	305	45	860	157	534	222	56		
9	61	137	75	304	44	770	146	584	180	36		
10	77	143	75	267	43	750	325	585	208	32		
11	86	154	74	207	43	720	162	558	236	27		
12	84	161	73	168	42	650	208	544	215	16		
13	77	219	74	146	43	560	290	533	236	30		
14	68	178	75	138	42	500	290	534	243	36		
15	74	159	75	118	41	384	306	524	500	46		
16	72	157	79	113	40	322	384	502	938	36		
17	71	173	87	112	39	298	430	454	839	30		
18	70	338	170	109	37	290	520	517	564	24		
19	71	164	115	107	35	282	674	467	375	43		
20	71	146	134	104	34	266	718	435	330	16		
21	80	136	151	103	35	258	872	479	266	4.0		
22	71	127	167	100	39	250	905	423	243	0		
23	50	119	177	87	46	229	905	341	229	0		
24	59	112	215	77	56	201	905	364	236	0		
25	77	105	237	69	63	194	872	390	208	16		
26	84	99	255	63	70	187	872	348	187	82		
27	80	93	275	60	74	180	872	339	139	33		
28	61	88	284	57	75	174	850	306	133	0		
29	60	85	270	57	------	174	828	402	139	0		
30	77	81	287	54	------	168	806	357	112	0		
31	86	------	323	56	------	168	------	490	------	0		------
TOTAL	2,221	3,976	4,353	4,922	1,332	15,339	14,369	15,487	9,356	1,119.0	0	0
MEAN	71.6	133	140	159	47.6	495	479	500	312	36.1	0	0
MAX	86	338	323	310	75	1,810	905	795	938	109	0	0
MIN	50	81	73	54	34	78	122	306	112	0	0	0
AC-FT	4,410	7,890	8,630	9,760	2,640	30,420	28,500	30,720	18,560	2,220	0	0

1969 TOTAL 375,282.8 MEAN 1,028 MAX 8,940 MIN 3.4 AC-FT 744,400
1970 TOTAL 72,474.00 MEAN 199 MAX 1,810 MIN 0 AC-FT 143,800

06476500 Sand Creek near Alpena, S. Dak.

LOCATION.--Lat 44°09'15", long 98°26'06", in NE¼NE¼ sec.19, T.108 N., R.63 W., Jerauld County, on left bank 5 ft downstream from highway bridge, 4.0 miles southwest of Alpena, 7.0 miles upstream from Chicago, Milwaukee, St. Paul and Pacific Railroad bridge, and 10.5 miles upstream from interlink with Cain Creek.

DRAINAGE AREA.--240 sq mi, approximately.

PERIOD OF RECORD.--March 1950 to current year.

GAGE.--Water-stage recorder. Altitude of gage is 1,315 ft (by barometer). Prior to Sept. 17, 1951, nonrecording gage at same site and datum.

AVERAGE DISCHARGE.--20 years, 10.6 cfs (7,680 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 253 cfs Apr. 21 (gage height, 10.30 ft); maximum gage height, 10.73 ft Mar. 5 (backwater from ice); no flow for many days.
Period of record: Maximum discharge, 2,240 cfs Mar. 28, 1960 (gage height, 13.35 ft); maximum gage height, 14.1 ft Mar. 28, 1950 (backwater from ice); no flow for many days in each year.

REMARKS.--Records good.

REVISIONS (WATER YEARS).--WSP 1309: 1950(M).

Rating table (gage height, in feet, and discharge, in cubic feet per second)
(Stage-discharge relation affected by ice Feb. 23 to Mar. 15)

7.4	0	7.8	1.3	9.0	70
7.5	.10	7.9	3.5	9.5	120
7.6	.20	8.1	14	10	200
7.7	.60	8.5	36	11	440

DISCHARGE IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1					0	1.0	3.5	22	13	.32		
2					0	2.5	5.1	18	13	.20		
3					0	14	4.0	16	15	.17		
4					0	25	3.5	13	20	.13		
5					0	100	2.6	11	24	.11		
6					0	120	2.2	9.3	20	.07		
7					0	110	2.4	8.3	15	.07		
8					0	100	1.5	6.7	11	.06		
9					0	60	1.3	5.6	9.3	.03		
10					0	35	1.3	5.1	7.7	.04		
11					0	30	1.3	5.1	6.7	.01		
12					0	27	2.6	4.0	7.2	0		
13					0	25	2.6	3.5	6.2	0		
14					0	23	2.6	3.5	5.1	0		
15					0	21	5.6	3.1	4.6	0		
16					0	19	11	2.6	6.7	0		
17					0	17	20	2.4	3.5	0		
18					0	16	43	2.2	3.1	0		
19					0	15	68	1.7	3.1	0		
20					0	11	133	1.5	3.1	0		
21					0	11	229	1.3	2.6	0		
22					0	10	168	1.2	2.6	0		
23					0	9.3	126	3.1	3.1	0		
24					0	8.8	98	8.8	1.7	0		
25					0	8.3	76	3.1	1.5	0		
26					0	8.3	60	2.4	1.2	0		
27					.30	7.2	50	2.2	.95	0		
28					.60	6.2	40	2.6	.74	0		
29					------	5.1	34	14	.56	0		
30					------	3.5	27	17	.40	0		
31		------			------	3.5	------	18	------	0		------
TOTAL	0	0	0	0	.90	852.7	1,225.1	218.3	212.65	1.21	0	0
MEAN	0	0	0	0	.032	27.5	40.8	7.04	7.09	.039	0	0
MAX	0	0	0	0	.60	120	229	22	24	.32	0	0
MIN	0	0	0	0	0	1.0	1.3	1.2	.40	0	0	0
AC-FT	0	0	0	0	1.8	1,690	2,430	433	422	2.4	0	0

CAL YR 1969 TOTAL 6,111.23 MEAN 16.7 MAX 1,990 MIN 0 ACFT 12,120
WAT YR 1970 TOTAL 2,510.86 MEAN 6.88 MAX 229 MIN 0 ACFT 4,980

PEAK DISCHARGE (BASE, 50 CFS)

DATE	TIME	G.H.	DISCHARGE
3- 5	-	-	about 175
4-21	0600	10.30	253

06477000 James River near Forestburg, S. Dak.

LOCATION.--Lat 43°58'26", long 98°04'14", in SW¼SW¼NW¼ sec.20, T.106 N., R.60 W., Sanborn County, on right bank 5 ft downstream from highway bridge, 3.8 miles southeast of Forestburg, 5.4 miles downstream from Chicago, Milwaukee, St. Paul and Pacific Railroad bridge, and 6.1 miles downstream from Sand Creek.

DRAINAGE AREA.--18,600 sq mi, approximately.

PERIOD OF RECORD.--March 1950 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,208.34 ft above mean sea level (Bureau of Reclamation bench mark). Prior to Sept. 5, 1951, nonrecording gage at same site and datum.

AVERAGE DISCHARGE.--20 years, 302 cfs (218,800 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, about 1,320 cfs Mar. 9; maximum gage height, 11.39 ft Mar. 9 (backwater from ice); no flow Sept. 11-15.

Period of record: Maximum discharge, 12,500 cfs Apr. 9, 1969 (gage height, 17.16 ft); no flow at times in 1950, 1955, 1959, 1961, 1970.

Floods in March 1920 and March 1922 reached a stage of about 18 ft, from information by local residents.

REMARKS.--Records good except those for winter periods, which are poor. Records of chemical analyses for the water year 1970 are published in Part 2 of this report.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	52	68	95	300	60	150	196	902	468	238	16	.50
2	51	78	93	310	58	160	186	871	506	221	13	.32
3	46	83	90	320	57	200	191	813	484	202	10	.40
4	52	83	88	310	55	350	177	774	431	187	8.0	.26
5	58	83	85	290	53	600	174	737	402	171	7.2	.10
6	60	82	80	280	50	850	176	691	373	154	6.9	.08
7	72	87	75	270	48	1,100	162	632	353	142	10	.07
8	68	93	73	260	47	1,200	149	593	332	132	9.6	.03
9	63	104	70	260	45	1,300	148	573	308	123	8.0	.01
10	60	117	65	265	44	1,250	151	584	280	111	6.6	.02
11	58	134	63	270	43	1,200	149	595	279	84	5.7	0
12	61	149	62	240	42	1,150	174	591	306	67	4.5	0
13	73	162	60	200	40	1,100	258	565	313	52	3.6	0
14	78	145	60	160	38	1,000	325	554	314	39	2.6	0
15	75	140	60	120	36	900	353	551	329	33	2.6	0
16	66	150	58	115	34	800	379	547	464	36	1.8	.04
17	61	160	58	115	32	650	439	530	745	37	2.0	.26
18	60	150	65	113	31	600	498	506	858	33	1.8	.80
19	59	145	80	110	30	520	588	508	742	30	2.4	1.2
20	59	140	90	110	31	460	702	501	590	23	2.4	1.6
21	59	150	100	108	33	400	791	479	529	19	2.0	1.2
22	59	160	120	105	37	350	907	485	496	16	1.9	.60
23	58	160	135	100	45	316	1,020	477	445	14	1.9	.40
24	56	155	145	95	75	292	1,080	443	406	13	1.7	.40
25	52	140	180	90	90	296	1,090	427	390	12	1.6	.50
26	47	135	210	85	110	264	1,080	433	365	13	1.6	.40
27	52	120	240	80	125	249	1,040	419	340	13	1.2	.26
28	62	105	255	75	140	225	1,010	389	304	12	1.1	.22
29	65	100	260	70	------	219	969	395	277	36	1.0	.22
30	64	95	275	68	------	212	936	418	258	37	.90	.32
31	61	------	290	65	------	200	------	430	------	25	.70	------
TOTAL	1,867	3,673	3,680	5,359	1,529	18,563	15,498	17,413	12,687	2,325	140.30	10.21
MEAN	60.2	122	119	173	54.6	599	517	562	423	75.0	4.53	.34
MAX	78	162	290	320	140	1,300	1,090	902	858	238	16	1.6
MIN	46	68	58	65	30	150	148	389	258	12	.70	0
AC-FT	3,700	7,290	7,300	10,630	3,030	36,820	30,740	34,540	25,160	4,610	278	20

CAL YR 1969 TOTAL 413,563.0 MEAN 1,133 MAX 12,200 MIN 4.0 AC-FT 820,300
WTR YR 1970 TOTAL 82,744.51 MEAN 227 MAX 1,300 MIN 0 AC-FT 164,100

06477150 Rock Creek near Fulton, S. Dak.

LOCATION(revised).--Lat 43°45'39", long 97°54'25", in NW¼NW¼ sec.3, T.103 N., R.59 W., Hanson County on right bank at downstream side of highway bridge, 4.9 miles northwest of Fulton, and 9.5 miles upstream from mouth.

DRAINAGE AREA.--270 sq mi, approximately.

PERIOD OF RECORD.--October 1966 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,232.08 ft above mean sea level.

EXTREMES.--Current year: Maximum discharge, 199 cfs Mar. 7 (gage height, 5.23 ft); no flow for many days.
Period of record: Maximum discharge, 2,040 cfs Apr. 7, 1969 (gage height, 10.21 ft); from rating curve extended above 300 cfs. No flow for many days in each year.

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

REVISIONS(WATER YEARS).--WRD S. Dak. 1968: 1967(M).

Rating table (gage height, in feet, and discharge, in cubic feet per second)
(Stage-discharge relation affected by ice Nov. 20 to Mar. 4; shifting-control method used Mar. 5, 6)

2.65	0	3.4	12
2.7	.03	3.7	22
2.8	.45	4.0	40
2.9	1.6	4.3	69
3.1	5.0	5.0	172

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.06	.40	.15	.10	.30	.80	5.4	7.6	.90	0		
2	.06	.18	.14	.10	.29	1.0	5.0	6.5	.60	0		
3	.06	.15	.13	.10	.27	2.0	5.0	5.8	.45	0		
4	.18	.15	.12	.11	.28	13	4.6	5.4	.32	0		
5	.90	.12	.11	.11	.30	75	4.6	5.0	.27	0		
6	.24	.15	.09	.12	.33	158	4.5	4.5	.27	0		
7	.15	.12	.08	.12	.34	145	4.1	4.3	.22	.01		
8	.12	.09	.07	.13	.35	108	3.9	3.6	.08	.03		
9	.09	.09	.07	.14	.36	69	3.9	3.0	.03	0		
10	.09	.12	.06	.15	.35	35	3.4	2.7	.08	.01		
11	.09	.09	.06	.17	.34	26	3.4	2.7	.14	0		
12	.15	.12	.05	.18	.33	20	4.8	2.4	.38	0		
13	.24	.12	.04	.18	.32	16	6.1	2.2	.27	0		
14	.18	.15	.04	.18	.31	14	6.1	2.2	.18	.02		
15	.18	.24	.04	.18	.32	11	5.8	2.1	.27	0		
16	.18	.40	.04	.16	.33	9.7	5.8	1.9	.69	0		
17	.18	.40	.04	.13	.33	8.3	6.3	1.8	.27	0		
18	.18	.40	.05	.10	.33	7.3	7.1	1.4	.14	0		
19	.18	.18	.05	.04	.33	7.1	8.7	1.2	.32	0		
20	.18	.18	.06	.03	.40	6.7	8.0	1.0	.90	0		
21	.15	.19	.07	.04	.52	5.8	10	.79	.38	0		
22	.12	.20	.08	.06	.57	5.4	12	.69	.32	0		
23	.12	.19	.09	.08	.58	5.0	13	.79	.22	0		
24	.09	.17	.10	.09	.54	5.0	15	.79	.18	0		
25	.09	.15	.10	.10	.50	5.6	16	.69	.14	0		
26	.09	.14	.11	.11	.45	5.6	15	.60	.11	0		
27	.09	.13	.11	.11	.39	5.6	13	.52	.06	0		
28	.09	.13	.11	.12	.39	5.4	11	.60	.02	0		
29	.09	.14	.11	.13	------	5.8	9.7	.60	.01	0		
30	.18	.14	.11	.14	------	5.8	8.7	.60	0	0		
31	.48	------	.10	.25	------	5.8	------	.90	------	0		------
TOTAL	5.28	5.43	2.58	3.76	10.45	793.70	229.9	74.87	8.22	0.07	0	0
MEAN	.17	.18	.083	.12	.37	25.6	7.66	2.42	.27	.002	0	0
MAX	.90	.40	.15	.25	.58	158	16	7.6	.90	.03	0	0
MIN	.06	.09	.04	.03	.27	.80	3.4	.52	0	0	0	0
AC-FT	10	11	5.1	7.5	21	1,570	456	149	16	.1	0	0

CAL YR 1969 TOTAL 9,071.58 MEAN 24.9 MAX 1,840 MIN 0 AC-FT 17,990
WTR YR 1970 TOTAL 1,134.26 MEAN 3.11 MAX 158 MIN 0 AC-FT 2,250

PEAK DISCHARGE (BASE, 50 CFS)

DATE	TIME	G.H.	DISCHARGE
3- 7	0100	5.23	199

06477500 Firesteel Creek near Mount Vernon, S. Dak.

LOCATION.--Lat 43°46'30", long 98°14'33", in SW¼SW¼ sec.26, T.104 N., R.62 W., Davison County, near center of span on downstream side of highway bridge, 4.5 miles north of Mount Vernon, 5.2 miles downstream from West Firesteel Creek, and 12 miles northwest of Mitchell.

DRAINAGE AREA.--540 sq mi, approximately.

PERIOD OF RECORD.--September 1955 to current year.

GAGE.--Nonrecording gage and crest-stage gage. Altitude of gage is 1,310 ft (from topgraphic map).

AVERAGE DISCHARGE.--15 years, 26.8 cfs (19,420 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 320 cfs Apr. 22 (gage height, 5.60 ft); maximum gage height, 5.76 ft Mar. 6 (backwater from ice); no flow for many days.
Period of record: Maximum discharge, 6,610 cfs Apr. 4, 1969 (gage height, 15.34 ft); maximum gage height, 17.12 ft Apr. 3, 1969 (backwater from ice); no flow for many days in each year.

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

Rating table (gage height, in feet, and discharge, in cubic feet per second)
(Stage-discharge relation affected by ice Dec. 25 to Mar. 6)

2.25	0	2.5	.99	2.8	5.4	4.0	88
2.3	.02	2.6	1.9	2.9	8.4	5.0	218
2.4	.37	2.7	3.4	3.2	22	6.0	398
				3.5	42		

DISCHARGE IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0	.78	.07	.04	.20	.60	4.5	27	1.8	.04	0	
2	.01	.26	.03	.05	.14	.70	4.3	22	1.3	.02	0	
3	.02	.21	.04	.05	.12	2.6	4.1	17	1.2	0	0	
4	.47	.13	.02	.05	.13	1.2	5.0	15	.85	0	0	
5	.71	.21	.04	.04	.14	8.8	5.4	11	.92	0	0	
6	.65	.13	.02	.04	.15	200	4.7	6.9	.59	0	0	
7	.47	.10	.03	.04	.16	177	10	7.2	.31	0	0	
8	.16	.21	.04	.03	.18	40	11	6.9	.42	0	.16	
9	.02	.16	.10	.05	.19	39	12	6.6	.13	0	.02	
10	.01	.13	.03	.06	.20	26	12	6.9	.21	0	.02	
11	.01	.21	.04	.07	.22	22	13	6.3	.16	0	.02	
12	.02	.01	.02	.08	.22	16	12	5.0	.92	0	0	
13	.02	.02	.02	.08	.20	15	15	3.9	.78	0	0	
14	.04	.03	.02	.08	.18	10	17	3.7	1.3	0	0	
15	.04	.07	.02	.08	.28	12	20	3.4	6.9	0	0	
16	.01	.10	.04	.07	.60	10	27	3.0	16	0	0	
17	0	.02	.07	.06	1.4	8.4	76	2.7	6.6	0	0	
18	0	.07	.04	.05	1.2	6.9	137	3.0	3.2	0	0	
19	0	.04	.03	.03	1.2	6.6	170	3.4	1.8	0	0	
20	.01	.03	.03	.04	1.4	7.5	218	2.2	1.3	0	0	
21	.02	.04	.02	.06	1.1	7.8	272	1.4	.92	0	0	
22	.02	.03	.07	.08	1.6	5.0	297	1.7	1.1	0	0	
23	.02	.02	.10	.07	1.7	4.7	220	1.8	.53	0	0	
24	.01	.02	.04	.09	2.1	4.3	197	1.9	.42	0	0	
25	.02	.04	.04	.10	.90	5.0	171	2.1	.53	0	0	
26	.01	.07	.04	.13	.40	5.0	140	1.4	.59	0	0	
27	.02	.10	.04	.15	.40	5.4	99	1.2	.10	0	0	
28	.01	.13	.04	.16	.50	5.7	60	1.4	.13	0	0	
29	.01	.07	.03	.18	------	5.4	50	1.7	.10	0	0	
30	.03	.04	.02	.19	------	5.0	35	1.9	.07	0	0	
31	.42	------	.03	.20	------	4.7	------	2.1	------	0	0	------
TOTAL	3.26	3.48	1.22	2.50	17.21	668.30	2,319.0	181.7	51.18	.06	.22	0
MEAN	.11	.12	.039	.081	.61	21.6	77.3	5.86	1.71	.001	.007	0
MAX	.71	.78	.10	.20	2.1	200	297	27	16	.04	.16	0
MIN	0	.01	.02	.03	.12	.60	4.1	1.2	.07	0	0	0
AC-FT	6.5	6.9	2.4	5.0	34	1,330	4,600	360	102	.1	.4	0

CAL YR 1969 TOTAL 19,110.01 MEAN 52.4 MAX 5,820 MIN 0 ACFT 37,900
WAT YR 1970 TOTAL 3,248.13 MEAN 8.90 MAX 297 MIN 0 ACFT 6,440

PEAK DISCHARGE (BASE, 100 CFS)

DATE	TIME	G.H.	DISCHARGE
3- 6	-	-	about 300
4-22	0800	5.60	320

06478000 James River near Mitchell, S. Dak.

LOCATION.--Lat 43°41'36", long 97°57'54", in NW¼SW¼ sec.30, T.103 N., R.59 W., Hanson County, on left bank 50 ft downstream from bridge on Interstate 90, 0.2 mile downstream from Firesteel Creek, and 3.2 miles southeast of Mitchell.

DRAINAGE AREA.--19,800 sq mi, approximately.

PERIOD OF RECORD.--July 1953 to September 1958 (published as "near Alexandria"), August 1965 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,198.00 ft above mean sea level (South Dakota Department of Highways bench mark). July 1, 1953, to Sept. 30, 1958, nonrecording gage at site 10.5 miles downstream at datum 2.97 ft lower. Aug. 17 to Dec. 7, 1965, nonrecording gage at present site and datum.

AVERAGE DISCHARGE.--10 years, 303 cfs (219,500 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 1,300 cfs Apr. 25 (gage height, 9.33 ft); maximum gage height, 10.46 ft Mar. 14 (backwater from ice); minimum daily discharge, 1.2 cfs Sept. 7.
Period of record: Maximum discharge, 13,800 cfs Apr. 11, 1969 (gage height, 18.32 ft); minimum, 1.0 cfs Oct. 9, 1956, Sept. 26, 27, 1958.

REMARKS.--Records good except those for winter periods, which are poor. Records of chemical analyses and water temperatures for the water year 1970 are published in Part 2 of this report.

Rating table (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Mar. 18 to Apr. 4, June 7-30, July 12-27, Sept. 28-30; stage-discharge relation affected by ice Nov. 15 to Mar. 18)

0.7	0.6	3.0	78
.8	1.4	4.0	165
1.0	3.7	5.0	295
1.3	8.8	6.0	470
1.6	16	8.0	945
2.0	30	10.0	1,470

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	60	76	115	260	70	135	267	1,090	41	244	11	1.8
2	59	76	110	270	67	125	256	1,030	43	222	11	1.6
3	55	77	100	280	64	165	246	978	46	196	9.7	1.5
4	56	79	95	290	60	220	240	930	48	177	8.4	1.5
5	70	84	92	290	58	300	229	878	47	161	7.5	1.5
6	73	86	88	280	55	450	226	830	44	145	7.1	1.3
7	71	87	84	270	50	720	219	783	40	134	9.7	1.2
8	70	89	82	265	48	900	202	733	36	122	11	1.3
9	68	90	80	260	47	1,000	196	675	33	111	11	1.6
10	68	95	80	270	46	1,060	186	640	31	100	11	1.6
11	66	102	78	270	46	1,100	181	628	30	91	10	1.4
12	65	113	76	265	46	1,200	210	628	31	77	9.5	1.4
13	67	123	75	230	46	1,250	271	625	33	66	8.8	1.3
14	67	111	74	155	45	1,270	310	608	33	56	7.3	1.6
15	70	115	73	150	45	1,200	363	593	35	46	6.1	2.9
16	71	125	72	145	45	1,170	408	588	294	39	5.5	2.3
17	72	140	72	140	46	1,100	440	578	404	32	5.7	5.1
18	71	150	72	130	46	950	494	56	566	29	5.2	2.5
19	70	160	73	120	47	825	600	54	773	27	4.3	2.7
20	68	170	73	118	48	613	700	53	815	26	3.7	2.6
21	66	185	73	115	50	560	855	52	718	24	3.9	2.1
22	65	190	73	110	66	526	1,050	52	603	20	3.0	2.0
23	65	195	74	105	90	478	1,220	51	532	17	2.5	2.2
24	63	190	83	100	120	418	1,270	50	476	15	2.6	2.4
25	63	180	90	99	135	376	1,290	47	420	14	2.5	2.5
26	62	170	97	97	140	363	1,290	45	380	12	2.6	2.2
27	59	160	120	95	145	343	1,280	45	351	10	2.3	2.2
28	59	150	150	91	140	324	1,240	43	325	8.8	2.3	2.3
29	59	135	190	86	------	307	1,190	42	301	7.5	2.0	2.3
30	65	125	210	83	------	291	1,140	40	268	6.6	1.5	2.5
31	71	------	240	78	------	277	------	38	------	8.2	1.6	------
TOTAL	2,034	3,828	3,064	5,517	1,911	20,016	18,069	13,483	7,797	2,244.1	190.3	61.4
MEAN	65.6	128	98.8	178	68.3	646	602	435	260	72.4	6.14	2.05
MAX	73	195	240	290	145	1,270	1,290	1,090	815	244	11	5.1
MIN	55	76	72	78	45	125	181	38	30	6.6	1.5	1.2
AC-FT	4,030	7,590	6,080	10,940	3,790	39,700	35,840	26,740	15,470	4,450	377	122

CAL YR 1969 TOTAL 461,666 MEAN 1,265 MAX 13,200 MIN 10 AC-FT 915,700
WTR YR 1970 TOTAL 78,214.8 MEAN 214 MAX 1,290 MIN 1.2 AC-FT 155,100

06478500 James River near Scotland, S. Dak.

LOCATION.--Lat 43°11'00", long 97°37'57", in SW¼SW¼ sec.30, T.97 N., R.57 W., Hutchinson County, on left bank 50 ft upstream from highway bridge, 500 ft upstream from Dawson Creek, and 5 miles northeast of Scotland.

DRAINAGE AREA.--21,550 sq mi, approximately.

PERIOD OF RECORD.--September 1928 to current year. Monthly discharge only for some periods, published in WSP 1309.

GAGE.--Water-stage recorder and rock and earth control. Datum of gage is 1,168.51 ft above mean sea level. Prior to Dec. 1, 1934, nonrecording gage at site 50 ft downstream, and Dec. 1, 1934, to Sept. 27, 1948, water-stage recorder at site 50 ft upstream at present datum.

AVERAGE DISCHARGE.--42 years, 383 cfs (277,500 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 2,020 cfs Mar. 4 (gage height, 9.85 ft); minimum daily, 6.5 cfs Sept. 11, 13.

Period of record: Maximum discharge, 15,200 cfs Apr. 3, 1962 (gage height, 18.74 ft); no flow for many days in some years.

REVISIONS.--The maximum discharge for the water year 1968 has been revised to 1,120 cfs Sept. 23, 1968 (gage height, 7.48 ft) and the minimum daily discharge for the water year 1969 has been revised to 24 cfs Oct. 7, 8, 1968, superseding figures published in WRD S.Dak. 1968 and 1969.

REMARKS.--Records good. Occasional backwater caused by Dawson Creek; reverse flow occurred for part of May 15, 1961, from information by local residents. Records of chemical analyses and water temperatures for the water year 1970 are published in Part 2 of this report.

REVISIONS(WATER YEARS).--WSP 786: Drainage area. WSP 956: 1937-38. WSP 1279: 1932, 1948. Revised figures of discharge, in cubic feet per second, for the water years 1968, 1969 superseding those published in WRD S.Dak. 1968 and 1969, are given herewith:

Date	Discharge	Date	Discharge	Date	Discharge	Date	Discharge
1968		1968-Con.		1968-Con.		1968-Con.	
June 25	220	July 22	136	Aug. 18	122	Oct. 26	36
26	662	23	126	19	118	27	36
27	558	24	122	20	107	28	36
28	415	25	112	21	90	29	38
29	308	26	107	22	79	30	34
30	232	27	101	Sept.22	632	31	30
July 1	208	28	98	23	841	Nov. 1	28
2	202	29	115	24	182	2	27
3	178	30	143	25	76	3	27
4	146	31	132	Oct. 6	27	4	27
5	140	Aug. 1	132	7	24	5	27
6	146	2	129	8	24	6	29
7	150	3	126	9	30	7	31
8	150	4	118	10	33	8	33
9	146	5	112	11	36	9	31
10	122	6	112	12	32	10	31
11	104	7	109	13	27		
12	98	8	104	14	25	1969	
13	93	9	101	15	26	Sept.22	190
14	90	10	93	16	58	23	202
15	85	11	85	17	85	24	166
16	83	12	81	20	83	25	132
17	90	13	87	21	61	26	118
18	107	14	112	22	52	27	101
19	109	15	118	23	46	28	87
20	112	16	126	24	40	29	81
21	174	17	126	25	38	30	81

Month	Cfs-days	Maximum	Minimum	Mean	Runoff in acre-feet
June 1968.....	6,614	662	106	220	13,120
July.....	3,925	208	83	127	7,790
August.....	2,811	132	31	90.7	5,580
September.....	2,340	841	11	78.0	4,640
WTR YR 1968.....	29,852	841	11	81.6	59,210
October 1968.....	1,358	127	24	43.8	2,690
November.....	963	59	27	32.1	1,910
CAL YR 1968.....	32,510	841	11	89.1	64,480
September 1969.....	9,333	583	81	311	18,510
WTR YR 1969.....	522,079	13,900	24	1,430	1,036,000

06478500 James River near Scotland, S. Dak.--Continued

Rating table (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Oct. 8-20, Dec. 31 to Feb. 24, Apr. 16 to May 8, June 19 to Aug. 6, Aug. 26 to Sept. 30)

4.7	5.7	6.0	190
4.9	10	6.5	520
5.1	16	7.0	880
5.3	28	10.0	2,070
5.5	50		

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	81	118	193	170	95	341	360	1,410	457	316	22	8.4
2	79	112	181	190	90	276	360	1,290	447	312	22	8.2
3	72	112	164	215	85	1,300	347	1,170	440	297	21	8.7
4	72	112	138	230	90	1,960	315	1,070	437	263	19	8.4
5	101	107	132	240	87	1,680	281	988	457	229	19	8.2
6	104	104	131	235	85	1,350	264	917	472	199	19	7.7
7	93	109	113	225	85	1,120	221	845	452	197	19	7.7
8	93	107	93	220	85	958	204	804	405	185	21	7.4
9	87	107	94	213	83	930	207	767	351	173	23	7.8
10	87	109	94	210	81	854	188	723	328	161	23	6.9
11	90	115	94	215	78	994	171	683	322	147	23	6.5
12	98	118	95	220	78	1,120	166	651	334	137	22	7.1
13	101	126	95	210	76	1,200	211	630	346	132	20	6.5
14	95	136	96	190	80	1,190	264	632	341	127	17	6.7
15	95	118	95	182	85	1,310	324	636	337	116	16	8.1
16	101	117	99	180	93	1,460	369	629	479	104	15	8.3
17	104	143	98	175	98	1,410	416	614	448	87	15	9.9
18	101	128	101	165	95	1,420	443	598	362	89	15	10
19	104	127	98	155	93	1,410	515	597	384	97	14	9.8
20	109	151	92	150	86	1,170	670	573	637	73	14	9.5
21	107	169	95	143	86	998	774	559	920	57	13	9.5
22	107	190	93	138	145	880	862	555	905	44	13	9.2
23	98	198	83	135	238	745	1,190	554	832	36	13	9.0
24	90	220	91	130	387	648	1,680	534	737	33	12	8.5
25	90	233	95	125	528	595	1,830	534	641	34	12	9.3
26	101	243	99	120	415	550	1,840	525	544	33	11	8.9
27	101	220	103	115	401	513	1,780	483	489	30	11	8.8
28	93	177	112	110	422	478	1,700	454	420	29	9.6	8.4
29	81	184	122	107	------	429	1,610	443	380	28	9.4	8.4
30	85	210	136	103	------	401	1,520	451	340	26	9.4	8.1
31	107	------	150	100	------	380	------	458	------	24	8.8	------
TOTAL	2,927	4,420	3,475	5,316	4,350	30,070	21,082	21,777	14,444	3,815	501.2	249.9
MEAN	94.4	147	112	171	155	970	703	702	481	123	16.2	8.33
MAX	109	243	193	240	528	1,960	1,840	1,410	920	316	23	10
MIN	72	104	83	100	76	276	166	443	322	24	8.8	6.5
AC-FT	5,810	8,770	6,890	10,540	8,630	59,640	41,820	43,190	28,650	7,570	994	496

CAL YR 1969 TOTAL 528,075 MEAN 1,447 MAX 13,900 MIN 27 AC-FT 1,047,000
WTR YR 1970 TOTAL 112,427.1 MEAN 308 MAX 1,960 MIN 6.5 AC-FT 223,000

06478540 Little Vermillion River near Salem, S. Dak.

(Hydrologic benchmark station)

LOCATION.--Lat 43°47'39", long 97°22'02", in SW¼ sec.19, T.104 N., R.54 W (corrected)., McCook County, on right wingwall at downstream end of culvert on county highway, 2.0 miles upstream from small left-bank tributary, and 5.2 miles northeast of Salem.

DRAINAGE AREA.--51.0 sq mi, approximately.

PERIOD OF RECORD.--October 1966 to current year.

GAGE.--Water-stage recorder and concrete dam.

EXTREMES.--Current year: Maximum discharge, 369 cfs Mar. 5 (gage height, 6.63 ft); no flow for many days.
Period of record: Maximum discharge, 596 cfs Apr. 7, 1969 (gage height, 7.58 ft); maximum gage height, 8.53 ft Apr. 5, 1969 (backwater from ice); no flow for many days in each year.
CORRECTION.--The date of the maximum discharge for the 1967 water year is Mar. 4, 1967; the previously published date was Apr. 4, 1967.

REMARKS.--Records good.

Rating table (gage height, in feet, and discharge, in cubic feet per second)
(Shifting control method used Mar. 5-9)

3.70	0	4.1	1.4	5.0	47
3.8	.09	4.2	2.8	5.5	92
3.9	.20	4.3	5.5	6.0	160
4.0	.53	4.4	11	6.6	280
		4.5	16		

DISCHARGE IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1					0	19	1.3	1.2				
2					0	23	.91	.67				
3					0	110	.46	.35				
4					0	223	.31	.26				
5					0	262	.24	.22				
6					0	197	.20	.18				
7					0	126	.16	.15				
8					0	71	.16	.12				
9					0	30	.13	.08				
10					0	20	.09	.03				
11					0	15	.08	.02				
12					0	10	.14	.03				
13					0	5.0	.73	.01				
14					0	4.0	1.2	0				
15					0	3.5	1.8	0				
16					0	2.9	2.4	0				
17					0	2.2	1.5	0				
18					0	1.6	1.5	0				
19					0	1.3	2.4	0				
20					0	.99	2.4	0				
21					0	.91	2.4	0				
22					0	1.1	5.1	0				
23					1.4	.73	9.8	0				
24					6.0	.82	10	0				
25					2.4	1.4	9.3	0				
26					2.4	3.8	7.7	0				
27					4.4	3.4	5.5	0				
28					2.6	2.8	4.1	0				
29					------	2.1	2.9	0				
30					------	2.1	1.7	0				
31		------			------	1.6	------	0	------			------
TOTAL	0	0	0	0	19.2	1,148.25	76.61	3.32	0	0	0	0
MEAN	0	0	0	0	.69	37.0	2.55	.11	0	0	0	0
MAX	0	0	0	0	6.0	262	10	1.2	0	0	0	0
MIN	0	0	0	0	0	.73	.08	0	0	0	0	0
AC-FT	0	0	0	0	38	2,280	152	6.6	0	0	0	0

CAL YR 1969 TOTAL 2,677.66 MEAN 7.34 MAX 552 MIN 0 ACFT 5,310
WAT YR 1970 TOTAL 1,247.38 MEAN 3.42 MAX 262 MIN 0 ACFT 2,470

PEAK DISCHARGE (BASE, 10 CFS)

DATE	TIME	G.H.	DISCHARGE	DATE	TIME	G.H.	DISCHARGE
3- 4-67	1500	4.79	31	5- 6-69	2000	4.52	20
6-21-67	2400	4.58	22	3- 5-70	1200	6.63	369
4- 7-69	0700	7.58	596	4-24-70	1200	4.44	11

06478690 West Fork Vermillion River near Parker, S. Dak.

LOCATION (corrected).--Lat 43°24'55", long 97°12'18", in NE¼NE¼ sec.10 T.99 N., R.54 W., Turner County, near center of span at downstream side of bridge, 3.7 miles northwest of Parker, and 13.9 miles upstream from confluence with East Fork Vermillion River.

DRAINAGE AREA.--370 sq mi, approximately.

PERIOD OF RECORD.--August 1961 to current year.

GAGE.--Nonrecording gage and crest-stage gage. Altitude of gage is 1,340 ft (corrected) (from topographic map).

AVERAGE DISCHARGE.--9 years, 23.0 cfs (16,660 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, about 1,600 cfs Mar. 4; maximum gage height, 10.20 ft Mar. 4 (backwater from ice); minimum daily discharge, 0.03 cfs Sept. 22-26.
Period of record: Maximum discharge, 4,340 cfs Mar. 28, 1962 (gage height, 12.33 ft); no flow for many days in each year.

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

Rating table (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Oct. 1 to Dec. 3; stage-discharge relation affected by ice Dec. 30 to Mar. 4)

1.15	0	3.0	63
1.2	.09	4.0	142
1.3	.89	5.0	243
1.4	2.2	7.0	560
1.5	4.2	9.0	1,220
1.8	11	10	1,620
2.4	30		

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.43	1.4	1.6	.65	.30	150	47	18	4.5	1.2	.28	.07
2	.43	1.4	1.7	.60	.20	120	79	14	4.2	.99	.28	.07
3	.43	1.6	2.0	.55	.20	600	95	14	4.2	.70	.28	.07
4	.43	1.6	2.0	.50	.20	1,250	69	14	4.2	.52	.28	.07
5	.89	1.4	2.0	.40	.22	680	49	13	4.2	.35	.28	.07
6	.99	1.4	2.2	.35	.25	301	43	13	4.0	.28	.28	.07
7	.99	1.4	2.2	.30	.28	238	36	13	3.8	.28	.28	.07
8	.99	1.3	1.9	.25	.30	198	27	13	3.3	.21	.28	.07
9	.99	1.3	1.7	.30	.30	131	21	13	3.1	.21	.28	.07
10	.99	1.3	1.7	.35	.35	78	17	12	3.1	.15	.28	.07
11	.99	1.3	1.4	.40	.35	64	15	11	3.1	.15	.28	.07
12	.99	1.3	1.4	.50	.30	62	19	11	3.1	.15	.28	.07
13	.99	1.2	1.4	.50	.25	59	55	10	3.1	.21	.21	.05
14	.99	1.2	1.2	.55	.25	55	68	9.7	3.1	.43	.21	.05
15	.99	1.2	1.2	.60	.30	53	64	9.5	3.1	.52	.21	.05
16	1.2	1.2	.89	.55	.40	38	58	9.0	3.3	.43	.15	.05
17	1.4	1.3	1.1	.45	.50	31	54	8.5	26	.52	.15	.05
18	1.4	1.3	.99	.35	.50	28	62	8.3	17	.61	.09	.05
19	1.4	1.4	.99	.20	.45	24	66	7.8	13	.61	.09	.05
20	1.3	1.7	.99	.15	.40	23	69	7.3	9.2	.52	.09	.05
21	1.3	1.6	.99	.15	5.0	22	80	7.3	8.5	.52	.09	.05
22	1.3	1.6	.99	.20	10	22	90	6.8	7.1	.43	.09	.03
23	1.3	1.9	.99	.30	30	20	244	6.6	5.9	.43	.09	.03
24	1.2	1.9	.89	.40	120	18	255	6.6	4.7	.35	.09	.03
25	1.2	1.7	.89	.50	160	18	109	6.1	3.3	.28	.09	.03
26	1.2	1.7	.79	.60	180	20	64	5.9	2.9	.28	.09	.03
27	1.2	1.7	.79	.60	190	21	54	5.4	2.5	.28	.07	.05
28	1.3	1.6	.79	.65	200	22	46	5.4	2.2	.28	.07	.05
29	1.3	1.6	.79	.65	------	23	33	4.9	1.9	.28	.07	.05
30	1.4	1.6	.75	.60	------	22	24	4.9	1.3	.28	.07	.07
31	1.4	------	.70	.50	------	21	------	4.5	------	.28	.07	------
TOTAL	33.31	44.1	39.92	13.65	901.30	4,412	2,012	293.5	162.9	12.73	5.45	1.66
MEAN	1.07	1.47	1.29	.44	32.2	142	67.1	9.47	5.43	.41	.18	.055
MAX	1.4	1.9	2.2	.65	200	1,250	255	18	26	1.2	.28	.07
MIN	.43	1.2	.70	.15	.20	18	15	4.5	1.3	.15	.07	.03
AC-FT	66	87	79	27	1,790	8,750	3,990	582	323	25	11	3.3

CAL YR 1969 TOTAL 23,295.16 MEAN 63.8 MAX 2,700 MIN 0 AC-FT 46,210
WTR YR 1970 TOTAL 7,932.52 MEAN 21.7 MAX 1,250 MIN .03 AC-FT 15,730

PEAK DISCHARGE (BASE, 400 CFS)

DATE	TIME	G.H.	DISCHARGE
3-4	-	-	about 1,600

06479000 Vermillion River near Wakonda, S. Dak.

LOCATION(revised).--Lat 42°59'27", long 96°57'49", in SW¼NW¼ sec.2, T.94 N., R.52 W., Clay County, on left bank 40 ft downstream from bridge on State Highway 19, 4.3 miles downstream from Frog Creek, 7.4 miles southeast of Wakonda, and 29.6 miles upstream from mouth.

DRAINAGE AREA.--1,680 sq mi, approximately.

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

GAGE.--Water-stage recorder. Datum of gage is 1,150.9 ft above mean sea level (levels by Corps of Engineers). Prior to Sept. 2, 1954, nonrecording gage and crest-stage gage at site 40 ft upstream at same datum. Since Dec. 27, 1951, supplementary nonrecording gage on secondary channel 1,300 ft left.

AVERAGE DISCHARGE.--25 years, 120 cfs (86,940 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 1,640 cfs Mar. 8 (gage height, 14.23 ft); minimum daily, 4.5 cfs Sept. 11.
Period of record: Maximum discharge, 9,880 cfs Apr. 8, 1969; maximum gage height, 17.17 ft Apr. 6, 1969; no flow at times in 1951, 1956-59.

REMARKS.--Records good except those for winter periods, which are poor. At times during periods of high stage, part of flow leaves main channel through levee breaks and bypasses gage through overflow channel on left bank. Records of chemical analyses for the water year 1970 are published in Part 2 of this report.

Rating tables (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Mar. 8-14, Mar. 31 to June 3; stage-discharge relation affected by ice Nov. 14 to Mar. 7)

Oct. 1 to Mar. 4

3.5	3.8	4.5	57
3.6	7.8	6.0	180
4.0	28	8.0	377

Mar. 5 to Sept. 30

3.3	4.3	7.0	277
3.5	10	9.0	500
4.0	32	12.0	1,010
5.0	93	14.0	1,650

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	21	25	13	16	13	270	148	215	62	23	11	4.9
2	20	26	14	15	12	280	175	196	58	23	11	5.5
3	20	26	14	14	10	290	234	179	55	23	10	6.3
4	19	27	14	13	9.0	325	259	164	50	32	11	5.7
5	21	27	13	12	8.0	420	260	147	46	38	11	5.7
6	21	26	13	11	8.0	900	222	134	44	34	10	6.1
7	20	24	12	10	8.5	1,500	197	121	41	35	11	6.5
8	21	24	15	9.5	9.0	1,570	179	110	39	30	11	6.2
9	25	23	17	9.5	9.5	1,050	167	102	36	26	11	5.5
10	24	22	16	10	10	577	155	93	35	23	11	5.2
11	22	21	15	11	11	408	146	96	36	21	11	4.5
12	22	21	15	11	12	317	147	100	36	19	11	4.6
13	22	21	14	12	13	264	167	96	43	18	9.8	4.6
14	21	20	15	12	15	217	222	93	39	18	9.0	4.8
15	23	19	15	12	18	197	281	89	36	18	8.7	6.5
16	24	17	15	11	21	180	287	85	38	18	8.3	7.2
17	25	15	16	10	24	172	280	80	46	20	8.2	9.2
18	25	13	16	9.0	27	157	270	74	35	24	7.9	9.4
19	25	11	17	8.5	30	146	263	70	33	21	7.5	9.3
20	26	9.0	17	7.5	35	136	274	63	33	19	7.0	9.2
21	25	9.5	16	7.0	50	126	330	60	45	19	7.2	10
22	23	10	16	7.0	70	124	341	57	44	19	6.9	9.4
23	22	11	15	7.5	110	117	333	56	42	17	6.8	8.6
24	21	12	15	8.5	125	113	367	55	40	15	6.9	8.7
25	21	13	16	9.5	150	115	485	54	36	14	6.6	9.0
26	20	12	17	11	170	113	507	54	33	14	6.3	8.3
27	21	11	17	12	200	114	422	80	31	13	6.0	7.1
28	20	11	16	12	250	116	340	122	28	12	5.7	6.5
29	20	10	16	13	------	121	286	75	27	11	5.6	6.3
30	22	12	15	14	------	127	245	65	25	11	5.7	6.3
31	24	------	15	14	------	132	------	66	------	11	5.3	------
TOTAL	686	528.5	470	339.5	1,428.0	10,694	7,989	3,051	1,192	639	265.4	207.1
MEAN	22.1	17.6	15.2	11.0	51.0	345	266	98.4	39.7	20.6	8.56	6.90
MAX	26	27	17	16	250	1,570	507	215	62	38	11	10
MIN	19	9.0	12	7.0	8.0	113	146	54	25	11	5.3	4.5
AC-FT	1,360	1,050	932	673	2,830	21,210	15,850	6,050	2,360	1,270	526	411

CAL YR 1969 TOTAL 111,864.7 MEAN 306 MAX 9,720 MIN 1.0 AC-FT 221,900
WTR YR 1970 TOTAL 27,489.5 MEAN 75.3 MAX 1,570 MIN 4.5 AC-FT 54,530

PEAK DISCHARGE (BASE, 1,000 CFS)

DATE	TIME	G.H.	DISCHARGE
3- 8	0300	14.23	1,640

06479500 Big Sioux River at Watertown, S. Dak.

LOCATION (revised).--Lat 44°56'33", long 97°08'45", in SW¼SW¼NW¼ sec.13, T.117 N., R.53 W., Codington County, on right bank 20 ft downstream from highway bridge, 1.7 miles downstream from inlet-outlet to Lake Kampeska, 3.5 miles northwest of Watertown, and 7.1 miles upstream from Willow Creek.

DRAINAGE AREA.--1,800 sq mi, approximately, of which about 1,400 sq mi is probably noncontributing.

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

GAGE.--Water-stage recorder. Altitude of gage is 1,710 ft (from river-profile map). Prior to Oct. 15, 1958, nonrecording gage at same site and datum.

AVERAGE DISCHARGE.--25 years, 31.8 cfs (23,040 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, about 220 cfs Mar. 4; maximum gage height, 7.62 ft Mar. 4 (backwater from ice); minimum daily discharge, 0.20 cfs Aug. 27.
Period of record: Maximum discharge observed, 2,220 cfs Apr. 9, 1952; maximum gage height, 11.40 ft Apr. 8, 1969 (backwater from ice); no flow at times in most years.

REMARKS.--Records good except those for winter periods, which are poor. Water is stored naturally offstream in Lake Kampeska (capacity, 35,500 acre-ft) during periods when river is rising and then naturally released, in part, when river is falling. Records of chemical analyses for water year 1970 are contained in Part 2 of this report.

Rating table (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Apr. 7 to June 17; stage-discharge relation affect by ice Dec. 21 to Apr. 6)

3.6	0.15	3.9	2.8	4.5	21
3.7	.70	4.1	6.9	4.9	49
3.8	1.6	4.3	13	5.2	74

DISCHARGE IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.3	5.5	3.2	1.8	.80	1.9	32	48	33	15	1.7	.54
2	1.3	6.2	3.2	1.7	.70	2.9	32	46	28	13	1.6	.54
3	1.5	6.9	3.2	1.7	.70	34	32	42	25	9.3	1.6	.48
4	2.8	7.2	3.2	1.7	.80	200	33	41	22	6.4	1.5	.48
5	8.0	6.9	3.2	1.5	.90	120	34	38	20	5.1	1.3	.42
6	6.2	6.7	3.3	1.3	1.0	70	36	43	19	5.1	1.3	.42
7	5.3	6.0	3.2	1.2	1.0	50	46	44	18	4.8	1.5	.37
8	5.8	6.0	3.2	1.2	1.0	30	43	44	17	4.4	2.0	.32
9	5.3	5.5	3.2	1.1	1.0	26	42	46	17	4.4	2.0	.32
10	4.2	4.8	3.2	1.0	1.0	24	43	41	15	4.4	2.0	.59
11	3.7	4.6	3.2	1.0	1.0	23	45	35	13	4.1	1.8	.64
12	3.3	4.2	3.2	.90	1.0	23	45	33	14	3.7	1.6	.59
13	3.3	4.1	3.3	.80	.90	23	48	30	16	4.1	1.4	.48
14	3.5	4.1	3.3	.70	1.0	23	51	29	16	4.8	1.2	.70
15	3.7	4.1	3.3	.70	1.0	24	57	31	22	6.0	.97	1.3
16	3.5	4.1	3.3	.60	1.1	25	70	31	50	5.1	.79	1.3
17	3.2	3.7	3.3	.50	1.1	26	62	31	70	4.4	.79	1.3
18	3.3	4.1	3.3	.50	1.2	27	26	30	63	3.9	.97	1.2
19	3.3	3.9	3.3	.40	1.2	28	21	24	51	3.7	.79	1.2
20	3.3	4.1	3.3	.50	1.2	28	30	22	47	3.0	.54	1.2
21	3.0	3.9	3.0	.50	1.2	28	37	21	43	2.8	.54	.88
22	3.2	3.9	2.8	.50	1.3	29	33	20	39	2.8	.48	.59
23	3.3	3.7	2.5	.50	1.5	30	31	21	38	2.7	.37	.59
24	3.5	3.7	2.4	.60	1.5	31	36	25	34	2.4	.32	.64
25	3.3	3.7	2.3	.60	1.5	31	40	29	28	2.3	.32	.79
26	2.8	3.7	2.2	.70	1.6	31	43	26	24	2.2	.26	.70
27	3.0	3.5	2.1	.80	1.6	31	47	27	21	2.0	.20	.64
28	3.2	3.5	2.0	.90	1.7	31	50	30	20	1.8	.32	.59
29	3.5	3.2	1.9	.90	------	31	55	35	18	2.0	.54	.59
30	3.9	3.5	1.8	.90	------	31	58	35	17	2.1	.54	.64
31	4.6	------	1.8	.90	------	32	------	35	------	2.1	.48	------
TOTAL	113.1	139.0	89.7	28.60	31.50	1,144.8	1,258	1,033	858	139.9	31.72	21.04
MEAN	3.65	4.63	2.89	.92	1.13	36.9	41.9	33.3	28.6	4.51	1.02	.70
MAX	8.0	7.2	3.3	1.8	1.7	200	70	48	70	15	2.0	1.3
MIN	1.3	3.2	1.8	.40	.70	1.9	21	20	13	1.8	.20	.32
AC-FT	224	276	178	57	62	2,270	2,500	2,050	1,700	277	63	42

CAL YR 1969	TOTAL 23,451.10	MEAN 64.2	MAX 1,510	MIN 0	ACFT 46,520
WAT YR 1970	TOTAL 4,888.36	MEAN 13.4	MAX 200	MIN .20	ACFT 9,700

PEAK DISCHARGE (BASE, 400 CFS).--No peak above base.

06480000 Big Sioux River near Brookings, S. Dak.

LOCATION.--Lat 44°10'48", long 96°44'55", in NW¼NW¼ sec.8, T.108 N., R.49 W., Moody County, on right bank 3 ft downstream from highway bridge, 2.2 miles downstream from Medary Creek, and 9.5 miles southeast of Brookings.

DRAINAGE AREA.--4,420 sq mi, approximately, of which about 1,970 sq mi is probably noncontributing.

PERIOD OF RECORD.--August 1953 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,551.91 ft above mean sea level. Prior to May 30, 1959, nonrecording gage at present site and datum.

AVERAGE DISCHARGE.--17 years, 153 cfs (110,800 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, about 3,350 cfs Mar. 6; maximum gage height, 11.24 ft Mar. 6 (backwater from ice); minimum daily discharge, 13 cfs Feb. 3.
Period of record: Maximum discharge, 33,900 cfs Apr. 9, 1969 (gage height, 14.77 ft); no flow at times in 1956, 1959.

REMARKS.--Records good except those for winter periods, which are poor. Records of chemical analyses for the water year 1970 are published in Part 2 of this report.

Rating table (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Mar. 7-20, May 15 to June 23; stage-discharge relation affected by ice Nov. 14 to Mar. 6)

1.8	16	4.0	288
2.0	35	6.0	697
2.5	86	8.0	1,210
3.0	145	9.0	1,550

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	44	71	47	24	15	67	169	481	864	218	64	32
2	44	72	48	24	14	70	168	440	881	193	61	32
3	43	73	47	23	13	200	174	409	864	179	61	31
4	44	72	46	23	14	700	168	374	759	164	60	30
5	64	74	45	22	15	1,500	205	343	565	150	58	29
6	85	74	44	22	15	3,200	280	311	406	144	56	28
7	82	73	41	22	15	2,440	386	295	315	140	65	27
8	80	73	38	21	15	1,660	459	273	261	129	82	26
9	82	71	37	21	15	1,210	413	255	229	118	75	26
10	76	71	36	21	15	840	401	236	209	111	72	28
11	73	70	36	20	15	509	337	226	219	104	73	28
12	73	71	36	20	14	336	308	226	201	101	69	27
13	75	67	39	19	14	288	354	215	199	98	63	27
14	73	58	40	18	15	293	395	206	196	103	58	28
15	70	51	39	17	17	222	413	198	203	101	56	32
16	69	59	36	17	19	216	450	191	360	92	54	33
17	68	58	39	16	20	199	448	184	746	89	52	36
18	68	54	38	16	21	197	452	180	1,160	115	50	37
19	66	49	37	15	20	206	511	163	1,310	117	49	35
20	65	46	33	14	22	172	626	149	1,310	105	45	33
21	63	48	31	14	30	190	665	141	1,140	97	43	31
22	62	54	30	14	41	188	709	132	883	94	42	28
23	61	57	29	15	42	171	782	136	681	89	40	27
24	59	56	29	16	42	198	864	144	552	83	39	28
25	59	55	28	16	41	203	851	142	468	76	37	31
26	60	52	28	15	46	203	789	139	402	71	36	30
27	59	49	27	15	55	196	717	137	349	67	34	29
28	59	47	27	14	61	169	665	318	307	63	33	28
29	59	45	26	14	------	186	596	607	273	63	35	27
30	59	46	26	15	------	178	532	841	244	67	36	26
31	64	------	25	16	------	170	------	818	------	66	34	------
TOTAL	2,008	1,816	1,108	559	681	16,577	14,287	8,910	16,556	3,407	1,632	890
MEAN	64.8	60.5	35.7	18.0	24.3	535	476	287	552	110	52.6	29.7
MAX	85	74	48	24	61	3,200	864	841	1,310	218	82	37
MIN	43	45	25	14	13	67	168	132	196	63	33	26
AC-FT	3,980	3,600	2,200	1,110	1,350	32,880	28,340	17,670	32,840	6,760	3,240	1,770

CAL YR 1969 TOTAL 182,546.0 MEAN 500 MAX 31,200 MIN 5.0 AC-FT 362,100
WTR YR 1970 TOTAL 68,431 MEAN 187 MAX 3,200 MIN 13 AC-FT 135,700

PEAK DISCHARGE (BASE, 1,000 CFS)

DATE	TIME	G.H.	DISCHARGE
3- 6	-	-	about 3,350
6-19	2400	8.53	1,340

06481000 Big Sioux River near Dell Rapids, S. Dak.

LOCATION.--Lat 43°47'25", long 96°44'42", in NW¼NW¼ sec.29, T.104 N., R.49 W., Minnehaha County, on left bank at downstream side of highway bridge, 0.2 mile downstream from confluence of divided channels, and 3 miles southwest of Dell Rapids.

DRAINAGE AREA.--5,060 sq mi, approximately, of which about 1,970 sq mi is probably noncontributing.

PERIOD OF RECORD.--May 1948 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,455.99 ft above mean sea level. Prior to Nov. 11, 1949, nonrecording gage and Nov. 11, 1949, to Sept. 30, 1951, water-stage recorder, at present site at datum 0.04 ft lower.

AVERAGE DISCHARGE.--22 years, 268 cfs (194,200 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 2,870 cfs Mar. 9 (gage height, 10.68 ft); minimum daily, 17 cfs Jan. 30, 31, Feb. 2, 3, 6-10.
Period of record: Maximum discharge, 41,300 cfs Apr. 9, 1969 (gage height, 16.47 ft); minimum daily, 0.20 cfs Jan. 31, Feb. 1, 1965.

REMARKS.--Records good except those for winter periods, which are poor. Water quality records for the water year 1970 are published in Part 2 of this report.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	58	73	78	33	19	125	258	672	803	334	71	43
2	56	78	76	33	17	150	328	615	808	303	67	35
3	54	78	72	29	17	650	448	562	827	270	65	31
4	51	81	60	29	21	1,950	426	515	844	241	64	33
5	51	87	69	27	23	1,770	672	477	826	224	66	35
6	54	81	77	27	17	1,720	626	443	739	212	66	36
7	56	83	72	33	17	1,770	525	414	581	203	69	32
8	66	88	56	35	17	2,060	536	387	442	181	74	32
9	83	63	49	36	17	2,740	542	365	365	167	84	34
10	87	88	51	37	17	2,770	518	341	320	161	87	30
11	81	89	65	36	19	2,280	468	326	295	148	97	35
12	83	88	68	33	19	1,680	448	309	319	141	97	30
13	83	77	68	31	21	1,150	410	296	345	128	94	32
14	82	67	68	31	21	822	395	291	360	128	84	33
15	82	67	67	32	21	668	448	272	401	125	73	37
16	80	78	58	31	21	626	478	273	392	123	68	41
17	80	70	59	29	23	550	498	268	431	119	66	54
18	80	52	61	27	23	505	528	260	521	137	64	54
19	82	53	55	24	23	488	561	245	787	108	59	58
20	79	76	51	25	23	429	609	210	1,050	116	55	59
21	75	71	49	27	25	404	706	217	1,190	134	50	52
22	72	71	49	27	25	362	821	197	1,240	132	49	48
23	81	78	38	27	25	345	878	190	1,170	112	49	45
24	79	79	38	25	28	333	914	187	963	105	50	45
25	74	80	42	25	38	297	999	177	780	103	51	40
26	67	74	42	25	54	314	1,040	179	638	96	56	38
27	66	71	38	21	75	305	996	175	550	88	52	40
28	67	64	44	23	100	314	904	400	479	80	49	40
29	68	66	38	19	------	276	809	302	402	79	47	40
30	68	75	35	17	------	255	742	401	376	75	44	40
31	69	------	35	17	------	263	------	628	------	89	42	------
TOTAL	2,214	2,246	1,723	871	766	28,371	18,531	10,594	19,244	4,662	2,009	1,202
MEAN	71.4	74.9	55.6	28.1	27.4	915	618	342	641	150	64.8	40.1
MAX	87	89	78	37	100	2,770	1,040	672	1,240	334	97	59
MIN	51	52	35	17	17	125	258	175	295	75	42	30
AC-FT	4,390	4,450	3,420	1,730	1,520	56,270	36,760	21,010	38,170	9,250	3,980	2,380

CAL YR 1969 TOTAL 266,923.4 MEAN 731 MAX 35,000 MIN 9.7 AC-FT 529,400
WTR YR 1970 TOTAL 92,433 MEAN 253 MAX 2,770 MIN 17 AC-FT 183,300

PEAK DISCHARGE (BASE, 1,000 CFS)

DATE	TIME	G.H.	DISCHARGE
3- 9	2300	10.68	2,870
4-26	1300	6.76	1,050
6-22	1800	7.17	1,250

06481500 Skunk Creek near Sioux Falls, S. Dak.

LOCATION.--Lat 43°32'38", long 96°48'27", in NW¼NW¼ sec.23, T.101 N., R.50 W., Minnehaha County, on left bank 5 ft downstream from bridge on U.S. Highway 16, 600 ft upstream from small right-bank tributary, 3.2 miles upstream from mouth, and 4 miles west of Sioux Falls.

DRAINAGE AREA.--520 sq mi, approximately.

PERIOD OF RECORD.--May 1948 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,415.29 ft above mean sea level (levels by Corps of Engineers). Prior to Oct. 24, 1949, nonrecording gage at same site and datum.

AVERAGE DISCHARGE.--22 years, 50.2 cfs (36,370 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 1,970 cfs Mar. 3 (gage height, 6.96 ft); minimum daily, 0.13 cfs Sept. 13.
Period of record: Maximum discharge, 29,400 cfs June 17, 1957 (gage height, 17.78 ft), from rating curve extended above 8,100 cfs on basis of slope-area measurement of peak flow; no flow at times in many years.

REMARKS.--Records good except those for winter periods, which are poor. Records of chemical analyses for the water year 1970 are published in Part 2 of this report.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	4.5	5.0	5.1	4.7	3.1	51	176	75	141	23	5.1	1.2
2	3.7	5.5	5.1	4.5	2.9	32	236	71	108	25	5.3	1.2
3	3.7	5.2	5.1	4.5	2.5	991	307	70	85	21	6.3	1.4
4	3.5	5.0	4.5	4.1	2.7	653	193	69	71	19	7.3	1.3
5	3.7	5.0	5.3	4.1	2.7	320	214	69	64	18	8.3	.82
6	3.7	7.5	5.3	3.9	2.8	217	149	66	58	16	7.2	.67
7	3.1	6.9	5.2	2.4	2.8	204	106	64	53	16	6.5	.46
8	3.5	5.5	4.3	2.3	2.8	177	83	58	46	16	6.2	.26
9	3.7	5.8	5.1	2.1	2.8	128	64	53	41	15	5.5	.16
10	3.9	6.1	4.7	2.1	2.8	57	54	50	38	14	5.3	.16
11	3.7	5.7	4.6	2.5	2.9	41	54	50	40	14	5.6	.16
12	3.7	5.3	4.3	2.6	3.0	46	66	50	47	13	5.8	.16
13	4.7	5.0	4.4	2.5	3.0	81	117	50	47	13	5.7	.13
14	4.5	4.0	4.8	2.4	2.5	69	139	50	47	14	5.8	.16
15	3.7	5.4	4.1	2.3	2.4	55	127	50	105	13	5.3	.53
16	3.9	4.8	4.4	2.6	2.5	49	129	48	167	11	5.8	.74
17	4.3	4.8	4.3	2.6	2.9	47	108	46	145	10	5.8	2.0
18	3.3	4.7	4.1	2.6	2.9	46	89	43	114	9.3	5.3	1.2
19	3.7	5.1	3.9	2.3	3.0	44	118	37	89	8.6	4.9	.94
20	3.7	4.8	3.8	2.5	2.6	31	162	34	74	8.1	4.6	.94
21	3.9	4.7	4.0	2.2	2.6	32	135	30	61	7.2	4.8	1.3
22	4.3	4.8	3.3	2.2	3.5	35	117	27	52	6.5	4.6	1.4
23	4.3	4.9	4.5	2.5	6.5	32	190	26	44	5.9	4.4	1.2
24	4.3	5.3	4.5	2.5	39	31	206	26	39	5.6	4.3	1.5
25	4.5	5.1	4.3	3.0	31	29	174	27	38	5.4	3.4	1.5
26	4.3	5.3	4.3	3.0	18	28	127	25	36	5.6	2.2	1.7
27	5.0	5.3	4.5	3.0	93	30	104	23	32	5.5	1.9	1.3
28	4.7	5.0	4.3	3.0	98	25	92	402	30	4.9	1.8	1.1
29	4.3	5.0	4.3	3.0	------	26	83	937	27	4.4	1.6	1.1
30	4.7	5.1	4.5	3.0	------	33	79	363	24	4.8	1.6	1.3
31	4.7	------	4.7	3.2	------	141	------	204	------	4.9	1.5	------
TOTAL	125.2	157.6	139.6	90.2	347.2	3,781	3,998	3,193	1,963	357.7	149.7	27.99
MEAN	4.04	5.25	4.50	2.91	12.4	122	133	103	65.4	11.5	4.83	.93
MAX	5.0	7.5	5.3	4.7	98	991	307	937	167	25	8.3	2.0
MIN	3.1	4.0	3.3	2.1	2.4	25	54	23	24	4.4	1.5	.13
AC-FT	248	313	277	179	689	7,500	7,930	6,330	3,890	709	297	56

CAL YR 1969 TOTAL 41,579.40 MEAN 114 MAX 7,170 MIN .30 AC-FT 82,470
WTR YR 1970 TOTAL 14,330.19 MEAN 39.3 MAX 991 MIN .13 AC-FT 28,420

PEAK DISCHARGE (BASE, 500 CFS)

DATE	TIME	G.H.	DISCHARGE
3- 3	1030	6.96	1,970
5-29	0115	5.75	1,380

06482100 Big Sioux River near Brandon, S. Dak.

LOCATION.--Lat 43°36'25", long 96°37'55", in NE¼SE¼ sec.30, T.102 N., R.48 W., Minnehaha County, on left bank 130 ft upstream from Great Northern Railway bridge, 2.8 miles northwest of Brandon, and 7.2 miles upstream from Split Rock Creek.

DRAINAGE AREA.--5,810 sq mi, approximately, of which about 1,970 sq mi is probably noncontributing.

PERIOD OF RECORD.--July 1959 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,283.38 ft above mean sea level.

AVERAGE DISCHARGE.--11 years, 354 cfs (256,500 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 2,490 cfs Mar. 5 (gage height, 10.32 ft); minimum daily, 27 cfs Feb. 12, 13.
Period of record: Maximum discharge, 36,800 cfs Apr. 10, 1969 (gage height, 24.56 ft, from floodmarks); minimum daily, 5.0 cfs Jan. 7, 1968.

REMARKS.--Records good except those for winter periods, which are poor. Diurnal fluctuations caused by power-plants upstream. Records of chemical analyses for the water year 1970 are published in Part 2 of this report.

Rating table (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Feb. 21 to Mar. 3, Mar. 9-13, Mar. 23 to May 3; stage-discharge relation affected by ice Dec. 22 to Feb. 20)

4.0	23
4.4	73
4.8	145
5.5	351
6.0	531
8.0	1,330
10.0	2,310

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	82	98	92	42	39	252	519	863	1,040	437	100	50
2	78	93	93	43	37	216	675	796	1,060	431	91	51
3	74	99	81	41	38	1,010	946	734	1,030	372	87	63
4	78	98	68	40	40	1,740	845	681	1,030	333	89	53
5	100	99	73	39	41	1,810	951	627	1,020	306	89	48
6	85	103	83	41	38	1,750	991	584	966	293	93	48
7	82	117	83	43	32	1,350	782	543	837	281	101	47
8	79	111	76	46	34	1,310	702	506	668	269	102	45
9	84	106	59	48	30	1,600	676	475	552	250	99	49
10	93	111	69	50	29	1,950	663	446	482	245	104	50
11	96	112	71	53	28	1,930	626	433	429	225	103	48
12	105	111	77	52	27	1,740	663	424	431	207	91	49
13	113	109	80	50	27	1,440	668	397	457	216	94	42
14	107	67	78	49	28	847	578	399	450	214	88	47
15	109	76	72	50	29	845	649	385	509	199	85	70
16	114	90	69	53	36	607	668	363	709	183	80	57
17	105	96	72	52	42	541	669	346	665	173	84	100
18	102	55	71	48	37	408	676	336	606	172	75	66
19	102	66	68	44	35	413	776	320	640	177	74	58
20	102	66	60	39	34	414	836	305	870	163	70	55
21	100	109	60	37	59	431	854	294	1,050	158	70	74
22	95	98	56	38	82	410	953	280	1,170	155	67	57
23	94	86	54	39	118	367	1,100	268	1,230	119	61	55
24	93	95	54	41	128	385	1,150	251	1,170	112	59	74
25	93	96	53	41	143	389	1,170	308	1,020	155	62	64
26	89	91	52	41	164	356	1,180	262	837	132	59	58
27	89	85	51	42	213	368	1,190	261	698	132	55	53
28	88	72	50	42	289	368	1,120	1,600	607	97	50	52
29	90	81	46	42	------	368	1,020	1,600	543	75	43	55
30	97	91	43	42	------	365	933	1,100	483	96	44	54
31	103	------	41	40	------	381	------	962	------	97	47	------
TOTAL	2,921	2,787	2,055	1,368	1,877	26,361	25,229	17,149	23,259	6,474	2,416	1,692
MEAN	94.2	92.9	66.3	44.1	67.0	850	841	553	775	209	77.9	56.4
MAX	114	117	93	53	289	1,950	1,190	1,600	1,230	437	104	100
MIN	74	55	41	37	27	216	519	251	429	75	43	42
AC-FT	5,790	5,530	4,080	2,710	3,720	52,290	50,040	34,020	46,130	12,840	4,790	3,360

CAL YR 1969 TOTAL 308,073 MEAN 844 MAX 35,700 MIN 15 AC-FT 611,100
WTR YR 1970 TOTAL 113,588 MEAN 311 MAX 1,950 MIN 27 AC-FT 225,300

PEAK DISCHARGE (BASE, 2,600 CFS).--No peak above base.

06482610 Split Rock Creek at Corson, S. Dak.

LOCATION.--Lat 43°36'59", long 96°33'54", in NE¼NW¼ sec.26, T.101 N., R.48 W., Minnehaha County, on left bank 6 ft downstream from highway bridge, 0.3 mile east of Corson, and 3.4 miles upstream from mouth.

DRAINAGE AREA.--475 sq mi, approximately.

PERIOD OF RECORD.--October 1965 to current year. February 1951 to September 1965 (gage heights and discharge measurements only in files of Corps of Engineers).

GAGE.--Water-stage recorder. Datum of gage is 1,304.22 ft above mean sea level (levels by Corps of Engineers). Prior to Aug. 15, 1964, nonrecording gage at datum 0.15 ft higher and Aug. 15, 1964 to Sept. 3, 1970, nonrecording gage at present site and datum.

AVERAGE DISCHARGE.--5 years, 66.5 cfs (48,180 acre-ft per year).

EXTREMES.--Maximum and minimum discharges for the water years 1966-70 are contained in the following table:

Water year	Maximum			Minimum daily	
	Date	Discharge (cfs)	Gage height (feet)	Date	Discharge (cfs)
1966	Feb. 10, 1966	550	a	--	0
1967	Apr. 1, 1967	925	5.40	--	3.0
1968	June 24, 1968	1,850	6.85	--	0
1969	Apr. 18, 1969	17,800	15.00	Oct. 8, 1969	3.0
1970	Mar. 3, 1970	2,500	a8.82	Aug. 2, 1970	.65

a Backwater from ice.

Period of record: Maximum discharge, 17,800 cfs Apr. 8, 1969 (gage height, 15.00 ft); no flow at times most years.
Maximum stage since 1951, 15.41 ft June 17, 1957 (discharge not determined).

REMARKS.--Records good except those for winter periods, which are poor. Water-quality records for the water year 1970 are published in Part 2 of this report.

COOPERATION.--Records for the water years 1966-69 furnished by Corps of Engineers. Gage-height record and 14 discharge measurements furnished by Corps of Engineers for the 1970 water year.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1965 TO SEPTEMBER 1966

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	70	18	15	8.1	3.9	3.0	26	33	17	12	2.7	9.2
2	70	18	13	8.1	3.9	3.0	32	47	16	9.7	2.4	12
3	65	16	13	8.1	3.5	3.0	36	31	14	5.7	1.5	12
4	52	16	14	8.1	3.5	3.0	36	31	16	5.7	1.5	6.6
5	49	16	14	7.5	3.5	3.0	30	27	44	4.4	1.5	2.4
6	42	16	14	7.5	6.2	3.0	25	27	35	3.5	.90	2.7
7	38	15	14	7.5	8.6	32	20	27	18	2.1	1.5	.60
8	35	17	14	7.5	13	82	19	27	18	2.1	3.0	0
9	31	17	12	7.5	395	94	19	27	20	1.8	5.3	1.2
10	31	17	11	7.5	550	126	19	32	23	1.8	11	1.2
11	26	14	9.7	7.1	515	142	21	32	22	3.9	8.1	1.5
12	27	12	12	7.1	485	185	22	60	21	4.4	5.7	1.5
13	23	9.7	12	7.1	345	242	24	47	12	4.8	3.5	1.5
14	23	14	12	7.1	250	348	24	31	11	3.9	4.4	1.5
15	21	14	11	7.1	156	242	24	31	9.7	3.0	5.7	1.5
16	18	15	11	6.6	100	132	25	28	10	3.5	5.7	1.8
17	39	15	11	6.6	68	111	25	30	9.7	2.7	8.0	1.8
18	44	16	11	6.6	27	102	24	30	9.7	1.5	7.1	1.8
19	44	16	10	6.6	7.5	94	63	27	10	.60	9.2	1.8
20	31	16	10	6.6	7.5	94	55	28	11	0	9.7	15
21	31	15	9.7	6.2	7.1	95	47	28	11	2.4	10	14
22	26	15	9.7	6.2	6.6	103	47	28	9.7	3.0	8.6	14
23	25	14	9.7	6.2	5.3	95	47	31	11	2.1	8.6	11
24	21	11	9.2	6.2	4.4	63	47	32	8.1	2.1	8.6	11
25	20	11	9.2	6.2	3.5	41	46	31	8.6	1.2	7.5	11
26	20	14	8.6	6.0	3.0	30	54	29	9.2	1.2	7.5	10
27	19	20	8.6	5.7	3.0	30	54	29	7.1	2.1	6.6	13
28	19	19	8.6	5.3	2.4	25	62	30	7.5	5.7	4.4	10
29	18	18	8.6	4.8	------	26	60	30	9.2	11	4.4	10
30	18	15	8.6	4.8	------	26	36	21	9.7	10	3.4	10
31	18	------	8.1	4.4	------	26	------	21	------	4.8	4.5	------
TOTAL	1,014	459.7	342.3	207.9	2,987.4	2,604.0	1,069	963	438.2	122.70	172.50	191.60
MEAN	32.7	15.3	11.0	6.71	107	84.0	35.6	31.1	14.6	3.96	5.56	6.39
MAX	70	20	15	8.1	550	348	63	60	44	12	11	15
MIN	18	9.7	8.1	4.4	2.4	3.0	19	21	7.1	0	.90	0
AC-FT	2,010	912	679	412	5,930	5,160	2,120	1,910	869	243	342	380

CAL YR 1965 TOTAL -- MEAN - MAX - MIN - AC-FT -
WAT YR 1966 TOTAL 10,572.30 MEAN 29.0 MAX 550 MIN 0 AC-FT 20,970

PEAK DISCHARGE (BASE, 500 CFS)

DATE	TIME	G.H.	DISCHARGE
2-10	-	-	about 550

06482610 Split Rock Creek at Corson, S. Dak.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1966 TO SEPTEMBER 1967

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	9.2	9.2	12	6.6	3.0	164	133	27	6.6	182	8.6	10
2	9.2	8.6	12	6.6	3.0	204	674	28	6.6	167	7.5	8.6
3	9.2	8.6	12	6.2	3.0	272	294	19	6.2	135	8.1	6.6
4	9.2	8.1	12	6.2	3.0	230	178	19	6.2	119	7.5	6.6
5	7.5	8.1	12	6.2	3.0	188	138	19	7.0	87	8.6	5.7
6	7.5	7.1	11	6.2	3.0	164	114	17	4.8	57	8.6	5.3
7	7.5	7.1	11	5.7	3.0	145	114	16	5.3	55	8.6	5.3
8	7.5	20	11	5.7	3.0	124	82	16	5.3	47	7.5	4.4
9	7.5	6.6	11	5.3	3.0	108	98	15	230	47	6.2	4.4
10	6.6	6.6	11	5.3	3.0	92	46	13	246	52	6.2	4.8
11	6.2	8.1	10	5.3	3.0	81	39	13	206	55	6.2	4.8
12	6.2	8.6	9.2	4.8	3.0	68	35	13	158	47	6.2	3.9
13	4.8	8.6	8.6	4.8	10	58	42	13	116	42	5.7	3.9
14	17	8.6	8.0	4.8	13	44	35	13	111	38	6.2	3.0
15	84	9.2	8.1	4.8	12	35	35	14	146	33	5.3	3.0
16	82	9.7	8.1	4.4	9.2	36	34	16	177	33	5.3	3.9
17	66	10	7.5	4.4	7.5	39	36	13	145	32	4.4	4.8
18	35	9.7	7.5	3.9	7.5	42	37	12	174	29	4.4	6.2
19	26	10	7.5	3.9	7.5	47	31	11	428	24	4.4	5.7
20	18	10	7.5	3.9	7.5	49	26	9.7	318	20	4.4	5.7
21	12	11	7.5	3.5	7.5	52	26	9.7	294	17	4.4	4.8
22	12	9.7	7.5	3.5	7.5	60	26	9.2	261	14	4.4	4.8
23	12	10	7.1	3.5	7.5	60	29	9.2	244	12	4.4	4.8
24	12	10	7.1	3.0	7.5	55	31	8.1	250	11	6.2	4.8
25	11	11	7.1	3.0	7.5	55	32	6.2	212	8.6	6.2	4.8
26	11	12	7.1	3.0	7.5	49	34	6.2	196	7.5	84	4.8
27	10	11	7.1	3.6	49	42	32	6.2	188	7.5	88	4.8
28	10	15	7.1	3.0	52	36	32	5.7	182	6.2	40	4.4
29	9.7	11	6.6	3.0	------	32	27	6.6	182	7.5	15	3.5
30	10	12	6.6	3.0	------	27	27	7.5	166	8.6	12	3.5
31	9.7	------	6.6	3.0	------	19	------	6.6	------	9.7	11	------
TOTAL	545.5	295.2	274.4	140.1	256.2	2,677	2,517	397.9	4,678.0	1,410.6	405.5	151.6
MEAN	17.6	9.84	8.85	4.52	9.15	86.4	83.9	12.8	156	45.5	13.1	5.05
MAX	84	20	12	6.6	52	272	674	28	428	182	88	10
MIN	4.8	6.6	6.6	3.0	3.0	19	26	5.7	4.8	6.2	4.4	3.0
AC-FT	1,080	586	544	278	508	5,310	4,990	789	9,280	2,800	804	301

CAL YR 1966 TOTAL 9,871.4 MEAN 27.0 MAX 550 MIN 0 AC-FT 19,580
WAT YR 1967 TOTAL 13,749.0 MEAN 37.7 MAX 674 MIN 3.0 AC-FT 27,270

PEAK DISCHARGE (BASE, 500 CFS)

DATE	TIME	G.H.	DISCHARGE
4- 1	2400	5.40	925
6-19	0600	5.30	875

06482610 Split Rock Creek at Corson, S. Dak.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1967 TO SEPTEMBER 1968

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3.5	1.5	5.3	.90	6.6	12	8.0	23	9.2	18	5.2	.30
2	3.5	1.5	5.3	.90	6.2	15	1.8	19	7.5	18	1.2	.90
3	2.7	3.0	4.4	.90	5.7	18	2.4	17	7.5	18	.90	1.8
4	2.7	3.0	6.2	.90	5.3	25	2.4	16	5.0	25	.30	2.7
5	2.7	3.0	2.7	.90	5.3	32	2.4	16	4.8	18	0	2.4
6	5.1	2.4	2.7	.60	4.8	41	8.6	18	3.9	18	.60	3.9
7	2.1	2.4	2.7	.60	4.4	60	11	30	3.9	19	1.2	2.1
8	2.7	1.5	2.7	.60	4.4	42	14	36	3.9	17	1.5	2.4
9	3.9	1.5	3.5	.60	3.9	33	21	34	9.7	18	2.1	3.0
10	3.9	2.4	2.7	.60	3.9	27	15	32	66	20	2.1	3.4
11	4.4	3.0	2.7	.60	3.9	27	11	27	26	21	2.1	3.0
12	4.8	3.0	2.7	.60	3.9	25	9.2	20	15	107	2.7	2.7
13	4.4	3.0	2.7	.90	4.1	26	8.0	19	7.0	49	2.7	2.4
14	4.4	3.9	3.5	1.2	3.9	25	15	18	7.0	18	3.0	1.8
15	4.4	3.9	1.8	1.5	3.9	22	12	17	8.0	18	2.7	2.1
16	3.0	3.9	1.8	1.8	3.9	19	11	16	8.0	18	4.4	2.4
17	3.0	3.0	1.8	2.1	3.9	18	9.2	15	8.0	21	3.4	2.7
18	2.1	3.0	1.5	2.4	3.9	21	9.2	12	6.6	18	3.9	3.9
19	1.5	3.0	1.5	2.7	3.9	20	11	11	6.2	15	2.4	5.7
20	2.1	2.4	1.5	3.0	3.9	18	12	11	5.0	12	2.4	8.0
21	1.8	2.4	1.2	3.5	3.9	14	23	10	5.0	9.2	1.8	11
22	1.8	1.5	1.2	3.5	3.9	8.6	35	10	4.8	5.0	1.5	12
23	1.2	2.4	1.2	3.9	3.9	8.6	49	10	9.9	5.0	1.2	14
24	1.2	3.0	1.2	4.4	3.9	7.5	50	10	662	5.7	.60	12
25	1.2	3.0	1.2	4.4	3.9	7.5	27	10	226	5.2	.30	11
26	.90	3.9	.90	4.8	3.9	6.2	22	8.0	82	4.8	0	8.6
27	.90	4.4	.90	5.3	3.9	5.7	27	11	39	5.7	0	7.0
28	.90	5.3	.90	5.7	6.6	5.7	36	7.5	25	4.4	0	7.0
29	.90	5.3	.90	6.2	9.2	4.8	27	7.5	20	5.2	.30	6.2
30	.90	6.6	.90	6.6	------	4.8	27	7.5	17	5.7	.90	5.7
31	5.6	------	.90	6.6	------	3.5	------	10	------	2.7	1.2	------
TOTAL	84.20	92.1	71.10	79.20	132.8	602.9	517.2	508.5	1,308.9	544.6	52.60	152.10
MEAN	2.72	3.07	2.29	2.55	4.58	19.4	17.2	16.4	43.6	17.6	1.70	5.07
MAX	5.6	6.6	6.2	6.6	9.2	60	50	36	662	107	5.2	14
MIN	.90	1.5	.90	.60	3.9	3.5	1.8	7.5	3.9	2.7	0	.30
AC-FT	167	183	141	157	263	1,200	1,030	1,010	2,600	1,080	104	302

CAL YR 1967 TOTAL 12,881.30 MEAN 35.3 MAX 674 MIN .90 ACFT 25,550
WAT YR 1968 TOTAL 4,146.20 MEAN 11.3 MAX 662 MIN 0 ACFT 8,220

PEAK DISCHARGE (BASE, 500 CFS)

DATE	TIME	G.H.	DISCHARGE
6-24	0600	6.85	1,850

06482610 Split Rock Creek at Corson, S. Dak.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1968 TO SEPTEMBER 1969

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	5.7	39	31	7.5	9.2	10	100	89	15	470	36	12
2	4.8	35	26	7.5	9.2	10	164	71	15	506	29	11
3	6.9	34	23	7.5	9.2	10	252	75	16	446	26	10
4	4.4	32	21	7.5	9.2	10	1,960	77	16	310	19	8.7
5	4.4	35	22	7.5	9.2	10	2,960	82	18	248	22	11
6	4.4	32	23	7.5	9.2	10	4,800	86	18	157	20	12
7	3.5	32	21	7.5	9.2	10	11,900	86	19	132	17	12
8	3.0	31	18	7.5	9.2	10	16,400	84	21	134	15	14
9	3.9	29	14	7.5	9.2	10	9,740	78	19	117	16	12
10	5.3	26	9.7	7.5	9.2	10	4,800	66	18	102	16	12
11	3.9	20	8.6	7.5	9.2	10	1,750	60	19	89	15	11
12	3.5	18	7.5	7.5	9.3	10	1,030	57	20	75	14	8.7
13	4.4	12	6.8	7.5	9.2	10	810	57	22	64	14	6.6
14	6.2	10	4.8	7.5	9.2	11	638	51	23	59	14	8.3
15	7.5	28	4.8	7.5	9.2	12	515	50	22	55	13	9.5
16	11	4.8	5.3	8.0	9.2	12	425	44	19	51	13	13
17	25	8.6	5.3	8.0	9.2	12	352	44	18	44	12	12
18	65	12	5.3	8.0	9.7	13	325	41	25	49	12	11
19	106	21	5.3	8.0	9.7	14	270	38	13	25	12	11
20	121	31	5.7	8.0	9.7	15	222	36	14	28	12	10
21	134	26	5.7	8.0	9.7	15	195	36	15	31	11	10
22	148	23	5.7	8.0	9.7	14	162	43	19	27	12	12
23	145	21	6.2	8.0	9.7	13	144	46	34	38	14	14
24	138	22	6.2	8.0	9.7	13	136	46	46	55	13	14
25	126	25	6.6	8.0	9.7	12	120	51	38	50	14	15
26	100	28	6.6	8.6	9.7	12	91	55	32	44	13	14
27	74	31	6.6	8.6	9.7	12	84	46	25	48	14	13
28	62	32	6.6	8.6	9.7	11	76	39	41	43	12	14
29	58	33	7.0	8.6	------	11	71	31	1,610	46	11	15
30	50	33	7.0	8.6	------	11	68	25	498	44	11	17
31	42	------	7.0	8.6	------	32	------	19	------	43	14	------
TOTAL	1,476.8	764.4	339.3	244.1	263.2	375	60,560	1,709	2,728	3,630	486	353.8
MEAN	47.6	25.5	10.9	7.87	9.40	12.1	2,019	55.1	90.9	117	15.7	11.8
MAX	148	39	31	8.6	9.7	32	16,400	89	1,610	506	36	17
MIN	3.0	4.8	4.8	7.5	9.2	10	68	19	13	25	11	6.6
AC-FT	2,930	1,520	673	484	522	744	120,100	3,390	5,410	7,200	964	702

CAL YR 1968 TOTAL 6,479.3 MEAN 17.7 MAX 662 MIN 0 ACFT 12,850
WAT YR 1969 TOTAL 72,929.6 MEAN 200 MAX 16,400 MIN 3.0 ACFT 144,700

PEAK DISCHARGE (BASE, 500 CFS)

DATE	TIME	G.H.	DISCHARGE	DATE	TIME	G.H.	DISCHARGE
4- 4	2000	10.10	5,740	6-29	0700	8.20	3,090
4- 8	1000	15.00	17,800				

06482610 Split Rock Creek at Corson, S. Dak.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	16	16	18	13	11	40	124	96	107	17	1.2	3.8
2	16	13	18	12	10	50	195	93	89	16	.65	4.4
3	15	13	18	11	9.5	1,500	252	87	86	15	1.2	3.4
4	15	17	17	10	9.0	900	355	51	68	15	.95	3.4
5	14	17	17	9.5	8.5	700	512	44	53	14	1.6	3.4
6	14	18	18	9.0	9.0	650	512	39	43	14	3.4	3.4
7	12	17	18	8.5	9.0	550	407	31	31	15	5.5	3.8
8	12	16	18	9.0	9.0	300	260	27	24	14	5.8	3.4
9	11	16	19	9.0	9.5	164	195	25	23	13	7.6	3.4
10	10	17	19	9.5	10	132	155	24	21	13	7.6	3.0
11	9.0	18	18	10	10	114	126	25	20	8.0	8.3	2.7
12	10	18	18	11	11	86	112	26	19	10	7.6	3.0
13	12	18	18	12	11	48	112	28	19	20	7.6	3.8
14	13	16	19	13	10	44	107	31	18	17	7.6	4.8
15	14	15	19	14	10	242	107	36	19	16	6.2	5.5
16	17	15	19	13	9.5	55	112	32	20	13	6.6	7.2
17	16	16	19	12	9.0	53	120	29	25	14	6.9	8.6
18	17	16	19	11	9.0	53	139	26	71	8.3	6.9	9.5
19	17	18	19	10	8.5	55	160	22	57	8.0	6.9	9.0
20	15	17	18	10	8.0	62	180	20	86	9.5	5.5	8.6
21	15	16	19	9.5	9.0	46	160	19	280	12	4.8	8.3
22	15	15	19	9.0	12	32	225	20	144	7.6	4.1	8.0
23	15	15	19	9.0	15	41	255	24	108	6.6	3.0	8.0
24	14	16	19	9.5	40	36	225	22	87	4.8	2.4	8.6
25	14	16	18	9.5	60	50	178	19	69	3.8	2.0	8.0
26	13	16	18	10	140	48	162	18	32	4.1	1.7	8.0
27	12	17	18	10	150	46	136	21	28	6.6	4.1	8.0
28	12	17	16	11	90	44	131	992	24	7.2	4.1	8.0
29	13	18	15	11	------	44	105	512	21	5.8	4.1	7.6
30	14	18	14	12	------	55	102	188	18	2.4	3.8	8.0
31	15	------	13	12	------	62	------	144	------	1.4	3.8	------
TOTAL	427.0	501	554	329.0	706.5	6,302	5,921	2,771	1,710	332.1	143.50	178.6
MEAN	13.8	16.7	17.9	10.6	25.2	203	197	89.4	57.0	10.7	4.63	5.95
MAX	17	18	19	14	150	1,500	512	992	280	20	8.3	9.5
MIN	9.0	15	13	8.5	8.0	32	102	18	18	1.4	.65	2.7
AC-FT	847	994	1,100	653	1,400	12,500	11,740	5,500	3,390	659	285	354

CAL YR 1969 TOTAL 71,831.10 MEAN 197 MAX 16,400 MIN 6.6 ACFT 142,500
WAT YR 1970 TOTAL 19,875.70 MEAN 54.5 MAX 1,500 MIN .65 ACFT 39,420

PEAK DISCHARGE (BASE, 500 CFS)

DATE	TIME	G.H.	DISCHARGE	DATE	TIME	G.H.	DISCHARGE
3- 3	-	-	about 2,500	5-28	1330	7.10	2,090
4- 5	1600	4.42	543				

06485500 Big Sioux River at Akron, Iowa

LOCATION (revised).--Lat 42°49'42", long 96°33'45", in NE¼SW¼ sec.31, T.93 N., R.48 W., Plymouth County, Iowa, on left bank at west edge of Akron, 0.6 mile downstream from bridge on State Highway 48, and 2.3 miles upstream from Union Creek.

DRAINAGE AREA.--9,030 sq mi, approximately, of which about 1,970 sq mi is probably noncontributing.

PERIOD OF RECORD.--October 1928 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,118.90 ft above mean sea level. Prior to Dec. 3, 1934, nonrecording gage at bridge 300 ft upstream at same datum.

AVERAGE DISCHARGE.--42 years, 851 cfs (616,500 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 8,580 cfs May 30 (gage height, 16.30 ft); minimum daily, 100 cfs Jan. 20.
Period of record: Maximum discharge, 80,800 cfs Apr. 9, 1969 (gage height, 22.99 ft); minimum daily, 7 cfs Feb. 26-28, 1936.

REMARKS.--Records good except those for the winter months, which are poor. Records of chemical analyses for the water year 1970 are published in Part 2 of this report.

REVISIONS (WATER YEARS).--WSP 1309: 1929(M), 1931-33(M), 1936(M), 1939(M), 1940(M). WSP 1389: Drainage area.

Rating table (gage height, in feet, and discharge, in cubic feet per second)
(Shifting control method used Oct. 1 to Nov. 18, July 15-29;
stage-discharge affected by ice Nov. 19 to Mar. 3)

Mar. 4 to Oct. 30

2.7	132	4.0	405	7.0	1,420	14.0	5,800
3.0	190	5.0	680	10.0	2,960	16.0	7,930

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1969 TO SEPTEMBER 1970

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	246	269	180	105	120	1,100	1,150	1,770	3,190	900	309	145
2	243	268	175	105	110	1,150	1,290	1,630	2,280	837	302	166
3	241	267	170	105	110	3,150	1,910	1,530	2,020	809	289	743
4	240	263	165	110	112	5,340	2,560	1,430	1,870	777	294	222
5	244	257	162	110	115	6,450	2,650	1,360	1,740	728	281	176
6	246	256	158	113	118	7,380	3,910	1,270	1,660	671	269	170
7	246	255	155	118	120	6,470	4,890	1,190	1,590	629	266	162
8	250	251	150	120	122	4,740	5,500	1,120	1,460	596	260	146
9	252	251	150	120	125	3,430	4,250	1,060	1,330	574	257	141
10	249	255	145	125	125	2,680	2,790	1,000	1,190	552	255	143
11	245	251	148	125	130	2,350	2,310	991	1,140	526	293	141
12	245	249	155	128	125	2,520	2,060	1,000	1,050	510	349	136
13	256	253	160	130	120	2,620	1,900	931	1,050	495	343	137
14	265	242	160	132	125	2,130	1,830	907	1,010	486	312	137
15	272	211	158	135	140	1,640	1,820	879	1,030	622	286	156
16	280	230	155	132	160	1,530	1,760	858	1,040	584	267	160
17	286	228	150	125	200	1,420	1,740	854	1,070	589	255	162
18	284	218	148	115	190	1,280	1,730	816	1,340	571	244	170
19	285	160	145	105	190	1,220	1,730	781	1,510	528	235	176
20	286	185	140	100	180	1,110	1,740	746	1,640	498	222	186
21	285	195	138	105	200	1,040	1,880	719	1,550	700	216	190
22	281	205	133	115	350	1,000	2,080	695	1,520	745	211	164
23	276	210	130	125	630	994	2,170	671	1,610	659	202	158
24	270	210	130	130	1,100	970	2,310	653	1,680	581	193	173
25	265	205	128	130	1,150	973	2,500	671	1,650	518	185	188
26	265	200	125	132	1,000	952	2,440	605	1,550	463	179	183
27	257	198	120	135	1,050	924	2,320	662	1,390	432	172	185
28	253	195	120	132	1,050	854	2,200	5,780	1,220	420	166	185
29	253	188	115	130	------	826	2,070	3,840	1,080	393	160	182
30	254	183	110	128	------	928	1,900	7,180	973	375	156	179
31	259	------	110	125	------	956	------	6,970	------	341	148	------
TOTAL	8,079	6,808	4,488	3,745	9,267	70,127	71,390	50,569	44,433	18,109	7,576	5,562
MEAN	261	227	145	121	331	2,262	2,380	1,631	1,481	584	244	185
MAX	286	269	180	135	1,150	7,380	5,500	7,180	3,190	900	349	743
MIN	240	160	110	100	110	826	1,150	605	973	341	148	136
AC-FT	16,020	13,500	8,900	7,430	18,380	139,100	141,600	100,300	88,130	35,920	15,030	11,030

CAL YR 1969 TOTAL 884,163 MEAN 2,422 MAX 77,500 MIN 85 AC-FT 1,754,000
WTR YR 1970 TOTAL 300,153 MEAN 822 MAX 7,380 MIN 100 AC-FT 595,400

PEAK DISCHARGE (BASE, 3,500 CFS)

DATE	TIME	G.H..	DISCHARGE	DATE	TIME	G.H.	DISCHARGE
3-6	0100	15.70	7,480	5-28	1600	15.42	7,160
4-8	1600	13.76	5,610	5-30	2200	16.30	8,580

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 floodflow analyses, depending on the type of data collected. In addition, discharge measurements are made at other sites not included in the partial-record program. These measurements are usually made in time of drought or flood to give better areal coverage to those events. Those measurements and others collected for some special reason are called measurements at miscellaneous sites.

Records collected at partial-record stations are presented in two tables. The first is a table of discharge measurements at low-flow partial-record stations, and the second is a table of annual maximum stage and discharge at crest-stage stations. Discharge measurements made at miscellaneous sites for both low flow and high flow are given in a third table.

Low-flow partial-record stations

Measurements of streamflow in the area covered by this report made at low-flow partial-record stations are given in the following table. Most of these measurements were made during periods of base flow when streamflow is primarily from ground-water storage. These measurements, when correlated with the simultaneous discharge of a nearby stream where continuous records are available, will give a picture of the low-flow potentiality of the stream. The column headed "Period of record" shows the water years in which measurements were made at the same, or practically the same, site.

Discharge measurements made at low-flow partial-record stations during water year 1970

Station No.	Station name	Location	Drainage area (sq mi)	Period of record	Measurements	
					Date	Discharge (cfs)
		Cheyenne River basin				
06396400	Red Canyon Creek near Edgemont, S. Dak.	Lat 43°18'48", long 103°47'13", in SE¼NW¼ sec.32, T.8 S., R.3 E., Fall River County, at bridge on U.S. Highway 18, 500 ft above mouth, and 2 miles northeast of Edgemont.	208	1956-57 1962-70	4-28-70 6-16-70	0 0
06437450	Spring Creek near Sturgis, S. Dak.	Lat 44°29'04", long 103°26'51", in SE¼NE¼ sec.13, T.6 N., R.5 E., Meade County, at bridge on State Highway 79, 5.8 miles northeast of Sturgis.	944	1956-57 1962-63 1965-70	6- 3-70 7- 1-70 9- 2-70	3.69 1.49 .20
		White River basin				
06446700	Bear in the Lodge Creek near Wanblee, S. Dak.	Lat 43°32'07", long 101°47'29", in SW¼ sec.12, T.41 N., R.38 W., Washabaugh County, at bridge on county highway from Wanblee to Potato Creek, 7 miles southwest of Wanblee.	[a]365	1951 1954-70	10-21-69 9-15-70	5.96 0
06449400	Rosebud Creek at Rosebud, S. Dak.	Lat 43°14'09", long 100°51'12", in NE¼SE¼ sec.27, T.38 N., R.30 W., Todd County, at birdge on street to hospital at north edge of Rosebud.	[a] 60	1964-70	10-22-69 9-16-70	7.12 6.67
		Niobrara River basin				
06463900	Antelope Creek near Mission, S. Dak.	Lat 43°16'26", long 100°40'56", in SE¼SW¼ sec.7, T.38 N., R.28 W., Todd County, at culvert on county road 2 miles southwest of Mission.	[a] 60	1964-70	10-22-69 9-16-70	0 0
06464350	Cottonwood Creek near Wewela, S. Dak.	Lat 43°00'37", long 99°54'45", in NE¼ sec.35, T.95 N., R.77 W., Tripp County, 0.8 mile downstream from Nebraska-South Dakota State line, and 7 miles west of Wewela.	[a] 45	1957-70	10-23-69 9-17-70	2.19 2.52
		Vermillion River basin				
06478610	East Fork Vermillion River near Chancellor, S. Dak.	Lat 43°24'07", long 97°04'20", in NE¼NW¼ sec.14, T.99 N., R.53 W., Turner County, at bridge on county highway 0.8 mile upstream from confluence with West Fork Vermillion River, and 5 miles northwest of Chancellor.	[a]460	1962-70	8-18-70	4.27
06478900	Turkey Ridge Creek near Hurley, S. Dak.	Lat 43°14'34", long 97°07'00", in NW¼NW¼ sec.9, T.97 N., R.53 W., Turner County, at bridge on U.S. Highway 18, 3 miles southwest of Hurley.	-	1957-64 1966-70	8-18-70	.27

[a] Approximately

The following table contains annual maximum discharge 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, and discharge measurements may have been made for purposes of establishing the stage-discharge relation, but these are not published herein. The years given in the period of record represent water years for which the annual maximum has been determined.

Annual maximum discharge at crest-stage partial-record stations during water year 1970

Station No.	Station name	Location	Drainage area (sq mi)	Period of record	Annual maximum		
					Date	Gage height (feet)	Discharge (cfs)
		Grand River basin					
06356050	Wide Sandy Creek near Buffalo, S. Dak.	Lat 45°30'57", long 103°32'40", in NW¼ sec.20, T.18 N., R.5 E., Harding County, at bridge on U.S. Highway 85, 4.5 miles south of Buffalo.	38.8	1956-70	5-31-70	4.62	(+)
06358350	Claymore Creek tributary near Trail City, S. Dak.	Lat 45°29'14", long 100°34'54" (corrected), in NW¼ sec.32, T.18 N., R.29 E., Corson County, at culvert on former State Highway 8, 7.3 miles east of Trail City.	1.98	1956-70	4-28-70	2.60	(+)
06358400	Claymore Creek tributary No. 2 near Trail City, S. Dak.	Lat 45°29'14", long 100°35'30" (corrected), in NE¼ sec.31, T.18 N., R.29 E., Corson County, at culvert on former State Highway 8, 7 miles east of Trail City.	.15	1956-70	4-28-70	4.20	(+)
		Deadman Creek basin					
06358520	Deadman Creek tributary near Mobridge, S. Dak.	Lat 45°28'12", long 100°29'46" (corrected), in NW¼ sec.1, T.17 N., R.29 E., Dewey County, at culvert on county highway, 5.5 miles southwest of Mobridge.	.28	1956-70	4-21-70	5.36	18
		Moreau River basin					
06358600	South Fork Moreau River tributary near Redig, S. Dak.	Lat 45°11'45", long 103°34'09", in SE¼ sec.1, T.14 N., R.4 E., Butte County, at culvert on former U.S. Highway 85, 5 miles south of Redig, 26.2 miles south of Buffalo.	11.3	1956-70	5-11-70	2.20	(+)
06358620	Sand Creek tributary near Redig, S. Dak.	Lat 45°13'21", long 103°32'56", in NE¼ sec.31, T.15 N., R.5 E., Harding County, at culvert on U.S. Highway 85, 3.5 miles south of Redig.	.06	1956-70	7- -56 8-30-58 6-29-59 6-20-60 8-17-61 5- -62 6- -63 6- 9-64 5- -65 7- -66 6- 6-67 8-24-68 7- 8-69 5-31-70	2.64 3.69 2.07 2.92 2.55 3.37 3.32 2.79 2.89 3.71 3.85 3.97 5.31 3.96	[a]14 [a]32 [a] 5.2 [a]18 [a]12 [a]26 [a]25 [a]16 [a]18 [a]32 [a]35 [a]37 [a]64 37
06358750	North Fork Moreau River tributary near Redig, S. Dak.	Lat 45°19'51", long 103°32'57", in SE¼ sec.19, T.16 N., R.5 E., Harding County, at culvert on U.S. Highway 85, 5 miles north of Redig, 17.7 miles south of Buffalo.	4.00	1956-70	5-11-70	3.87	(+)
06359000	Moreau River at Bixby, S. Dak.	Lat 45°08'37", long 103°33'30", in SE¼ SW¼ sec.29, T.14 N., R.13 E., Perkins County, at highway bridge, 0.4 mile south of Bixby, and 3.5 miles downstream from proposed Bixby damsite.	1,570	1948-69‡ 1970	4-26-70	6.75	1,940

See footnotes at end of table.

Annual maximum discharge at crest-stage partial-record stations during water year 1970.--Continued

Station No.	Station name	Location	Drainage area (sq mi)	Period of record	Annual maximum		
					Date	Gage height (feet)	Discharge (cfs)
		Cheyenne River basin					
06396200	Fiddle Creek near Edgemont, S. Dak.	Lat 43°18'16", long 103°59'46", in SE¼ sec.33, T.8 S., R.1 E., Fall River County, at culvert on U.S. Highway 18 and 85A, 9 miles west of Edgemont.	1.97	1956-70	6-18-56	1.37	[a] 3.1
					5-24-57	2.82	[a]41
					7-20-58	2.87	[a]43
					9-24-59	1.46	[a] 4.4
					1960	(b)	[ac] .50
					8- 4-61	3.53	[a]68
					7-14-62	2.34	[a]26
					3-16-63	2.80	[a]40
					6-14-64	2.10	[a]19
					6-12-65	[d]2.54	[a]32
					7-22-66	[d]1.86	[a]13
					6-15-67	1.69	[a] 8.0
					6-25-68	2.49	[a]30
					7-18-69	2.32	[a]25
					4-23-70	1.24	1.5
06396300	Cottonwood Creek tributary near Edgemont, S. Dak.	Lat 43°17'35", long 103°52'20", in sec.3 T.9 S., R.2 E., Fall River County, at culvert on U.S. Highway 18 and 85A, 2.5 miles west of Edgemont.	.20	1956-70	7-12-70	3.25	(+)
06399300	Hat Creek tributary near Ardmore, S. Dak.	Lat 43°05'42", long 103°40'25", in NW¼ sec.16, T.11 S., R.4 E., Fall River County, at bridge on State Highway 71, 5 miles north of Ardmore.	3.74	1956-70	1970	(e)	0
06399700	Pine Creek near Ardmore, S. Dak.	Lat 43°11'14", long 103°38'24", in NW¼ sec.15, T.10 S., R.4 E., Fall River County, at bridge on State Highway 71, 11.5 miles north of Ardmore.	5.47	1956-70	6- 9-68	7.65	[a]1,550
					8-11-70	3.28	29
06403800	Battle Creek tributary near Keystone, S. Dak.	Lat 43°55'28", long 103°27'44", in NW¼ NE¼NE¼ sec.36, T.1 S., R.5 E., Pennington County, at culvert on U.S. Highway 16, 2.8 miles northwest of Keystone.	.88	1956-70	6- -56	4.35	[d]3.0
					6- 4-57	4.52	[d]4.4
					5- -60	4.45	[d]3.7
					5- -61	4.09	[d]1.3
					6-16-62	4.60	[d]5.2
					6-21-63	4.50	[d]4.2
					4- 6-64	4.35	[d]3.0
					5-25-65	4.90	[d]8.6
					4-19-66	4.21	[d]2.0
					6-23-67	5.41	[a]16
					8-18-68	4.19	[a]1.9
					4- 7-69	4.51	[a]4.2
					6-12-70	(b)	[c].50
06406900	Palmer Creek near Hill City, S. Dak.	Lat 43°56'12", long 103°30'36", in NE¼ SE¼NW¼ sec.27, T.1 S., R.5 E., Pennington County, at culvert on U.S. Highway 16, 3 miles east of Hill City.	8.24	1956-70	4-23-70	6.03	(+)
06432200	Polo Creek near Whitewood, S. Dak.	Lat 44°27'49", long 103°43'41", in SW¼ sec.23, T.6 N., R.3 E., Lawrence County, at bridge on U.S. Highway 85, 4.3 miles west of Whitewood.	10.6	1956-70	6-12-70	3.28	370
06437100	Boulder Creek near Deadwood, S. Dak.	Lat 44°23'28", long 103°39'38", in NE¼ SW¼ sec.17, T.5 N., R.4 E., Lawrence County, at culvert on U.S. Highway 14A, 3.5 miles east of Deadwood.	1.69	1956-70	6-12-70	8.38	202
06439050	Cherry Creek tributary near Avance, S. Dak.	Lat 44°48'33", long 102°03'18", in SW¼ sec.21, T.10 N., R.17 E., Meade County, at culvert on State Highway 73, 12.5 miles southeast of Avance.	.60	1956-70	8- 5-70	3.19	(+)
06439060	Cherry Creek tributary No. 2 near Avance, S. Dak.	Lat 44°48'15", long 102°03'18", in NW¼ sec.28, T.10 N., R.17 E., Meade County, at culvert on State Highway 73, 12.5 miles southeast of Avance.	.11	1956-70	6- -56	2.28	[a]7.5
					5-20-57	2.27	[a]7.5
					3-21-60	2.28	[a]7.5
					7-27-61	1.98	[a]3.5
					3-28-65	2.17	[a]6.0
					6-13-67	4.22	[a]46
					6-25-68	2.09	[a]5.0
					4-29-69	4.32	[a]48
					5- 8-70	2.28	7.5
06439080	Cherry Creek tributary No. 3 near Avance, S. Dak.	Lat 44°51'03", long 102°02'36", in SW¼ sec.3, T.10 N., R.17 E., Meade County, at bridge on State Highway 73, 11 miles southeast of Avance.	4.58	1956-70	6-12-70	3.36	92
06439100	Beaver Creek near Faith, S. Dak.	Lat 44°56'21", long 102°02'37", in SW¼ sec.3, T.11 N., R.17 E., Meade County, at bridge on State Highway 73, 6 miles south of Faith.	37.1	1956-70	4-24-70	[f]7.89	[c]175

Annual maximum discharge at crest-stage partial-record stations during water year 1970.--Continued

Station No.	Station name	Location	Drainage area (sq mi)	Period of record	Annual maximum		
					Date	Gage height (feet)	Discharge (cfs)
		Mush Creek basin					
06441650	Mush Creek near Pierre, S. Dak.	Lat 44°20'13", long 100°12'42", in NE¼ sec.16, T.110 N., R.78 W., Hughes County, at bridge on State Highway 34, 7.5 miles east of Pierre.	14.6	1956-70	8- 7-70	6.08	1,990
		Unnamed Missouri River tributaries					
06441670	Missouri River tributary near Pierre, S. Dak.	Lat 44°20'09", long 100°11'39", in NE¼ sec.15, T.110 N., R.78 W., Hughes County, at culvert on State Highway 34, 8 miles east of Pierre.	0.42	1956-70	8- 7-70	4.60	158
06441750	Missouri River tributary near Canning, S. Dak.	Lat 44°19'57", long 100°09'54", in NW¼ sec.13, T.110 N., R.78 W., Hughes County, at culvert on State Highway 34, 8 miles southwest of Canning.	.20	1956-70	6-10-57	3.88	[d]63
					7-14-59	4.52	[d]87
					6- -61	3.97	[d]66
					6- 6-63	3.93	[d]64
					7-10-64	4.59	[d]89
					4-23-65	4.26	[d]76
					7-18-67	5.66	[d]135
					6- 7-68	3.79	[d]60
					7-17-69	3.29	[d]43
					8- 7-70	5.32	120
06442050	Missouri River tributary near DeGrey, S. Dak.	Lat 44°17'45", long 99°58'58", in SW¼ sec.28, T.110 N., R.76 W., Hughes County, at culvert on State Highway 34, 3.2 miles northwest of DeGrey.	1.64	1956-70	6-15-70	5.09	580
		Medicine Creek basin					
06442350	North Fork Medicine Creek near Vivian, S. Dak.	Lat 43°57'06", long 100°19'25", in SW¼ sec.28, T.106 N., R.79 W., Lyman County, at bridge on U.S. Highway 83, 2.5 miles northwest of Vivian.	45.9	1956-70	5-28-70	7.39	550
06442380	Medicine Creek tributary near Vivian, S. Dak.	Lat 44°05'47", long 100°19'39", in SE¼ sec.5, T.107 N., R.79 W., Lyman County, at culvert on former U.S. Highway 83, 12 miles northwest of Vivian.	.30	1956-70	5-28-70	3.87	38
06442400	Medicine Creek tributary No. 2 near Vivian, S. Dak.	Lat 44°02'03", long 100°19'28", in NW¼ sec.33, T.107 N., R.79 W., Lyman County, at culvert on U.S. Highway 83, 8 miles northwest of Vivian.	8.62	1956-70	4-18-70	[f]4.16	[c]75
		White River basin					
06446400	Cain Creek tributary at Imlay, S. Dak.	Lat 43°42'59", long 102°23'23", in SE¼ NW¼ sec.12, T.4 S., R.14 E., Pennington County, at bridge on State Highway 40, 0.5 mile east of Imlay.	14.0	1956-70	6-12-70	4.23	185
06446430	White River tributary near Conata, S. Dak.	Lat 43°50'48", long 102°12'33", in N½ sec.28, T.2 S., R.16 E., Pennington County, at culvert on U.S. Highway 16A, 8 miles northwest of Conata.	.17	1956-70	8- -60	4.90	[a]73
					5-14-61	3.95	[a]40
					6-15-62	7.18	[a]182
					5-24-65	6.16	[a]128
					8-20-66	8.00	[a]240
					9-19-67	9.24	[a]290
					6- 7-68	9.55	[a]310
					7-20-69	4.91	[a]73
					6-12-70	4.91	73
06446550	White River tributary near Interior, S. Dak.	Lat 43°44'51", long 101°56'50", in SE¼ sec.27, T.3 S., R.18 E., Jackson County, at culvert on U.S. Highway 16A, 2.3 miles northeast of Interior.	.14	1956-70	6-12-70	4.15	43
06449700	[d]Little Oak Creek (Little White River tributary) near Mission, S. Dak.	Lat 43°19'45", long 100°42'33", in NW¼ sec.25, T.39 N., R.29 W., Todd County, at culvert on U.S. Highway 83, 3.2 miles northwest of Mission.	2.62	1956-70	4-16-70	[f]3.83	[c]15

Annual maximum discharge at crest-stage partial-record stations during water year 1970.--Continued

Station No.	Station name	Location	Drainage area (sq mi)	Period of record	Annual maximum		
					Date	Gage height (feet)	Discharge (cfs)
		White River basin - Continued					
06449750	[d]West Branch Horse Creek (Horsehead Creek tributary) near Mission, S. Dak.	Lat 43°23'36", long 100°42'32", in SW¼ sec.36, T.40 N., R.29 W., Mellette County, at culvert on U.S. Highway 83, 6.8 miles northwest of Mission.	6.05	1956-70	6-15-70	6.30	(+)
		James River basin					
06471050	Elm River tributary near Leola, S. Dak.	Lat 45°50'40", long 98°46'03", in NE¼ SE¼ sec.3, T.127 N., R.66 W., McPherson County, at culvert on county highway, 12.2 miles northeast of Leola.	14.7	1956-70	4-18-70	3.64	36
06471400	Willow Creek tributary near Leola, S. Dak.	Lat 45°44'10", long 98°45'45", in SW¼ sec.11, T.126 N., R.66 W., McPherson County, at culvert on former State Highway 10, 8.5 miles northeast of Leola.	3.74	1956-70	4-18-70	1.54	7.6
06471450	Willow Creek tributary near Barnard, S. Dak.	Lat 45°44'12", long 98°37'42", in SW¼ sec.11, T.126 N., R.65 W., Brown County, at culvert on former State Highway 10, 6.5 miles west of Barnard.	.18	1956-70	4-21-70	1.30	(+)
06472250	Mud Creek tributary No. 2 near Groton, S. Dak.	Lat 45°26'36", long 98°02'52", in SE¼ sec.21, T.123 N., R.60 W., Brown County, at culvert on U.S. Highway 12, 2.7 miles east of Groton.	60.0	1960-70	4-27-70	3.19	25
06472500	Mud Creek near Stratford, S. Dak.	Lat 45°16'13", long 98°17'16", in NW¼ NW¼NW¼ sec.27, T.121 N., R.62 W., Brown County, at highway bridge, 3.3 miles south of Stratford, and 14.7 miles upstream from mouth.	730	1955-69# 1970	4-26-70	3.50	64
06473700	Snake Creek near Ashton, S. Dak.	Lat 45°01'50", long 98°34'26", in SW¼ SW¼ sec.17, T.118 N., R.64 W., Spink County, on right bank 7 ft downstream from highway bridge, 700 ft downstream from South Fork Snake Creek, 4.5 miles northwest of Ashton, and 21.5 miles upstream from mouth.	2,620	1950-69# 1970	4-20-70	7.57	178
06473800	Matter Creek tributary near Orient, S. Dak.	Lat 44°48'08", long 99°04'06", in SE¼ NE¼ sec.1, T.115 N., R.69 W., Hand County, at culvert on county highway, 6.8 miles southeast of Orient.	5.41	1956-70	4-20-70	3.74	(+)
06473820	Shaefer Creek near Orient, S. Dak.	Lat 44°46'46", long 99°02'39", in NW¼ NW¼ sec.17, T.115 N., R.68 W., Hand County, on downstream side of bridge on county highway, 8.5 miles southeast of Orient.	45.1	1956-70	4-20-70	2.66	76
06473850	Shaefer Creek tributary near Orient, S. Dak.	Lat 44°43'49", long 98°59'17", in SE¼ NE¼ sec.34, T.115 N., R.68 W., Hand County, at culvert on State Highway 45, 13 miles southeast of Orient.	6.08	1956-70	4-20-70	3.36	15
06473880	Shaefer Creek tributary near Miller, S. Dak.	Lat 44°42'20", long 98°59'17", in NE¼ sec.10, T.114 N., R.68 W., Hand County, at culvert on State Highway 45, 13 miles north of Miller.	5.75	1956-70	4- 3-69 4-20-70	6.40 3.24	[d]265 23
06475500	Dry Run near Frankfort, S. Dak.	Lat 44°56'17", long 98°19'43", in NW¼ NW¼ sec.20, T.117 N., R.62 W., Spink County, at highway bridge, 400 ft downstream from small right-bank tributary, 4.4 miles north of Frankfort, and 8.1 miles upstream from mouth.	225	1955-69# 1970	3-19-70	5.34	26

Annual maximum discharge at crest-stage partial-record stations during water year 1970.--Continued

Station No.	Station name	Location	Drainage area (sq mi)	Period of record	Annual maximum		
					Date	Gage height (feet)	Discharge (cfs)
		James River basin - Continued					
06478260	North Branch Dry Creek near Parkston, S. Dak.	Lat 43°22'13", long 97°50'42", in NE¼ sec.29, T.99 N., R.59 W., Hutchinson County, at bridge on county highway, 7.5 miles southeast of Parkston.	37.0	1956-70	4-23-70	4.54	225
06478280	South Branch Dry Creek near Parkston, S. Dak.	Lat 43°21'22", long 97°49'35", in NW¼ sec.33, T.99 N., R.59 W., Hutchinson County, at bridge on county highway, 8.3 miles southeast of Parkston.	17.1	1956-70	4-23-70	4.11	945
06478300	Dry Creek near Parkston, S. Dak.	Lat 43°22'18", long 97°49'23", in SE¼ sec.21, T.99 N., R.59 W., Hutchinson County, at bridge on highway, 8.5 miles southeast of Parkston.	76.8	1956-70	4-23-70	5.95	310
		Vermillion River basin					
06478800	Saddlerock Creek near Canton, S. Dak.	Lat 43°12'20", long 96°43'37", in SW¼ sec.23, T.97 N., R.50 W., Lincoln County, at bridge on county highway, 9.6 miles southwest of Canton.	14.8	1956-70	4- 1-70	[f]4.05	[c]25
06478820	Saddlerock Creek tributary near Beresford, S.Dak.	Lat 43°12'53", long 96°45'58", in SW¼ sec.16, T.97 N., R.50 W., Lincoln County, at culvert on former U.S. Highway 77, 9 miles north of Beresford.	2.32	1956-70	4-19-70	3.52	7.8
06478840	Saddlerock Creek near Beresford, S. Dak.	Lat 43°12'55", long 96°49'33", in SE¼ SE¼ sec.14, T.97 N., R.51 W., Lincoln County, at bridge on county highway, 9.5 miles northwest of Beresford.	26.3	1956-70	7-14-70	4.15	81
		Big Sioux River basin					
06479240	Big Sioux River tributary No. 2 near Summit, S. Dak.	Lat 45°13'45", long 97°06'05", in SW¼ sec.30, T.121 N., R.51 W., Grant County, at culvert on U.S. Highway 81, 5.8 miles southwest of Summit, and 11.5 miles southeast of Waubay.	.26	1956-70	6-16-70	1.80	3.2
06479260	Big Sioux River tributary No. 3 near Summit, S. Dak.	Lat 45°13'30", long 97°06'27", in SE¼ sec.25, T.121 N., R.52 W., Grant County, at culvert on county highway, 6.5 miles southwest of Summit, and 11.5 miles southeast of Waubay.	6.60	1956-70	6-16-70	3.90	52
06479750	Peg Munky Run near Estelline, S. Dak.	Lat 44°34'22", long 96°51'15", in N½ sec.29, T.113 N., R.50 W., Deuel County, at bridge on State Highway 28, 2.5 miles east of Estelline.	25.4	1956-70	5-29-70	5.42	505
06479800	North Deer Creek near Estelline, S. Dak.	Lat 44°27'44", long 96°47'13", in SE¼ sec.35, T.112 N., R.50 W., Brookings County, at bridge on U.S. Highway 77, 9.8 miles southeast of Estelline.	48.3	1956-70	6-16-70	8.79	3,800
06479900	Sixmile Creek tributary near Brookings, S. Dak.	Lat 44°22'57", long 96°40'48", in NW¼ sec.35, T.111 N., R.49 W., Brookings County, at bridge on county highway, 7.3 miles northeast of Brookings.	9.42	1956-70	6-16-70	6.30	660
06479950	Deer Creek near Brookings, S. Dak.	Lat 44°23'03", long 96°37'19", in SW¼ sec.29, T.111 N., R.48 W., Brookings County, at bridge on county highway, 9.8 miles northeast of Brookings.	4.21	1956-70	6-16-70	5.43	250
06482870	Little Beaver Creek tributary near Canton, S. Dak.	Lat 43°15'27", long 96°37'59", in NE¼ sec.4, T.97 N., R.49 W., Lincoln County, at culvert on county highway, 4.0 miles southwest of Canton.	.22	1956-70	6-16-70	2.49	20

(+) Discharge not determined
(‡) Operated as a continuous-record gaging station
a Not previously published
b Peak stage did not reach bottom of gage
c Estimated
d Revised
e No evidence of any flow during 1970 water year
f Backwater from ice

Discharge measurements at miscellaneous sites

Measurements of streamflow at points other than gaging stations are given in the following table. Those that are measurements of base flow are designated by an asterisk (*); measurements of peak flow by a dagger (‡).

Discharge measurements made at miscellaneous sites during water year 1970

Stream	Tributary to	Location	Drainage area (sq mi)	Measured previously (water years)	Measurements	
					Date	Discharge (cfs)
Cheyenne River basin						
Spring Creek	Cheyenne River	Lat 43°57'43", long 103°29'11", in NW¼ SE¼ sec.14, T.15 N., R.5 E., Pennington County, 600 ft upstream from bridge, 1.2 miles northeast of junction of U.S. Highways 385 and 16, and 5.5 miles northeast of Hill City.	-	-	6-29-70	10.1
Whitewood Creek	Belle Fourche River	Lat 44°21'31", long 103°44'21", in NW¼ NE¼ sec.34, T.5 N., R.3 E., Lawrence County, 200 ft east of junction of U.S. Highways 385 and 85 at Pluma.	-	-	8-13-70	5.05
Deadwood Creek	Whitewood Creek	Lat 44°22'14", long 103°44'34", in NE¼ NW¼ sec.27, T.5 N., R.3 E., Lawrence County, 0.8 mile southwest of junction of U.S. Highways 85 and alternate 14.	-	-	8-13-70	1.63
Whitewood Creek	Belle Fourche River	Lat 44°23'12", long 103°42'53", in NW¼ NE¼ sec.23, T.5 N., R.3 E., Lawrence County, 600 ft downstream from northeast fairgrounds entrance in Deadwood and 700 ft southwest of the junction of U.S. Highways 85 and alternate 14.	-	-	8-13-70 8-14-70	24.2 22.9
Whitewood Creek	Belle Fourche River	Lat 44°37'18", long 103°28'17", in SE¼ SE¼ sec.26, T.8 N., R.5 E., Butte County, at bridge on county road, 2.0 mile upstream from mouth, and 3.5 miles west of Vale.	-	-	5-22-70	135
Missouri River basin						
Choteau Creek	Missouri River	Lat 42°51'36", long 98°08'21", in NW¼ sec.23, T.93 N., R.62 W., Charles Mix County, at bridge on county road, 3.7 miles upstream from mouth, and 10 miles southwest of Avon.	[a]575	1966-70	11-20-69 1-14-70 2-18-70 3-26-70 4-27-70 5-20-70 7- 1-70	3.29 3.15 6.92 17.4 146 9.74 3.17
Big Sioux River basin						
Willow Creek	Watertown	Lat 44°52'36", long 97°05'51", in NW¼ NE¼ sec.8, T.116 N., R.52 W., Codington County, at bridge on county road, 1.0 mile southeast from Watertown, and 1.1 miles upstream from Willow Creek.	-	-	8-11-70	.47
Beaver Creek	Big Sioux River	Lat 43°19'04", long 96°36'31", in SW¼ SW¼ sec.11, T.98 N., R.49 W., Lincoln County, at bridge on county road, 1.5 miles northwest from Canton, and 3.8 miles upstream from South Fork Beaver Creek.	-	-	8-11-70	.59

a Approximately

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