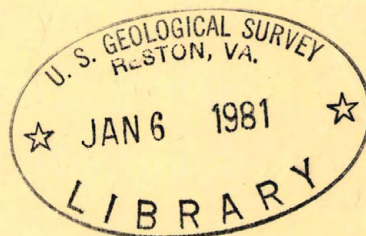


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pt. 1

# Water Resources Data for Montana

## Part 1. Surface Water Records



UNITED STATES  
DEPARTMENT OF THE INTERIOR  
GEOLOGICAL SURVEY

Prepared in cooperation with the State of Montana  
and with other agencies



# CALENDAR FOR WATER YEAR 1971

## OCTOBER 1970

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

## NOVEMBER 1970

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

## DECEMBER 1970

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

## JANUARY 1971

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

## FEBRUARY 1971

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

## MARCH 1971

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

## APRIL 1971

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

## MAY 1971

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

## JUNE 1971

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

## JULY 1971

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

## AUGUST 1971

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

## SEPTEMBER 1971

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



1971

# **Water Resources Data for Montana**

## **Part 1. Surface Water Records**



**UNITED STATES  
DEPARTMENT OF THE INTERIOR  
GEOLOGICAL SURVEY**

**Prepared in cooperation with the State of Montana  
and with other agencies**



Prepared in cooperation with

Montana Water Resources Board  
Montana Highway Commission  
Montana Fish and Game Department  
Wyoming State Engineer  
Endowment and Research Foundation, Montana State University  
U.S. Department of State  
Corps of Engineers, U.S. Army  
Bureau of Reclamation, U.S. Department of the Interior  
Bureau of Indian Affairs, U.S. Department of the Interior  
Bureau of Land Management, U.S. Department of the Interior  
Bonneville Power Administration, U.S. Department of the Interior

Water resources records, 1971, for Montana are in the following reports of the U.S. Geological Survey:

1. Water Resources Data for Montana  
Part 1: Surface Water Records
2. Water Resources Data for Montana  
Part 2: Water Quality Records

Copies of this report may be obtained from  
District Chief, Water Resources Division  
U.S. Geological Survey  
421 Federal Building  
P.O. Box 1696  
Helena, Montana 59601

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GAGING STATIONS, IN DOWNSTREAM ORDER  
FOR WHICH RECORDS ARE PUBLISHED

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GAGING STATIONS, IN DOWNSTREAM ORDER  
FOR WHICH RECORDS ARE PUBLISHED

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# WATER RESOURCES DATA FOR MONTANA, 1971

## PART 1. SURFACE-WATER RECORDS

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### INTRODUCTION

Surface-water records for the 1971 water year for Montana, including records of streamflow or reservoir storage at gaging stations, partial-record stations, and miscellaneous sites, are given in this report. Records for a few pertinent gaging stations in bordering States and Canadian Provinces also are included. The records were collected and computed by the Water Resources Division of the U.S. Geological Survey under the direction of G. M. Pike, 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 Montana.

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 year, 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 Geological Survey water-supply paper series entitled "Surface Water Supply of the United States 1961-65."

### COOPERATION

Many State of Montana, municipal and private organizations have cooperated with the U.S. Geological Survey in this work by either furnishing or helping to collect data. Cooperative agreements for financial assistance by organizations of the State of Montana began in 1906 after a decade of informal work assistance. Organizations that supplied data are acknowledged in station descriptions. Organizations that assisted in collecting data through cooperative agreements with the Survey are:

Montana Water Resources Board, D. G. Smith, Director.

Montana State Highway Commission, L. M. Chittim, State Highway Engineer.

Montana Fish and Game Department, F. H. Dunkle, Director.

Endowment and Research Foundation at Montana State University,  
R. E. Huffman.

Assistance in the form of funds or services was given by the Department of State in collecting records published herein for 56 gaging stations; by the Bureau of Reclamation, U.S. Department of the Interior for 2 stations; by the Corps of Engineers, U.S. Army for 18 stations; by the Bureau of Sport Fisheries and Wildlife, U.S. Department of the Interior for 2 stations; and by the Bonneville Power Administration, U.S. Department of the Interior for 4 stations.



The following organizations aided in collecting records:

The Montana Power Co.; The Washington Water Power Co.; Pacific Power and Light Co.; and the city of Helena.

On waters adjacent to the international boundary, certain gaging stations are maintained by the United States (or Canada) under agreement with Canada (or the United States) and the records are obtained and compiled in a manner equally acceptable in both countries. Those stations are designated herein as "International 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 artificial structure, or a uniform cross section over a long reach of the channel.

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

Cubic foot per second (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 the 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 manmade changes in other basins which have been developed and in which the physiography, climate, and geology are similar to those in the undeveloped bench-mark basin.

#### 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 06090500, includes the part number "06" and a 6-digit station number. This number 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 consist of records of stage and measurements of discharge of streams or canals, and stage, surface area, and contents of lakes or reservoirs. In addition, observation 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 height 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 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 table 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 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 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 tabulation 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. Records are published, for the most part, for the water year, which begins on October 1 and ends on September 30. Records for some gaging stations on streams or canals in Canada and along the international boundary are published on an irrigation season basis and the tables of daily discharge generally show data from March through October. A calendar for the 1970 water year is shown on the reverse side of the front cover to facilitate findings 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. 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 non-recording gage read at the time of 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 capacity tables are published for reservoirs for which records of stage 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 period 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 stage at a given time, usually at 2400 each day.

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 non-contributing 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), and contents at the end of the month and the change in contents during the month. If elevation is given in the daily table, the monthly summary gives contents at the end of the month, the change in contents during the month, and the maximum and minimum for the month.

In the yearly summary below the monthly summary, the figures following MAX are the maximum daily discharges for the calendar and water years; likewise, those following the MIN 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 one reservoir station, the changes in contents are adjusted for evaporation.

Peak discharge 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 and/or periods of backwater from ice are indicated if the period is continuous for a month or more

or includes the maximum discharge for the year and the accuracy of the records is affected. 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. 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" means 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 1303 (5), 1309 (6), and 1316 (12); records for October 1950 to September 1960 have been compiled and published in Water-Supply Papers 1723 (5), 1729 (6), and 1736 (12). 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 re-examined 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 Montana through 1968 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

Streamflows throughout the State were generally in the normal range except during February and May when most flows were above average. The high flows were caused by melting of the above average snow pack during unseasonable warm periods. The Yellowstone River basin (south central part, Fig. 1) had above average streamflow for nearly the entire year. Streamflow in the northwestern part of the State generally was deficient during the fall, but flow returned to normal for the rest of the year. The Flathead River basin had above average flow during the year.

Most hydroelectric and irrigation reservoirs were near average levels throughout the water year. Storage in Fort Peck Lake continued to be well above average during the year. Lima Reservoir ranged from 140 to 275 percent of average during the entire year. Gibson Reservoir was about 50 percent of average from October through January and Fresno Reservoir ranged from 25 to 55 percent of average from July through September.



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

Records of discharge not published by the Geological Survey were collected at 124 sites in Montana during the 1971 water year by the following agencies: Records were collected at 11 sites by the Corps of Engineers; at 29 sites by the Forest Service; at 46 sites by the Montana Water Resources Board; at 10 sites by the University of Montana, and at 28 sites by the National Weather Service. The office of Water Data Coordination, Water Resources Division, U.S. Geological Survey, Washington, D. C. 20242, maintains an index of these sites and can provide information for specific sites upon request.

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- 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.
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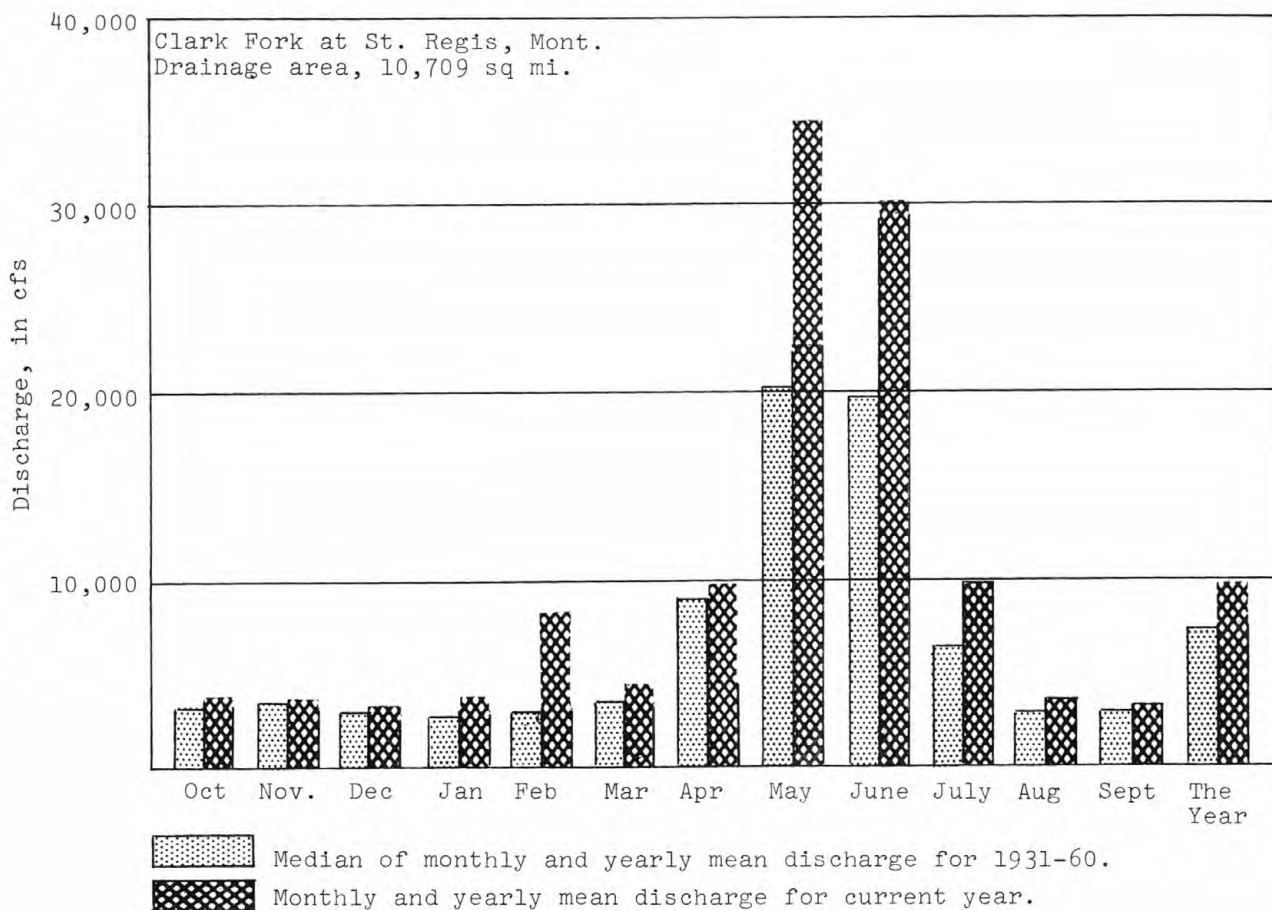
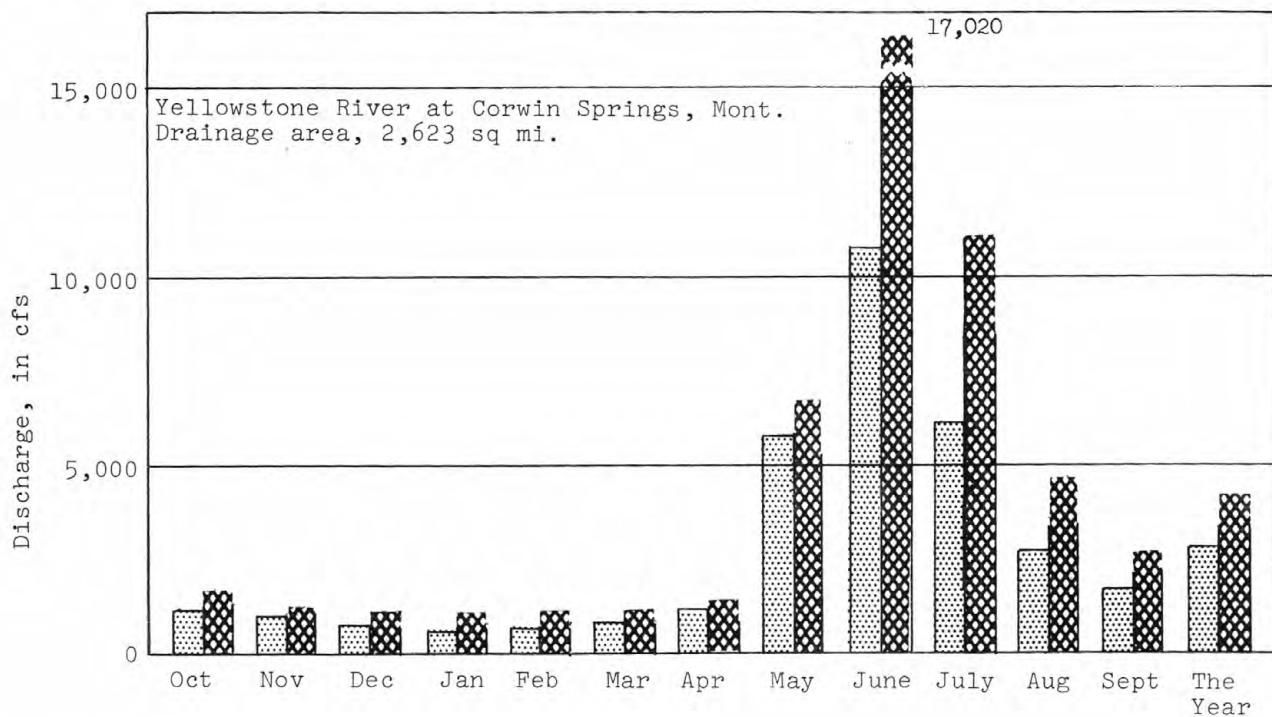


Figure 1. Comparison of discharge at two long-term representative gaging stations during current year with median discharge for period 1931-60.

## GAGING-STATION RECORDS

11

## HUDSON BAY BASIN

## SASKATCHEWAN RIVER BASIN

05010700 Mountain View Irrigation District Canal near Mountain View, Alberta

(International gaging station)

LOCATION.--Lat 49°05'58", long 113°41'34", in NW¼ sec.4, T.2, R.28 W., fourth meridian, in Alberta on left bank 1.5 miles downstream from headgate, 5 miles southwest of Mountain View, and 7 miles north of international boundary.

PERIOD OF RECORD.--May 1935 to current season (seasonal records only). Monthly discharge only for some periods, published in WSP 1308.

GAGE.--Water-stage recorder and sharp-crested weir. Datum of gage is 4,377.26 ft above mean sea level (Irrigation Surveys datum). Prior to May 12, 1950, nonrecording gage at site 600 ft upstream at different datum. May 12, 1950, to May 22, 1952, nonrecording gages at sites 0.2 mile upstream at different datums.

EXTREMES.--Period of record: Maximum daily discharge, 187 cfs May 24, 1970; no flow at times each season.

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

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

## DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR 1971

| DAY   | JAN | FEB   | MAR | APR   | MAY     | JUN   | JUL   | AUG      | SEP   | OCT   | NOV   | DEC |
|-------|-----|-------|-----|-------|---------|-------|-------|----------|-------|-------|-------|-----|
| 1     |     |       | -   | 0     | 1.2     | 36    | 83    | .41      | 94    | 14    | 1.6   |     |
| 2     |     |       | -   | 0     | 1.1     | 35    | 84    | 0        | 92    | 14    | .45   |     |
| 3     |     |       | -   | 0     | 17      | 35    | 83    | 0        | 90    | 14    | -     |     |
| 4     |     |       | -   | 0     | 54      | 35    | 81    | 0        | 97    | 14    | -     |     |
| 5     |     |       | -   | 0     | 62      | 35    | 79    | 0        | 91    | 14    | -     |     |
| 6     |     |       | -   | 0     | 68      | 36    | 78    | 0        | 89    | 12    | -     |     |
| 7     |     |       | -   | .10   | 63      | 33    | 77    | 30       | 88    | 12    | -     |     |
| 8     |     |       | -   | .20   | 63      | 27    | 74    | 52       | 85    | 12    | -     |     |
| 9     |     |       | -   | .30   | 64      | 27    | 72    | 51       | 84    | 12    | -     |     |
| 10    |     |       | -   | .40   | 63      | 25    | 77    | 50       | 84    | 13    | -     |     |
| 11    |     |       | -   | .50   | 62      | 24    | 77    | 50       | 84    | 13    | -     |     |
| 12    |     |       | -   | .54   | 62      | 23    | 77    | 49       | 84    | 13    | -     |     |
| 13    |     |       | -   | .60   | 64      | 24    | 74    | 45       | 81    | 13    | -     |     |
| 14    |     |       | -   | 1.7   | 60      | 24    | 73    | 57       | 79    | 14    | -     |     |
| 15    |     |       | -   | 1.5   | 59      | 23    | 72    | 79       | 79    | 14    | -     |     |
| 16    |     |       | -   | 2.4   | 57      | 23    | 72    | 104      | 82    | 14    | -     |     |
| 17    |     |       | -   | .90   | 57      | 22    | 74    | 104      | 81    | 13    | -     |     |
| 18    |     |       | -   | .96   | 56      | 22    | 74    | 103      | 79    | 13    | -     |     |
| 19    |     |       | -   | 2.0   | 54      | 23    | 74    | 100      | 78    | 13    | -     |     |
| 20    |     |       | -   | 1.4   | 53      | 22    | 73    | 96       | 87    | 13    | -     |     |
| 21    |     |       | -   | 3.3   | 53      | 23    | 74    | 94       | 84    | 13    | -     |     |
| 22    |     |       | -   | 2.4   | 52      | 23    | 75    | 93       | 84    | 13    | -     |     |
| 23    |     |       | -   | 2.3   | 52      | 23    | 76    | 95       | 84    | 13    | -     |     |
| 24    |     |       | -   | 2.4   | 52      | 23    | 69    | 96       | 86    | 13    | -     |     |
| 25    |     |       | -   | 2.1   | 56      | 22    | 55    | 91       | 86    | 13    | -     |     |
| 26    |     |       | -   | 1.2   | 58      | 56    | 54    | 89       | 85    | 9.4   | -     |     |
| 27    |     |       | -   | 1.3   | 57      | 74    | 53    | 89       | 83    | 2.1   | -     |     |
| 28    |     |       | 0   | 1.1   | 56      | 72    | 53    | 88       | 82    | 1.9   | -     |     |
| 29    |     | ----- | 0   | 1.2   | 52      | 77    | 54    | 89       | 48    | 1.6   | -     |     |
| 30    |     | ----- | 0   | 1.2   | 50      | 84    | 53    | 91       | 14    | 1.7   | -     |     |
| 31    |     | ----- |     | ----- | 44      | ----- | 49    | 94       | ----- | 1.6   | ----- |     |
| TOTAL |     |       | -   | 32.00 | 1,622.3 | 1,031 | 2,193 | 1,983.41 | 2,434 | 347.3 | -     |     |
| MEAN  |     |       | -   | 1.07  | 52.3    | 34.4  | 70.7  | 64.0     | 81.1  | 11.2  | -     |     |
| MAX   |     |       | -   | 3.3   | 68      | 84    | 84    | 104      | 94    | 14    | -     |     |
| MIN   |     |       | -   | 0     | 1.1     | 22    | 49    | 0        | 14    | 1.6   | -     |     |
| AC-FT |     |       | -   | 63    | 3,220   | 2,040 | 4,350 | 3,930    | 4,830 | 689   | -     |     |

THE SEASON APRIL TO OCTOBER AC-FT 19,130



## SASKATCHEWAN RIVER BASIN

05011000 Belly River near Mountain View, Alberta

(International gaging station)

LOCATION.--Lat 49°06'00", long 113°41'48", in NE $\frac{1}{4}$  sec.5, T.2, R.28 W., fourth meridian, in Alberta, on right bank 2 miles downstream from intake of Mountain View Irrigation District Canal, 5 miles southwest of Mountain View, and 7 miles north of international boundary.

DRAINAGE AREA.--121 sq mi.

PERIOD OF RECORD.--November 1911 to current year. Monthly discharge only for some periods, published in WSP1308.

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

AVERAGE DISCHARGE.--22 years (1912-34), prior to operation of Mountain View Irrigation District Canal, 327 cfs (236,700 acre-ft per year); 37 years, 306 cfs (221,700 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 1,910 cfs May 28 (gage height, 3.52 ft); minimum, 31 cfs Apr. 1 (gage height, 0.53 ft).

Period of record: Maximum discharge, 16,400 cfs June 8, 1964 (gage height, 11.40 ft, from floodmarks); minimum, 0.50 cfs Oct. 22, 1963, result of upstream diversion.

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

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

## DISCHARGE, IN CUBIC FEET PER SECND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT   | NOV     | DEC   | JAN   | FEB   | MAR   | APR    | MAY    | JUN    | JUL     | AUG    | SEP   |
|-------------|-------|---------|-------|-------|-------|-------|--------|--------|--------|---------|--------|-------|
| 1           | 81    | 76      | 65    | 52    | 75    | 47    | 51     | 385    | 1,340  | 960     | 503    | 181   |
| 2           | 78    | 76      | 63    | 52    | 76    | 47    | 54     | 449    | 1,180  | 1,030   | 524    | 159   |
| 3           | 76    | 79      | 63    | 50    | 77    | 46    | 57     | 561    | 1,140  | 1,010   | 561    | 146   |
| 4           | 75    | 82      | 63    | 50    | 77    | 40    | 62     | 690    | 1,150  | 911     | 571    | 138   |
| 5           | 103   | 82      | 63    | 50    | 75    | 47    | 63     | 885    | 1,260  | 812     | 560    | 122   |
| 6           | 134   | 81      | 66    | 50    | 74    | 55    | 78     | 1,220  | 1,440  | 736     | 542    | 112   |
| 7           | 125   | 81      | 71    | 52    | 74    | 55    | 95     | 1,050  | 1,440  | 722     | 491    | 108   |
| 8           | 121   | 80      | 75    | 52    | 75    | 52    | 97     | 1,010  | 1,480  | 654     | 453    | 98    |
| 9           | 119   | 81      | 80    | 52    | 77    | 49    | 108    | 1,130  | 1,520  | 583     | 430    | 90    |
| 10          | 120   | 83      | 84    | 50    | 79    | 56    | 125    | 1,100  | 1,370  | 716     | 411    | 82    |
| 11          | 119   | 82      | 90    | 49    | 80    | 79    | 111    | 1,070  | 1,220  | 838     | 388    | 79    |
| 12          | 124   | 79      | 74    | 48    | 80    | 88    | 102    | 1,130  | 1,180  | 799     | 368    | 80    |
| 13          | 119   | 77      | 74    | 48    | 80    | 84    | 100    | 1,320  | 1,200  | 718     | 350    | 71    |
| 14          | 113   | 74      | 71    | 48    | 80    | 79    | 108    | 1,430  | 1,240  | 660     | 324    | 64    |
| 15          | 109   | 74      | 68    | 48    | 80    | 71    | 130    | 1,170  | 1,140  | 645     | 285    | 62    |
| 16          | 105   | 74      | 63    | 48    | 79    | 75    | 130    | 957    | 982    | 660     | 238    | 71    |
| 17          | 101   | 72      | 59    | 50    | 79    | 59    | 128    | 861    | 860    | 707     | 218    | 67    |
| 18          | 100   | 74      | 56    | 53    | 77    | 66    | 126    | 757    | 804    | 729     | 198    | 62    |
| 19          | 99    | 71      | 53    | 56    | 77    | 57    | 129    | 647    | 776    | 716     | 179    | 63    |
| 20          | 98    | 53      | 52    | 56    | 75    | 52    | 143    | 615    | 835    | 702     | 171    | 87    |
| 21          | 100   | 65      | 52    | 56    | 72    | 53    | 192    | 593    | 935    | 701     | 166    | 77    |
| 22          | 99    | 72      | 50    | 56    | 68    | 63    | 228    | 556    | 1,090  | 736     | 157    | 76    |
| 23          | 98    | 74      | 50    | 55    | 63    | 65    | 292    | 539    | 1,290  | 744     | 171    | 80    |
| 24          | 98    | 79      | 50    | 55    | 55    | 59    | 393    | 612    | 1,350  | 735     | 166    | 89    |
| 25          | 95    | 75      | 50    | 55    | 52    | 60    | 566    | 879    | 1,290  | 667     | 151    | 87    |
| 26          | 88    | 74      | 50    | 59    | 49    | 63    | 547    | 1,190  | 1,330  | 570     | 138    | 82    |
| 27          | 86    | 72      | 50    | 62    | 48    | 59    | 495    | 1,580  | 1,140  | 521     | 129    | 77    |
| 28          | 81    | 72      | 50    | 68    | 47    | 50    | 434    | 1,890  | 928    | 540     | 130    | 75    |
| 29          | 79    | 71      | 52    | 69    | ----- | 48    | 406    | 1,740  | 984    | 503     | 134    | 100   |
| 30          | 79    | 68      | 52    | 69    | ----- | 47    | 385    | 1,510  | 921    | 465     | 152    | 129   |
| 31          | 78    | -----   | 52    | 68    | ----- | 43    | -----  | 1,510  | -----  | 449     | 182    | ----- |
| TOTAL       | 3,100 | 2,253   | 1,911 | 1,686 | 2,003 | 1,814 | 5,935  | 31,036 | 34,815 | 21,939  | 9,441  | 2,814 |
| MEAN        | 100   | 75.1    | 61.6  | 54.4  | 71.5  | 58.5  | 198    | 1,001  | 1,161  | 708     | 305    | 93.8  |
| MAX         | 134   | 83      | 90    | 69    | 80    | 88    | 566    | 1,890  | 1,520  | 1,030   | 571    | 181   |
| MIN         | 75    | 53      | 50    | 48    | 47    | 40    | 51     | 385    | 776    | 449     | 129    | 62    |
| AC-FT       | 6,150 | 4,470   | 3,790 | 3,340 | 3,970 | 3,600 | 11,770 | 61,560 | 69,060 | 43,520  | 18,730 | 5,580 |
| CAL YR 1970 | TOTAL | 109,534 | MEAN  | 300   | MAX   | 3,010 | MIN    | 29     | AC-FT  | 217,300 |        |       |
| WTR YR 1971 | TOTAL | 118,747 | MEAN  | 325   | MAX   | 1,890 | MIN    | 40     | AC-FT  | 235,500 |        |       |

## 05013000 Waterton River near Waterton Park, Alberta

(International gaging station)

LOCATION.--Lat 49°06'47", long 113°50'18", in NE 1/4 sec.8, T.2, R.29 W., fourth meridian, in Alberta on right bank 300 ft downstream from highway bridge, 0.3 mile upstream from Crooked Creek, and 5.3 miles northeast of Waterton Park.

DRAINAGE AREA.--238 sq mi.

PERIOD OF RECORD.--June to September 1908, April to November 1909, April to November 1910, May to October 1911, March 1912 to May 1931, September 1932, June to August 1933, April 1948 to current year. Monthly discharge only for some periods, published in WSP 1308.

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

AVERAGE DISCHARGE.--41 years (1912-30, 1948-71), 673 cfs (38.40 inches per year, 487,600 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 4,280 cfs May 29 (gage height, 4.05 ft); minimum, 42 cfs Mar. 28 (gage height, 0.56 ft), result of freezeup.

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

REMARKS.--Records good except those for winter period, which are fair. No regulation or diversions.

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

REVISIONS (WATER YEARS).--WSP 1308: 1908(M).

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT           | NOV      | DEC       | JAN    | FEB       | MAR      | APR           | MAY     | JUN     | JUL    | AUG    | SEP    |
|-------------|---------------|----------|-----------|--------|-----------|----------|---------------|---------|---------|--------|--------|--------|
| 1           | 199           | 133      | 127       | 118    | 163       | 151      | 110           | 950     | 3,660   | 2,000  | 894    | 286    |
| 2           | 193           | 133      | 128       | 115    | 166       | 174      | 111           | 960     | 3,330   | 2,000  | 873    | 265    |
| 3           | 198           | 134      | 128       | 112    | 166       | 158      | 103           | 1,090   | 3,040   | 2,110  | 888    | 250    |
| 4           | 197           | 133      | 133       | 110    | 174       | 142      | 103           | 1,360   | 2,940   | 2,100  | 856    | 251    |
| 5           | 190           | 137      | 130       | 106    | 168       | 135      | 103           | 1,820   | 2,990   | 2,010  | 842    | 247    |
| 6           | 194           | 135      | 158       | 97     | 168       | 135      | 100           | 2,370   | 3,230   | 1,920  | 826    | 238    |
| 7           | 203           | 136      | 165       | 83     | 168       | 138      | 105           | 2,560   | 3,320   | 1,750  | 800    | 241    |
| 8           | 193           | 137      | 173       | 84     | 166       | 129      | 112           | 2,580   | 3,440   | 1,550  | 763    | 226    |
| 9           | 191           | 134      | 180       | 80     | 166       | 130      | 116           | 2,600   | 3,680   | 1,430  | 727    | 210    |
| 10          | 194           | 137      | 187       | 78     | 166       | 132      | 122           | 2,600   | 3,480   | 1,500  | 695    | 210    |
| 11          | 190           | 137      | 191       | 77     | 166       | 127      | 140           | 2,600   | 3,160   | 1,740  | 672    | 208    |
| 12          | 183           | 133      | 181       | 80     | 174       | 126      | 145           | 2,710   | 2,930   | 1,770  | 629    | 205    |
| 13          | 182           | 130      | 190       | 80     | 200       | 115      | 153           | 3,080   | 2,900   | 1,700  | 590    | 190    |
| 14          | 188           | 140      | 161       | 78     | 198       | 116      | 159           | 3,400   | 2,980   | 1,630  | 569    | 179    |
| 15          | 182           | 137      | 158       | 80     | 209       | 116      | 177           | 3,170   | 2,800   | 1,610  | 525    | 173    |
| 16          | 174           | 142      | 156       | 90     | 202       | 103      | 191           | 2,800   | 2,480   | 1,610  | 488    | 184    |
| 17          | 166           | 121      | 153       | 97     | 187       | 118      | 204           | 2,430   | 2,200   | 1,640  | 455    | 190    |
| 18          | 164           | 122      | 151       | 103    | 187       | 111      | 223           | 2,160   | 2,010   | 1,670  | 419    | 176    |
| 19          | 170           | 122      | 148       | 117    | 182       | 116      | 232           | 1,870   | 1,930   | 1,660  | 392    | 179    |
| 20          | 167           | 115      | 145       | 124    | 182       | 106      | 242           | 1,750   | 1,950   | 1,620  | 365    | 203    |
| 21          | 177           | 113      | 143       | 122    | 186       | 100      | 286           | 1,640   | 2,060   | 1,570  | 363    | 209    |
| 22          | 168           | 111      | 140       | 115    | 203       | 100      | 331           | 1,540   | 2,280   | 1,590  | 317    | 209    |
| 23          | 177           | 116      | 138       | 124    | 188       | 99       | 398           | 1,470   | 2,730   | 1,570  | 309    | 212    |
| 24          | 169           | 130      | 135       | 135    | 179       | 102      | 508           | 1,580   | 2,980   | 1,510  | 292    | 215    |
| 25          | 162           | 133      | 132       | 147    | 169       | 104      | 798           | 1,870   | 2,980   | 1,410  | 269    | 236    |
| 26          | 165           | 129      | 130       | 163    | 165       | 110      | 1,030         | 2,320   | 3,040   | 1,320  | 259    | 212    |
| 27          | 168           | 127      | 127       | 176    | 160       | 117      | 1,130         | 3,100   | 2,910   | 1,200  | 250    | 215    |
| 28          | 163           | 134      | 125       | 176    | 154       | 101      | 1,110         | 3,970   | 2,580   | 1,140  | 243    | 212    |
| 29          | 148           | 138      | 122       | 163    | -----     | 122      | 1,040         | 4,220   | 2,430   | 1,070  | 239    | 212    |
| 30          | 135           | 128      | 120       | 161    | -----     | 127      | 985           | 4,010   | 2,170   | 1,010  | 246    | 211    |
| 31          | 132           | -----    | 120       | 161    | -----     | 112      | -----         | 3,940   | -----   | 936    | 265    | -----  |
| TOTAL       | 5,482         | 3,907    | 4,575     | 3,552  | 4,962     | 3,772    | 10,567        | 74,520  | 84,610  | 49,346 | 16,320 | 6,454  |
| MEAN        | 177           | 130      | 148       | 115    | 177       | 122      | 352           | 2,404   | 2,820   | 1,592  | 526    | 215    |
| MAX         | 203           | 142      | 191       | 176    | 209       | 174      | 1,130         | 4,220   | 3,680   | 2,110  | 894    | 286    |
| MIN         | 132           | 111      | 120       | 77     | 154       | 99       | 100           | 950     | 1,930   | 936    | 239    | 173    |
| CFSM        | .74           | .55      | .62       | .48    | .74       | .51      | 1.48          | 10.1    | 11.8    | 6.69   | 2.21   | .90    |
| IN.         | .86           | .61      | .72       | .56    | .78       | .59      | 1.65          | 11.65   | 13.22   | 7.71   | 2.55   | 1.01   |
| AC-FT       | 10,870        | 7,750    | 9,070     | 7,050  | 9,840     | 7,480    | 20,960        | 147,800 | 167,800 | 97,880 | 32,370 | 12,800 |
| CAL YR 1970 | TOTAL 234,675 | MEAN 643 | MAX 6,200 | MIN 82 | CFSM 2.70 | IN 36.68 | AC-FT 465,500 |         |         |        |        |        |
| WTR YR 1971 | TOTAL 268,067 | MEAN 734 | MAX 4,220 | MIN 77 | CFSM 3.08 | IN 41.90 | AC-FT 531,700 |         |         |        |        |        |

NOTE.--Stage-discharge relation affected by ice Jan. 6 to Feb. 12.

## SASKATCHEWAN RIVER BASIN

05013900 Grinnell Creek at Grinnell Glacier, near Many Glacier, Mont.

LOCATION.--Lat 48°45'28", long 113°43'25", in SE¼ sec.35, T.35 N., R.17 W., (unsurveyed), Glacier National Park, on left bank 0.2 mile downstream from Grinnell Glacier, 0.4 mile upstream from Grinnell Falls, 4.1 miles southwest of Many Glacier, and 15.0 miles southwest of Babb.

DRAINAGE AREA.--1.1 sq mi, approximately.

PERIOD OF RECORD.--July 1959 to September 1971 (no winter records), discontinued.

GAGE.--Water-stage recorder. Datum of gage is 6,322 ft above mean sea level (plane-table benchmark).

EXTREMES.--Current year: Maximum discharge recorded, 65 cfs Aug. 7 (gage height, 3.15 ft); maximum gage height, 3.85 ft (from recorded range in stage, probably during June, backwater from snow and ice); minimum not determined; probably no flow during most of winter.

Period of record: Maximum discharge recorded, 100 cfs Aug. 3, 1960 (gage height, 3.65 ft); maximum gage height exceeded 9 ft several years during period of no gage-height record (backwater from snow and ice); no flow at times; probably no flow most of each winter.

REMARKS.--Records fair. No regulation or diversion.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY   | OCT   | NOV   | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL   | AUG   | SEP   |
|-------|-------|-------|-----|-----|-----|-----|-----|-----|-----|-------|-------|-------|
| 1     | 11    | 2.0   |     |     |     |     |     |     |     | 40    | 47    | 31    |
| 2     | 12    | 1.9   |     |     |     |     |     |     |     | 50    | 50    | 25    |
| 3     | 11    | 1.8   |     |     |     |     |     |     |     | 45    | 52    | 22    |
| 4     | 11    | 1.7   |     |     |     |     |     |     |     | 35    | 49    | 20    |
| 5     | 9.0   | 1.5   |     |     |     |     |     |     |     | 35    | 49    | 22    |
| 6     | 7.2   | 1.5   |     |     |     |     |     |     |     | 35    | 51    | 21    |
| 7     | 6.4   | 1.5   |     |     |     |     |     |     |     | 30    | 56    | 17    |
| 8     | 5.7   | 1.4   |     |     |     |     |     |     |     | 25    | 57    | 17    |
| 9     | 5.1   | 1.7   |     |     |     |     |     |     |     | 30    | 52    | 15    |
| 10    | 6.4   | 1.7   |     |     |     |     |     |     |     | 40    | 46    | 15    |
| 11    | 8.7   | 1.4   |     |     |     |     |     |     |     | 40    | 45    | 16    |
| 12    | 9.2   | 1.4   |     |     |     |     |     |     |     | 30    | 43    | 13    |
| 13    | 7.9   | 1.4   |     |     |     |     |     |     |     | 30    | 40    | 11    |
| 14    | 5.1   | 1.2   |     |     |     |     |     |     |     | 35    | 37    | 8.7   |
| 15    | 3.8   | 1.0   |     |     |     |     |     |     |     | 45    | 35    | 7.2   |
| 16    | 3.2   | 1.2   |     |     |     |     |     |     |     | 45    | 31    | 7.2   |
| 17    | 3.0   | 1.7   |     |     |     |     |     |     |     | 50    | 29    | 5.7   |
| 18    | 2.6   | 1.6   |     |     |     |     |     |     |     | 48    | 27    | 5.1   |
| 19    | 2.8   | 1.4   |     |     |     |     |     |     |     | 48    | 26    | 4.5   |
| 20    | 3.3   | 1.2   |     |     |     |     |     |     |     | 50    | 26    | 4.7   |
| 21    | 3.8   | .90   |     |     |     |     |     |     |     | 55    | 31    | 4.0   |
| 22    | 4.0   | .70   |     |     |     |     |     |     |     | 60    | 33    | 3.5   |
| 23    | 4.0   | .80   |     |     |     |     |     |     |     | 60    | 39    | 3.7   |
| 24    | 3.8   | 1.3   |     |     |     |     |     |     |     | 52    | 29    | 3.8   |
| 25    | 3.7   | 1.5   |     |     |     |     |     |     |     | 42    | 28    | 3.8   |
| 26    | 3.5   | 1.0   |     |     |     |     |     |     |     | 39    | 27    | 3.8   |
| 27    | 3.0   | .80   |     |     |     |     |     |     |     | 39    | 27    | 4.0   |
| 28    | 2.6   | .60   |     |     |     |     |     |     |     | 41    | 30    | 4.5   |
| 29    | 2.0   | .50   |     |     |     |     |     |     |     | 36    | 28    | 3.5   |
| 30    | 2.2   | .50   |     |     |     |     |     |     |     | 37    | 37    | 2.8   |
| 31    | 2.0   | ----- |     |     |     |     |     |     |     | 41    | 39    | ----- |
| TOTAL | 169.0 | 38.80 |     |     |     |     |     |     |     | 1,288 | 1,196 | 325.5 |
| MEAN  | 5.45  | 1.29  |     |     |     |     |     |     |     | 41.5  | 38.6  | 10.9  |
| MAX   | 12    | 2.0   |     |     |     |     |     |     |     | 60    | 57    | 31    |
| MIN   | 2.0   | .50   |     |     |     |     |     |     |     | 25    | 26    | 2.8   |
| CFSM  | 4.95  | 1.17  |     |     |     |     |     |     |     | 37.7  | 35.1  | 9.91  |
| IN.   | 5.72  | 1.31  |     |     |     |     |     |     |     | 43.56 | 40.45 | 11.01 |
| AC-FT | 335   | 77    |     |     |     |     |     |     |     | 2,550 | 2,370 | 646   |

|             |       |   |      |   |     |   |     |   |      |   |     |   |       |   |
|-------------|-------|---|------|---|-----|---|-----|---|------|---|-----|---|-------|---|
| CAL YR 1970 | TOTAL | - | MEAN | - | MAX | - | MIN | - | CFSM | - | IN. | - | AC-FT | - |
| WTR YR 1971 | TOTAL | - | MEAN | - | MAX | - | MIN | - | CFSM | - | IN. | - | AC-FT | - |

## 05014000 Grinnell Creek near Many Glacier, Mont.

LOCATION.--Lat 48°46'14", long 113°41'53", in SE¼ sec.21, T.35 N., R.16 W., (unsurveyed), Glacier National Park, on right bank 600 ft upstream from trail crossing, 900 ft downstream from Grinnell Lake, 0.3 mile upstream from mouth, 2.6 miles southwest of Many Glacier, and 13.5 miles southwest of Babb.

DRAINAGE AREA.--3.47 sq mi.

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

GAGE.--Water-stage recorder. Altitude of gage is 4,920 ft (revised), from topographic map. Prior to Oct. 12, 1949, nonrecording gages at various sites and datums.

AVERAGE DISCHARGE.--22 years, 25.6 cfs (100.19 inches per year, 18,550 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 176 cfs June 25 (gage height, 2.82 ft); minimum daily, 1.5 cfs Mar. 28, 29.

Period of record: Maximum discharge, 536 cfs June 8, 1964 (gage height, 4.88 ft), from rating curve extended above 120 cfs on basis of slope-area measurement of peak flow; minimum, probably less than 0.20 cfs at times in winter periods.

REMARKS.--Records good except those for winter period, which are poor. No regulation or diversion. Since 1964, some inflow from Cataract Creek has entered above gage during high-water periods in some years.

REVISIONS.--WSP 1278: Drainage area.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY   | OCT   | NOV   | DEC   | JAN   | FEB   | MAR  | APR   | MAY   | JUN   | JUL   | AUG   | SEP   |
|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|-------|
| 1     | 15    | 5.0   | 6.2   | 4.0   | 4.2   | 2.5  | 2.5   | 22    | 68    | 76    | 70    | 49    |
| 2     | 16    | 5.3   | 5.0   | 3.5   | 19    | 3.0  | 2.5   | 34    | 64    | 90    | 74    | 42    |
| 3     | 15    | 5.0   | 4.5   | 3.5   | 22    | 3.0  | 3.0   | 47    | 72    | 79    | 79    | 38    |
| 4     | 14    | 4.8   | 4.0   | 3.5   | 7.5   | 3.0  | 3.5   | 59    | 86    | 65    | 76    | 31    |
| 5     | 15    | 4.4   | 4.5   | 3.5   | 5.5   | 3.0  | 3.5   | 71    | 148   | 62    | 72    | 29    |
| 6     | 13    | 4.4   | 5.9   | 3.5   | 4.5   | 3.0  | 4.0   | 62    | 148   | 62    | 72    | 29    |
| 7     | 10    | 4.2   | 7.5   | 3.5   | 3.5   | 2.5  | 4.5   | 51    | 107   | 51    | 74    | 26    |
| 8     | 8.4   | 4.0   | 7.2   | 3.0   | 3.5   | 3.0  | 4.5   | 59    | 124   | 44    | 79    | 23    |
| 9     | 7.5   | 5.0   | 6.2   | 3.0   | 2.5   | 3.5  | 4.8   | 73    | 111   | 47    | 74    | 22    |
| 10    | 8.1   | 5.0   | 5.3   | 3.0   | 2.5   | 4.0  | 5.3   | 63    | 83    | 74    | 66    | 20    |
| 11    | 8.4   | 4.2   | 5.0   | 2.5   | 2.5   | 4.5  | 5.5   | 67    | 85    | 75    | 59    | 22    |
| 12    | 9.8   | 4.4   | 4.6   | 2.5   | 2.5   | 4.5  | 5.3   | 79    | 90    | 60    | 58    | 19    |
| 13    | 9.7   | 4.0   | 3.8   | 2.5   | 4.0   | 4.5  | 4.5   | 101   | 94    | 59    | 53    | 17    |
| 14    | 8.1   | 3.4   | 3.4   | 2.5   | 7.0   | 4.5  | 4.2   | 83    | 93    | 67    | 43    | 15    |
| 15    | 8.6   | 3.0   | 3.2   | 3.0   | 8.0   | 3.5  | 4.0   | 51    | 70    | 80    | 47    | 13    |
| 16    | 5.9   | 3.8   | 3.4   | 4.0   | 7.5   | 4.0  | 4.4   | 42    | 52    | 90    | 43    | 13    |
| 17    | 5.6   | 5.3   | 3.4   | 6.0   | 0.0   | 4.0  | 5.9   | 35    | 46    | 94    | 39    | 11    |
| 18    | 5.3   | 5.3   | 3.0   | 7.0   | 0.0   | 3.5  | 7.2   | 29    | 51    | 89    | 36    | 10    |
| 19    | 5.9   | 4.8   | 3.0   | 8.0   | 4.0   | 2.5  | 5.9   | 26    | 60    | 89    | 34    | 9.3   |
| 20    | 5.9   | 4.5   | 3.0   | 9.5   | 4.0   | 2.0  | 3.1   | 30    | 73    | 91    | 35    | 9.3   |
| 21    | 7.5   | 4.0   | 2.5   | 8.5   | 3.0   | 2.0  | 12    | 28    | 90    | 101   | 36    | 8.5   |
| 22    | 7.2   | 3.5   | 2.5   | 6.0   | 2.5   | 2.0  | 16    | 25    | 110   | 110   | 40    | 7.8   |
| 23    | 6.9   | 4.5   | 2.5   | 4.5   | 2.5   | 2.0  | 23    | 26    | 133   | 109   | 51    | 7.5   |
| 24    | 7.2   | 9.3   | 2.5   | 4.5   | 2.5   | 2.0  | 31    | 38    | 128   | 97    | 40    | 7.2   |
| 25    | 6.6   | 12    | 2.5   | 4.0   | 2.5   | 2.5  | 33    | 68    | 133   | 72    | 36    | 7.2   |
| 26    | 5.3   | 9.8   | 2.5   | 6.0   | 2.5   | 2.5  | 30    | 93    | 148   | 65    | 34    | 7.8   |
| 27    | 4.8   | 8.4   | 3.0   | 6.0   | 2.5   | 2.0  | 23    | 123   | 98    | 66    | 33    | 9.3   |
| 28    | 4.0   | 7.0   | 4.0   | 5.0   | 2.5   | 1.5  | 19    | 133   | 71    | 70    | 35    | 11    |
| 29    | 4.2   | 6.2   | 5.0   | 5.0   | ----- | 1.5  | 19    | 103   | 65    | 61    | 36    | 9.3   |
| 30    | 4.6   | 5.9   | 5.0   | 11    | ----- | 2.0  | 19    | 91    | 62    | 58    | 41    | 8.1   |
| 31    | 4.6   | ----- | 4.0   | 4.6   | ----- | 2.2  | ----- | 83    | ----- | 62    | 49    | ----- |
| TOTAL | 255.1 | 160.9 | 128.1 | 146.6 | 145.7 | 90.2 | 325.3 | 1,895 | 2,763 | 2,315 | 1,619 | 531.3 |
| MEAN  | 8.23  | 5.36  | 4.13  | 4.73  | 5.20  | 2.91 | 10.8  | 61.1  | 92.1  | 74.7  | 52.2  | 17.7  |
| MAX   | 16    | 12    | 7.5   | 11    | 22    | 4.5  | 38    | 133   | 148   | 110   | 79    | 49    |
| MIN   | 4.0   | 3.0   | 2.5   | 2.5   | 2.5   | 1.5  | 2.5   | 22    | 46    | 44    | 33    | 7.2   |
| CFRSM | 2.37  | 1.54  | 1.19  | 1.36  | 1.50  | .84  | 3.11  | 17.6  | 26.5  | 21.5  | 15.0  | 5.10  |
| IN    | 2.73  | 1.72  | 1.37  | 1.57  | 1.56  | .97  | 3.49  | 20.32 | 29.62 | 24.82 | 17.36 | 5.70  |
| AC-FT | 506   | 319   | 254   | 291   | 289   | 179  | 645   | 3,760 | 5,480 | 4,590 | 3,210 | 1,050 |

|             |       |           |      |      |     |     |     |     |       |      |    |        |       |        |
|-------------|-------|-----------|------|------|-----|-----|-----|-----|-------|------|----|--------|-------|--------|
| CAL YR 1970 | TOTAL | 8,982.30  | MEAN | 24.6 | MAX | 195 | MIN | .50 | CFRSM | 7.09 | IN | 96.29  | AC-FT | 17,820 |
| WTR YR 1971 | TOTAL | 10,375.20 | MEAN | 28.4 | MAX | 148 | MIN | 1.5 | CFRSM | 8.18 | IN | 111.23 | AC-FT | 20,580 |

## PEAK DISCHARGE (BASE, 100 CFS)

| DATE | TIME | G.HT. | DISCHARGE | DATE | TIME | G.HT. | DISCHARGE |
|------|------|-------|-----------|------|------|-------|-----------|
| 5-13 | 1330 | 2.22  | 107       | 6-25 | 2300 | 2.82  | 176       |
| 5-28 | 0230 | 2.52  | 144       | 7-22 | 2330 | 2.28  | 115       |
| 6-5  | 2130 | 2.75  | 174       |      |      |       |           |

NOTE.--Stage-discharge relation affected by ice Dec. 18 to Jan. 29, Feb. 2 to Apr. 8 (no gage-height record Dec. 24 to Jan. 17).



## SASKATCHEWAN RIVER BASIN

05014500 Swiftcurrent Creek at Many Glacier, Mont.

(Hydrologic bench-mark station)

LOCATION.--Lat 48°47'57", long 113°39'21", in SE $\frac{1}{4}$  sec.11, T.35 N., R.16 W., (unsurveyed), Glacier County, Glacier National Park, on right bank 100 ft upstream from outlet of Swiftcurrent Lake at Many Glacier, and 11 miles southwest of Babb.

DRAINAGE AREA.--31.4 sq mi.

PERIOD OF RECORD.--June 1912 to current year (records incomplete most years prior to 1959). Published as "at McDermott Lake" 1912-14. Monthly discharge only for some periods, published in WSP 1308.

GAGE.--Water-stage recorder. Altitude of gage is 4,880 ft (revised), from topographic map. Prior to May 23, 1916, nonrecording gage on left bank of lake opposite present gage at same datum. May 23, 1916 to June 15, 1918, nonrecording gage at same site and datum.

AVERAGE DISCHARGE.--15 years (1917-19, 1958-71), 146 cfs (63.14 inches per year, 105,800 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 985 cfs May 28 (gage height, 4.57 ft); minimum, 11 cfs Mar. 28, 29 (gage height, 1.44 ft).

Period of record: Maximum discharge, 6,700 cfs June 8, 1964 (gage height, 10.00 ft, from floodmarks), from rating curve extended above 1,100 cfs on basis of computation of peak flow over dam; minimum, 7.5 cfs Mar. 16, 1969 (gage height, 1.34 ft).

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

REVISIONS (WATER YEARS).--WSP 1508: 1918(M), 1943.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY   | OCT   | NOV   | DEC   | JAN   | FEB   | MAR   | APR   | MAY    | JUN    | JUL    | AUG    | SEP   |
|-------|-------|-------|-------|-------|-------|-------|-------|--------|--------|--------|--------|-------|
| 1     | 57    | 29    | 33    | 15    | 45    | 17    | 15    | 190    | 554    | 479    | 236    | 158   |
| 2     | 57    | 29    | 31    | 17    | 48    | 17    | 16    | 259    | 471    | 549    | 257    | 146   |
| 3     | 57    | 30    | 28    | 17    | 51    | 18    | 16    | 358    | 468    | 503    | 270    | 137   |
| 4     | 59    | 30    | 25    | 18    | 52    | 18    | 19    | 464    | 511    | 418    | 276    | 123   |
| 5     | 49    | 30    | 23    | 18    | 51    | 19    | 22    | 539    | 705    | 373    | 261    | 106   |
| 6     | 47    | 30    | 31    | 18    | 47    | 20    | 27    | 512    | 823    | 371    | 248    | 98    |
| 7     | 46    | 29    | 45    | 18    | 43    | 21    | 36    | 427    | 670    | 329    | 240    | 94    |
| 8     | 45    | 28    | 49    | 18    | 38    | 21    | 43    | 444    | 708    | 280    | 242    | 84    |
| 9     | 45    | 31    | 46    | 18    | 34    | 22    | 48    | 597    | 730    | 263    | 238    | 76    |
| 10    | 46    | 32    | 39    | 17    | 30    | 22    | 56    | 523    | 578    | 355    | 221    | 72    |
| 11    | 47    | 29    | 35    | 16    | 31    | 22    | 53    | 512    | 516    | 428    | 197    | 72    |
| 12    | 49    | 29    | 32    | 14    | 31    | 20    | 50    | 572    | 518    | 368    | 185    | 73    |
| 13    | 46    | 27    | 28    | 14    | 38    | 21    | 46    | 746    | 557    | 326    | 173    | 61    |
| 14    | 42    | 25    | 27    | 14    | 50    | 22    | 48    | 719    | 601    | 322    | 161    | 58    |
| 15    | 39    | 25    | 26    | 16    | 60    | 22    | 60    | 475    | 505    | 341    | 150    | 55    |
| 16    | 35    | 27    | 27    | 18    | 58    | 23    | 67    | 367    | 403    | 372    | 142    | 56    |
| 17    | 34    | 28    | 27    | 20    | 54    | 24    | 65    | 305    | 348    | 413    | 128    | 54    |
| 18    | 36    | 30    | 25    | 23    | 47    | 25    | 61    | 248    | 351    | 392    | 120    | 48    |
| 19    | 34    | 30    | 25    | 35    | 43    | 23    | 62    | 223    | 375    | 372    | 113    | 46    |
| 20    | 35    | 26    | 24    | 55    | 38    | 20    | 72    | 233    | 458    | 361    | 110    | 49    |
| 21    | 40    | 23    | 24    | 60    | 32    | 17    | 98    | 218    | 523    | 375    | 109    | 48    |
| 22    | 39    | 21    | 23    | 60    | 30    | 18    | 131   | 194    | 607    | 415    | 110    | 47    |
| 23    | 39    | 23    | 20    | 45    | 29    | 19    | 177   | 198    | 713    | 410    | 136    | 45    |
| 24    | 41    | 43    | 20    | 41    | 27    | 20    | 243   | 263    | 718    | 407    | 133    | 46    |
| 25    | 37    | 54    | 17    | 37    | 24    | 20    | 346   | 447    | 709    | 331    | 114    | 44    |
| 26    | 34    | 50    | 16    | 38    | 21    | 17    | 307   | 635    | 891    | 272    | 103    | 46    |
| 27    | 32    | 41    | 17    | 45    | 18    | 15    | 242   | 813    | 628    | 249    | 99     | 47    |
| 28    | 29    | 35    | 18    | 59    | 16    | 12    | 197   | 942    | 456    | 266    | 98     | 51    |
| 29    | 29    | 30    | 19    | 62    | ----- | 12    | 187   | 767    | 431    | 253    | 100    | 51    |
| 30    | 29    | 33    | 20    | 58    | ----- | 13    | 179   | 644    | 423    | 226    | 111    | 47    |
| 31    | 29    | ----- | 15    | 48    | ----- | 15    | ----- | 635    | -----  | 220    | 136    | ----- |
| TOTAL | 1,283 | 927   | 835   | 952   | 1,086 | 595   | 2,989 | 14,469 | 16,949 | 11,039 | 5,217  | 2,138 |
| MEAN  | 41.4  | 30.9  | 26.9  | 30.7  | 38.8  | 19.2  | 99.6  | 467    | 565    | 356    | 168    | 71.3  |
| MAX   | 59    | 54    | 49    | 62    | 60    | 25    | 346   | 942    | 891    | 549    | 276    | 158   |
| MIN   | 29    | 21    | 15    | 14    | 16    | 12    | 15    | 190    | 348    | 220    | 98     | 44    |
| CFSM  | 1.32  | .98   | .86   | .98   | 1.24  | .61   | 3.17  | 14.9   | 18.0   | 11.3   | 5.35   | 2.27  |
| IN.   | 1.52  | 1.10  | .99   | 1.13  | 1.29  | .70   | 3.54  | 17.14  | 20.08  | 13.08  | 6.18   | 2.53  |
| AC-FT | 2,540 | 1,840 | 1,660 | 1,890 | 2,150 | 1,180 | 5,930 | 28,700 | 33,620 | 21,900 | 10,350 | 4,240 |

|             |              |          |         |        |           |          |               |
|-------------|--------------|----------|---------|--------|-----------|----------|---------------|
| CAL YR 1970 | TOTAL 48,778 | MEAN 134 | MAX 976 | MIN 12 | CFSM 4.27 | IN 57.79 | AC-FT 96,750  |
| WTR YR 1971 | TOTAL 58,479 | MEAN 160 | MAX 942 | MIN 12 | CFSM 5.10 | IN 69.28 | AC-FT 116,000 |

## PEAK DISCHARGE (BASE, 680 CFS)

| DATE | TIME | G.HT | DISCHARGE | DATE | TIME | G.HT | DISCHARGE |
|------|------|------|-----------|------|------|------|-----------|
| 5-13 | 2200 | 4.20 | 837       | 6-6  | 0130 | 4.29 | 867       |
| 5-28 | 0645 | 4.57 | 985       | 6-26 | 0400 | 4.53 | 968       |

05015500 Lake Sherburne at Sherburne, Mont.

LOCATION.--Lat 48°49'42", long 113°31'16", in SE $\frac{1}{4}$ SE $\frac{1}{4}$ SE $\frac{1}{4}$  sec.35, T.36 N., R.15 W., Glacier County, in gatehouse at dam on Swiftcurrent Creek, 4.5 miles southwest of Babb.

DRAINAGE AREA.--63.7 sq mi.

PERIOD OF RECORD.--May 1915 to September 1923 (fragmentary), May 1924 to September 1925, November 1925 to June 1926, September 1926 to March 1936 (no winter records some years), May 1936 to May 1937, July 1937 to current year. Monthend contents for some periods, published in WSP 1308. Published as "Sherburne Lake Reservoir at Sherburne" 1915, 1917-28, 1931-52, and as "Sherburne Lake Reservoir near Babb" 1929-30.

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

EXTREMES.--Current year: Maximum contents, 66,350 acre-ft July 22 (elevation, 4,788.09 ft); minimum, 5,840 acre-ft Oct. 1 (elevation, 4,736.57 ft).

Period of record: Maximum contents, 66,570 acre-ft July 11, 1966 (elevation, 4,788.22 ft); no usable contents at times.

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

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

REVISIONS.--WSP 1338: Drainage area.

MONTHEND ELEVATION AND CONTENTS AT 2400, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| Date                  | Elevation<br>(feet) | Contents<br>(acre-feet) | Change in Contents<br>(acre-feet) |
|-----------------------|---------------------|-------------------------|-----------------------------------|
| Sept. 30 . . . . .    | 4,736.58            | 5,850                   | -                                 |
| Oct. 31 . . . . .     | 4,741.69            | 9,640                   | +3,790                            |
| Nov. 30 . . . . .     | 4,745.00            | 12,300                  | +2,660                            |
| Dec. 31 . . . . .     | 4,748.35            | 15,220                  | +2,920                            |
| CAL YR 1970 . . . . . |                     |                         | +1,130                            |
| Jan. 31 . . . . .     | 4,751.92            | 18,620                  | +3,400                            |
| Feb. 28 . . . . .     | 4,755.36            | 21,960                  | +3,340                            |
| Mar. 31 . . . . .     | 4,757.41            | 24,150                  | +2,190                            |
| Apr. 30 . . . . .     | 4,766.46            | 34,250                  | +10,100                           |
| May 31 . . . . .      | 4,773.70            | 43,580                  | +9,330                            |
| June 30 . . . . .     | 4,783.17            | 57,990                  | +14,410                           |
| July 31 . . . . .     | 4,787.90            | 66,030                  | +8,040                            |
| Aug. 31 . . . . .     | 4,776.48            | 47,620                  | -18,410                           |
| Sept. 30 . . . . .    | 4,738.86            | 7,490                   | -40,130                           |
| WTR YR 1971 . . . . . |                     |                         | +3,190                            |

## SASKATCHEWAN RIVER BASIN

05016000 Swiftcurrent Creek at Sherburne, Mont.

(International gaging station)

LOCATION.--Lat 48°49'49", long 113°30'59", in NW¼SW¼SW¼ sec.36, T.36 N., R.15 W., Glacier County, on left bank 1,200 ft downstream from outlet of Lake Sherburne Dam at Sherburne and 4.2 miles southwest of Babb.

DRAINAGE AREA.--64.3 sq mi.

PERIOD OF RECORD.--July 1912 to November 1915 (no winter records), March 1916 to October 1923, May 1924 to current year (no winter records). Monthly discharge only for some periods, published in WSP 1308, 1728. Published as "at Sherburne Lake" 1912-14.

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

AVERAGE DISCHARGE.--7 years (1916-23), 199 cfs (144,200 acre-ft per year), unadjusted.

EXTREMES.--Current year: Maximum discharge, 2,190 cfs May 14 (gage height, 7.45 ft); minimum daily, 0.08 cfs Nov. 1-3.

Period of record: Maximum discharge, 2,420 cfs June 25, 1969 (gage height, 7.63 ft); no flow at times when gates in dam were closed.

REMARKS.--Records good except those below 5 cfs, which are fair, and those for period of no gage-height record, which are poor. Flow regulated by Lake Sherburne (see preceding page). No diversion.

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

REVISIONS (WATER YEARS).--WSP 1388: Drainage area. WSP 1508: 1935.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY    | OCT   | NOV   | DEC | JAN | FEB | MAR   | APR    | MAY      | JUN    | JUL    | AUG    | SEP    |
|--------|-------|-------|-----|-----|-----|-------|--------|----------|--------|--------|--------|--------|
| 1      | .38   | .08   |     |     |     | .30   | .38    | 2.2      | 2,030  | 357    | 254    | 742    |
| 2      | .36   | .08   |     |     |     | .30   | .38    | 2.3      | 1,840  | 359    | 347    | 736    |
| 3      | .35   | .08   |     |     | .30 | .30   | .35    | 2.5      | 745    | 359    | 379    | 731    |
| 4      | .30   | -     |     |     | .30 | .30   | .40    | 2.5      | 635    | 359    | 371    | 726    |
| 5      | .31   | -     |     |     | .30 | .30   | .50    | 2.0      | 638    | 252    | 371    | 720    |
| 6      | .36   | -     |     |     |     | .30   | .70    | 4.3      | 881    | 192    | 348    | 715    |
| 7      | .33   | -     |     |     |     | .30   | 1.0    | 2.5      | 1,060  | 192    | 314    | 709    |
| 8      | .27   | -     |     |     |     | .30   | 1.5    | 2.5      | 1,060  | 193    | 303    | 743    |
| 9      | .27   | -     | .19 |     |     | .30   | 1.2    | 2.5      | 1,070  | 193    | 301    | 767    |
| 10     | .27   | -     |     |     |     | .30   | 1.0    | 2.5      | 1,060  | 194    | 299    | 760    |
| 11     | .21   | -     |     |     |     | .30   | .30    | 210      | 859    | 195    | 300    | 751    |
| 12     | .22   | -     |     |     |     | .30   | .90    | 631      | 343    | 195    | 299    | 743    |
| 13     | .21   | -     |     |     |     | .30   | .90    | 975      | 300    | 298    | 460    | 732    |
| 14     | .21   | -     |     |     |     | .30   | 1.0    | 1,290    | 171    | 388    | 563    | 723    |
| 15     | .21   | -     |     |     |     | .30   | .90    | 878      | 174    | 389    | 561    | 713    |
| 16     | .19   | -     |     |     |     | .30   | .76    | 467      | 166    | 392    | 560    | 726    |
| 17     | .18   | -     |     |     |     | .30   | .64    | 462      | 174    | 410    | 558    | 751    |
| 18     | .18   | -     |     |     |     | .30   | .56    | 480      | 175    | 519    | 568    | 773    |
| 19     | .17   | -     |     |     |     | .30   | .70    | 479      | 176    | 569    | 597    | 773    |
| 20     | .17   | -     |     |     |     | .30   | .90    | 479      | 176    | 509    | 594    | 759    |
| 21     | .17   | -     |     |     |     | .30   | 1.2    | 478      | 178    | 426    | 592    | 784    |
| 22     | .17   | -     |     |     |     | .30   | 2.0    | 442      | 179    | 484    | 624    | 807    |
| 23     | .16   | -     |     |     |     | .30   | 2.0    | 375      | 181    | 660    | 649    | 805    |
| 24     | .16   | -     |     |     |     | .30   | 1.8    | 349      | 182    | 678    | 682    | 850    |
| 25     | .15   | -     |     |     |     | .30   | 1.5    | 411      | 184    | 493    | 698    | 868    |
| 26     | .13   | -     |     |     |     | .40   | 1.2    | 727      | 186    | 317    | 694    | 839    |
| 27     | .12   | -     |     |     |     | .40   | 1.2    | 1,380    | 188    | 242    | 690    | 841    |
| 28     | .10   | -     |     |     |     | .40   | 1.3    | 1,810    | 290    | 260    | 685    | 830    |
| 29     | .10   | -     |     |     |     | .40   | 1.5    | 2,100    | 1,170  | 385    | 723    | 822    |
| 30     | .09   | -     |     |     |     | .40   | 2.0    | 2,060    | 516    | 356    | 752    | 818    |
| 31     | .09   | ----- |     |     |     | .40   | -----  | 2,060    | -----  | 261    | 747    | -----  |
| TOTAL  | 6.59  | -     |     |     |     | 9.90  | 31.17  | 18,568.8 | 16,987 | 11,076 | 15,883 | 23,057 |
| MEAN   | .21   | -     |     |     |     | .32   | 1.04   | 599      | 566    | 357    | 512    | 769    |
| MAX    | .38   | -     |     |     |     | .40   | 2.0    | 2,100    | 2,030  | 678    | 752    | 868    |
| MIN    | .09   | -     |     |     |     | .30   | .35    | 2.0      | 166    | 192    | 254    | 709    |
| AC-FT  | 13    | -     |     |     |     | 20    | 62     | 36,830   | 33,690 | 21,970 | 31,500 | 45,730 |
| MEAN†  | 63.5  | -     |     |     |     | 36.0  | 171    | 758      | 816    | 499    | 223    | 98.1   |
| CFSM†  | .99   | -     |     |     |     | .56   | 2.66   | 11.8     | 12.7   | 7.76   | 3.47   | 1.53   |
| IN.†   | 1.14  | -     |     |     |     | .65   | 2.96   | 13.59    | 14.16  | 8.95   | 4.00   | 1.70   |
| AC-FT† | 3,900 | -     |     |     |     | 2,210 | 10,160 | 46,610   | 48,540 | 30,680 | 13,700 | 5,840  |

CAL YR 1970 TOTAL - MEAN - MAX - MIN - AC-FT -  
WAT YR 1971 TOTAL - MEAN - MAX - MIN - AC-FT -

† Adjusted for change in contents and evaporation in Lake Sherburne.  
NOTE.--No gage-height record Mar. 1-31.

05017500 St Mary River near Babb, Mont.

LOCATION.--Lat 48°50'00", long 113°25'08", in NW1/4 sec.34, T.36 N., R.14 W., Glacier County, on right bank 0.7 mile upstream from outlet of Lower St. Mary Lake and 2.0 miles southeast of Babb.

DRAINAGE AREA.--278 sq mi.

PERIOD OF RECORD.--July 1901 to October 1902, May 1910 to September 1925, October 1950 to current year. Monthly discharge only for some periods, published in WSP 1308. Published as "at Main" 1901-2, and as "below Swiftcurrent Creek, at Babb" 1910-15. April 1902 to September 1915, May 1929 to September 1950 at sites about 1.5 miles downstream; records not equivalent because flow of Swiftcurrent Creek not included 1905-15 and because diversion by St. Mary Canal not included 1929-50.

GAGE.--Water-stage recorder. Datum of gage is 4,468.13 ft above mean sea level. Prior to Oct. 1, 1915, water-stage recorder or nonrecording gages at several sites about 3.8 miles downstream at different datums. Oct. 1, 1915, to Sept. 30, 1925, water-stage recorder or nonrecording gages at several sites within 1.5 miles downstream at different datums.

AVERAGE DISCHARGE.--37 years (1901-2, 1910-25, 1950-71), 792 cfs (573,800 acre-ft per year), unadjusted.

EXTREMES.--Current year: Maximum discharge, 5,160 cfs May 31 (gage height, 6.84 ft); minimum daily, 80 cfs Jan. 12, 13.

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

REMARKS.--Records good. Entire flow of Swiftcurrent Creek below Lake Sherburne is diverted into Lower St. Mary Lake above station. Flow of Swiftcurrent Creek regulated by Lake Sherburne (see p. 17 ), since 1919. Since October 1950, monthly discharge and runoff figures adjusted for change in contents (adjusted for evaporation since October 1961) in Lake Sherburne.

REVISIONS (WATER YEARS).--WSP 1308: 1913-14, 1920, 1922-24. WSP 1508: 1902.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY    | OCT    | NOV   | DEC   | JAN    | FEB    | MAR   | APR    | MAY     | JUN     | JUL     | AUG    | SEP    |
|--------|--------|-------|-------|--------|--------|-------|--------|---------|---------|---------|--------|--------|
| 1      | 252    | 103   | 140   | 99     | 168    | 147   | 92     | 835     | 5,090   | 2,480   | 1,390  | 1,240  |
| 2      | 247    | 102   | 137   | 95     | 177    | 144   | 89     | 846     | 4,900   | 2,280   | 1,370  | 1,220  |
| 3      | 240    | 100   | 130   | 95     | 180    | 141   | 89     | 894     | 4,250   | 2,220   | 1,410  | 1,200  |
| 4      | 237    | 98    | 130   | 90     | 179    | 141   | 87     | 1,030   | 3,570   | 2,170   | 1,430  | 1,180  |
| 5      | 225    | 98    | 120   | 90     | 175    | 135   | 87     | 1,240   | 3,300   | 2,090   | 1,440  | 1,160  |
| 6      | 229    | 97    | 109   | 91     | 175    | 132   | 89     | 1,500   | 3,340   | 1,950   | 1,440  | 1,130  |
| 7      | 228    | 97    | 118   | 88     | 170    | 125   | 92     | 1,700   | 3,620   | 1,850   | 1,420  | 1,110  |
| 8      | 219    | 96    | 132   | 87     | 165    | 122   | 94     | 1,770   | 3,750   | 1,730   | 1,390  | 1,090  |
| 9      | 214    | 97    | 133   | 85     | 169    | 117   | 98     | 1,880   | 3,830   | 1,630   | 1,360  | 1,080  |
| 10     | 215    | 99    | 132   | 85     | 171    | 115   | 110    | 1,990   | 3,830   | 1,600   | 1,330  | 1,090  |
| 11     | 205    | 100   | 126   | 85     | 169    | 110   | 112    | 2,100   | 3,710   | 1,630   | 1,300  | 1,060  |
| 12     | 201    | 100   | 105   | 80     | 168    | 110   | 117    | 2,400   | 3,300   | 1,630   | 1,260  | 1,050  |
| 13     | 194    | 99    | 95    | 80     | 175    | 105   | 120    | 2,930   | 2,960   | 1,610   | 1,230  | 1,030  |
| 14     | 189    | 99    | 95    | 85     | 185    | 103   | 127    | 3,480   | 2,790   | 1,650   | 1,300  | 1,000  |
| 15     | 184    | 99    | 100   | 90     | 187    | 100   | 141    | 3,620   | 2,660   | 1,690   | 1,310  | 975    |
| 16     | 175    | 100   | 104   | 97     | 192    | 100   | 156    | 3,280   | 2,490   | 1,720   | 1,300  | 979    |
| 17     | 164    | 100   | 108   | 99     | 192    | 100   | 168    | 2,860   | 2,290   | 1,780   | 1,260  | 984    |
| 18     | 157    | 99    | 110   | 100    | 190    | 98    | 180    | 2,590   | 2,080   | 1,890   | 1,220  | 981    |
| 19     | 152    | 98    | 110   | 107    | 188    | 94    | 186    | 2,330   | 1,930   | 2,020   | 1,190  | 982    |
| 20     | 146    | 105   | 115   | 115    | 184    | 94    | 200    | 2,130   | 1,860   | 2,070   | 1,170  | 1,040  |
| 21     | 146    | 109   | 115   | 118    | 178    | 95    | 237    | 1,960   | 1,890   | 2,060   | 1,140  | 1,010  |
| 22     | 139    | 108   | 110   | 117    | 175    | 90    | 278    | 1,820   | 2,000   | 2,050   | 1,120  | 1,010  |
| 23     | 138    | 103   | 110   | 118    | 169    | 90    | 334    | 1,680   | 2,220   | 2,150   | 1,130  | 1,000  |
| 24     | 135    | 100   | 110   | 128    | 167    | 96    | 412    | 1,580   | 2,450   | 2,270   | 1,140  | 1,000  |
| 25     | 129    | 110   | 108   | 144    | 164    | 96    | 526    | 1,600   | 2,600   | 2,220   | 1,150  | 1,020  |
| 26     | 124    | 117   | 108   | 148    | 161    | 100   | 616    | 1,820   | 2,750   | 2,000   | 1,150  | 1,020  |
| 27     | 121    | 124   | 106   | 151    | 155    | 98    | 696    | 2,510   | 2,820   | 1,770   | 1,130  | 1,010  |
| 28     | 118    | 131   | 103   | 149    | 149    | 94    | 762    | 3,450   | 2,680   | 1,640   | 1,120  | 1,010  |
| 29     | 113    | 136   | 101   | 147    | -----  | 92    | 805    | 4,420   | 3,010   | 1,600   | 1,110  | 998    |
| 30     | 108    | 135   | 99    | 159    | -----  | 92    | 827    | 4,890   | 2,910   | 1,560   | 1,180  | 991    |
| 31     | 105    | ----- | 101   | 166    | -----  | 92    | -----  | 5,100   | -----   | 1,470   | 1,220  | -----  |
| TOTAL  | 5,449  | 3,159 | 3,520 | 3,388  | 4,877  | 3,368 | 7,927  | 72,235  | 90,880  | 58,480  | 39,110 | 31,650 |
| MEAN   | 176    | 105   | 114   | 109    | 174    | 109   | 264    | 2,330   | 3,029   | 1,886   | 1,262  | 1,055  |
| MAX    | 252    | 136   | 140   | 166    | 192    | 147   | 827    | 5,100   | 5,090   | 2,480   | 1,440  | 1,240  |
| MIN    | 105    | 96    | 95    | 80     | 149    | 90    | 87     | 835     | 1,860   | 1,470   | 1,110  | 975    |
| AC-FT  | 10,810 | 6,270 | 6,980 | 6,720  | 9,670  | 6,680 | 15,720 | 143,300 | 180,300 | 116,000 | 77,570 | 62,780 |
| MEAN†  | 239    | 150   | 161   | 165    | 234    | 144   | 434    | 2,489   | 3,279   | 2,028   | 972    | 385    |
| CFSM†  | .86    | .54   | .58   | .59    | .84    | .52   | 1.56   | 8.95    | 11.8    | 7.29    | 3.50   | 1.38   |
| IN.†   | .99    | .60   | .67   | .68    | .88    | .60   | 1.74   | 10.33   | 13.16   | 8.41    | 4.03   | 1.54   |
| AC-FT† | 14,700 | 8,930 | 9,900 | 10,130 | 13,010 | 8,870 | 25,820 | 153,100 | 195,100 | 124,700 | 59,770 | 22,880 |

## OBSERVED

|             |       |         |      |     |     |       |     |    |       |         |
|-------------|-------|---------|------|-----|-----|-------|-----|----|-------|---------|
| CAL YR 1970 | TOTAL | 275,518 | MEAN | 755 | MAX | 5,060 | MIN | 60 | AC-FT | 546,500 |
| WTR YR 1971 | TOTAL | 324,043 | MEAN | 888 | MAX | 5,100 | MIN | 80 | AC-FT | 642,700 |

## ADJUSTED

|             |       |         |      |     |      |      |     |       |       |         |
|-------------|-------|---------|------|-----|------|------|-----|-------|-------|---------|
| CAL YR 1970 | TOTAL | 277,040 | MEAN | 759 | CFSM | 2.73 | IN. | 37.07 | AC-FT | 549,500 |
| WTR YR 1971 | TOTAL | 326,124 | MEAN | 893 | CFSM | 3.21 | IN. | 43.64 | AC-FT | 646,900 |

† Adjusted for change in contents and evaporation in Lake Sherburne.



## SASKATCHEWAN RIVER BASIN

05018500 St. Mary Canal at St. Mary Crossing, near Babb, Mont.

(International gaging station)

LOCATION.--Lat 48°56'50", long 113°22'28", in NE 1/4 SW 1/4 sec.19, T.37 N., R.13 W., Glacier County, on left bank 50 ft upstream from inlet of St. Mary siphon, 6.6 miles northeast of Babb, and 9 miles downstream from intake.

PERIOD OF RECORD.--July 1918 to current season (seasonal records only). Monthly discharge only for some periods, published in WSP 1308, 1728.

GAGE.--Water-stage recorder and concrete control. Altitude of gage is 4,450 ft (revised), from topographic map. Prior to June 14, 1951, water-stage recorder at several sites 0.8 mile downstream at different datums.

EXTREMES.--Period of record: Maximum daily discharge, 767 cfs June 19, 28, 1936; no flow at times each year.

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

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

## DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR 1971

| DAY   | JAN | FEB   | MAR | APR   | MAY     | JUN     | JUL    | AUG    | SEP    | OCT   | NOV   | DEC |
|-------|-----|-------|-----|-------|---------|---------|--------|--------|--------|-------|-------|-----|
| 1     |     |       | -   |       | 0       | 10      | 699    | 695    | 708    | 694   | 0     |     |
| 2     |     |       | -   |       | 0       | 9.4     | 693    | 695    | 708    | 691   | 0     |     |
| 3     |     |       | -   |       | 0       | 8.3     | 690    | 704    | 709    | 669   | -     |     |
| 4     |     |       | -   |       | 0       | 7.7     | 689    | 704    | 708    | 575   | -     |     |
| 5     |     |       | -   |       | 0       | 7.5     | 686    | 705    | 707    | 341   | -     |     |
| 6     |     |       | -   |       | 0       | 7.6     | 689    | 706    | 705    | 314   | -     |     |
| 7     |     |       | -   |       | 0       | 8.2     | 696    | 704    | 705    | 291   | -     |     |
| 8     |     |       | -   |       | 0       | 7.7     | 700    | 703    | 704    | 153   | -     |     |
| 9     |     |       | -   |       | 0       | 7.3     | 695    | 701    | 704    | 144   | -     |     |
| 10    |     |       | -   |       | 22      | 6.7     | 695    | 700    | 704    | 143   | -     |     |
| 11    |     |       | -   |       | 169     | 6.3     | 697    | 699    | 703    | 142   | -     |     |
| 12    |     |       | -   |       | 303     | 5.9     | 705    | 696    | 701    | 92    | -     |     |
| 13    |     |       | -   |       | 453     | 5.6     | 705    | 694    | 698    | 10    | -     |     |
| 14    |     |       | -   |       | 567     | 5.5     | 708    | 697    | 699    | 0     | -     |     |
| 15    |     |       | -   |       | 605     | 5.4     | 709    | 698    | 696    | 0     | -     |     |
| 16    |     |       | -   |       | 620     | 5.0     | 709    | 701    | 696    | 0     | -     |     |
| 17    |     |       | -   |       | 658     | 4.7     | 710    | 704    | 695    | 0     | -     |     |
| 18    |     |       | -   |       | 672     | 41      | 713    | 704    | 696    | 0     | -     |     |
| 19    |     |       | -   |       | 684     | 204     | 715    | 703    | 698    | 0     | -     |     |
| 20    |     |       | -   |       | 697     | 364     | 718    | 702    | 697    | 0     | -     |     |
| 21    |     |       | -   |       | 668     | 539     | 719    | 700    | 692    | 0     | -     |     |
| 22    |     |       | -   |       | 458     | 650     | 718    | 699    | 692    | 0     | -     |     |
| 23    |     |       | -   |       | 176     | 686     | 719    | 699    | 692    | 0     | -     |     |
| 24    |     |       | -   |       | 21      | 706     | 721    | 700    | 692    | 0     | -     |     |
| 25    |     |       | -   |       | 16      | 712     | 723    | 701    | 694    | 0     | -     |     |
| 26    |     |       | -   |       | 14      | 713     | 720    | 701    | 695    | 0     | -     |     |
| 27    |     |       | -   |       | 13      | 717     | 715    | 700    | 694    | 0     | -     |     |
| 28    |     |       | -   |       | 11      | 716     | 710    | 700    | 693    | 0     | -     |     |
| 29    |     | ----- | -   |       | 10      | 698     | 705    | 700    | 694    | 0     | -     |     |
| 30    |     | ----- | 0   |       | 8.4     | 655     | 704    | 703    | 693    | 0     | -     |     |
| 31    |     | ----- | 0   | ----- | 9.6     | -----   | 700    | 705    | -----  | 0     | ----- |     |
| TOTAL |     |       | -   | 0     | 6,855.0 | 7,519.8 | 21,875 | 21,723 | 20,972 | 4,259 | -     |     |
| MEAN  |     |       | -   | 0     | 221     | 251     | 706    | 701    | 699    | 137   | -     |     |
| MAX   |     |       | -   | 0     | 697     | 717     | 723    | 706    | 709    | 694   | -     |     |
| MIN   |     |       | -   | 0     | 0       | 4.7     | 686    | 694    | 692    | 0     | -     |     |
| AC-FT |     |       | -   | 0     | 13,600  | 14,920  | 43,390 | 43,090 | 41,600 | 8,450 | -     |     |

THE SEASON APRIL TO OCTOBER

AC-FT 165,000

05020500 St. Mary River at international boundary

(International gaging station)

LOCATION.--Lat 49°00'12", long 113°18'48", in Sw<sup>1</sup>/<sub>4</sub> sec. 5, T.1, R.25 W., fourth meridian, in Alberta, on right bank 0.4 mile north of international boundary, 2.5 miles downstream from Boundary Creek, 7.5 miles southwest of Kimball, Alberta, and 11.5 miles northeast of Babb, Mont.

DRAINAGE AREA.--469 sq mi.

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

GAGE.--Water-stage recorder. Altitude of gage is 4,120 ft (from topographic map). Prior to Jan. 1, 1913, non-recording gages at two sites within 0.3 mile of present site at different datums. Jan. 1, 1913, to Oct. 25, 1955, water-stage recorder at several sites about 8 miles downstream from present site at various datums. Oct. 26, 1955, to Mar. 23, 1965, water-stage recorder at site 100 ft upstream at datum 2 ft higher.

AVERAGE DISCHARGE.--14 years (1902-16), prior to operation of St. Mary Canal, 1,003 cfs (726,700 acre-ft per year); 54 years (1916-71), 704 cfs (510,000 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 5,710 cfs May 31 (gage height, 8.44 ft); minimum daily, 111 cfs Jan. 14.

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

REMARKS.--Records good except those for winter period, which are poor. Since 1917, St. Mary Canal has diverted water from the river near Babb, Mont. to North Fork Milk River (see p. 20). Some regulation by Lake Sherburne on Swiftcurrent Creek (see p. 17).

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

REVISIONS (WATER YEARS).--WSP 1308: 1908-12. WSP 1508: 1902, 1908-9.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT    | NOV     | DEC    | JAN   | FEB    | MAR    | APR    | MAY     | JUN     | JUL     | AUG    | SEP    |
|-------------|--------|---------|--------|-------|--------|--------|--------|---------|---------|---------|--------|--------|
| 1           | 309    | 150     | 220    | 138   | 210    | 191    | 207    | 1,020   | 5,580   | 2,250   | 839    | 564    |
| 2           | 300    | 146     | 234    | 132   | 214    | 204    | 191    | 1,060   | 5,310   | 2,080   | 797    | 558    |
| 3           | 296    | 144     | 224    | 131   | 220    | 201    | 197    | 1,140   | 4,760   | 1,950   | 818    | 546    |
| 4           | 288    | 142     | 204    | 125   | 207    | 188    | 203    | 1,350   | 3,990   | 1,850   | 839    | 529    |
| 5           | 279    | 147     | 204    | 125   | 201    | 186    | 226    | 1,600   | 3,720   | 1,740   | 846    | 502    |
| 6           | 281    | 145     | 186    | 136   | 198    | 176    | 248    | 2,040   | 3,840   | 1,590   | 846    | 474    |
| 7           | 284    | 141     | 178    | 142   | 204    | 178    | 267    | 2,140   | 4,150   | 1,460   | 825    | 452    |
| 8           | 276    | 140     | 191    | 142   | 201    | 171    | 240    | 2,170   | 4,330   | 1,300   | 783    | 426    |
| 9           | 274    | 141     | 210    | 129   | 210    | 161    | 249    | 2,310   | 4,310   | 1,190   | 734    | 421    |
| 10          | 270    | 141     | 214    | 119   | 224    | 163    | 269    | 2,300   | 4,250   | 1,180   | 708    | 421    |
| 11          | 269    | 140     | 217    | 113   | 248    | 166    | 222    | 2,260   | 4,150   | 1,210   | 678    | 403    |
| 12          | 264    | 143     | 168    | 116   | 255    | 161    | 209    | 2,430   | 3,780   | 1,180   | 630    | 385    |
| 13          | 253    | 139     | 154    | 116   | 349    | 149    | 214    | 2,820   | 3,450   | 1,140   | 594    | 372    |
| 14          | 245    | 136     | 147    | 111   | 327    | 147    | 228    | 3,170   | 3,280   | 1,160   | 648    | 354    |
| 15          | 237    | 144     | 156    | 121   | 322    | 140    | 274    | 3,230   | 3,090   | 1,190   | 660    | 322    |
| 16          | 230    | 138     | 161    | 127   | 345    | 138    | 271    | 2,930   | 2,890   | 1,210   | 642    | 331    |
| 17          | 218    | 139     | 145    | 132   | 358    | 132    | 272    | 2,540   | 2,680   | 1,270   | 600    | 340    |
| 18          | 208    | 137     | 142    | 136   | 345    | 134    | 274    | 2,310   | 2,400   | 1,370   | 558    | 336    |
| 19          | 202    | 136     | 147    | 149   | 300    | 136    | 289    | 2,020   | 2,090   | 1,480   | 529    | 340    |
| 20          | 195    | 140     | 147    | 156   | 271    | 136    | 323    | 1,790   | 1,850   | 1,530   | 507    | 417    |
| 21          | 198    | 145     | 152    | 149   | 287    | 132    | 417    | 1,720   | 1,700   | 1,540   | 474    | 399    |
| 22          | 187    | 154     | 156    | 147   | 279    | 125    | 483    | 1,820   | 1,740   | 1,530   | 452    | 390    |
| 23          | 190    | 152     | 161    | 147   | 259    | 132    | 564    | 1,910   | 1,950   | 1,600   | 458    | 390    |
| 24          | 181    | 149     | 158    | 154   | 248    | 138    | 673    | 1,910   | 2,160   | 1,700   | 469    | 381    |
| 25          | 181    | 156     | 163    | 161   | 234    | 142    | 813    | 2,000   | 2,280   | 1,680   | 474    | 385    |
| 26          | 168    | 163     | 168    | 171   | 227    | 168    | 825    | 2,320   | 2,470   | 1,460   | 474    | 394    |
| 27          | 168    | 183     | 161    | 186   | 207    | 173    | 870    | 3,040   | 2,500   | 1,230   | 463    | 390    |
| 28          | 167    | 207     | 158    | 198   | 198    | 176    | 930    | 3,990   | 2,330   | 1,140   | 441    | 390    |
| 29          | 163    | 207     | 156    | 188   | -----  | 194    | 998    | 4,800   | 2,780   | 1,050   | 441    | 381    |
| 30          | 157    | 227     | 140    | 186   | -----  | 220    | 1,020  | 5,250   | 2,720   | 1,010   | 507    | 367    |
| 31          | 153    | -----   | 142    | 191   | -----  | 234    | -----  | 5,580   | -----   | 937     | 564    | -----  |
| TOTAL       | 7,391  | 4,572   | 5,364  | 4,474 | 7,148  | 5,092  | 12,466 | 76,970  | 96,530  | 44,207  | 19,298 | 12,360 |
| MEAN        | 229    | 152     | 173    | 144   | 255    | 164    | 416    | 2,483   | 3,218   | 1,426   | 623    | 412    |
| MAX         | 309    | 227     | 234    | 198   | 358    | 234    | 1,020  | 5,580   | 5,580   | 2,250   | 846    | 564    |
| MIN         | 153    | 136     | 140    | 111   | 198    | 125    | 191    | 1,020   | 1,700   | 937     | 441    | 322    |
| AC-FT       | 14,070 | 9,070   | 10,640 | 8,870 | 14,180 | 10,100 | 24,730 | 152,700 | 191,500 | 87,680  | 38,280 | 24,520 |
| CAL YR 1970 | TOTAL  | 242,556 | MEAN   | 665   | MAX    | 5,820  | MIN    | 82      | AC-FT   | 481,100 |        |        |
| WTR YR 1971 | TOTAL  | 295,572 | MEAN   | 810   | MAX    | 5,580  | MIN    | 111     | AC-FT   | 586,300 |        |        |

NOTE.--Stage-discharge relation affected by ice Nov. 20 to Apr. 2.

## MISSOURI RIVER MAIN STEM

06015300 Clark Canyon Reservoir near Grant, Mont.

LOCATION.--Lat 45°00'06", long 112°51'27", in SE $\frac{1}{4}$ SW $\frac{1}{4}$  sec.32, T.9 S., R.10 W., Beaverhead County, in shaft house near left end of dam on Beaverhead River, 1.5 miles upstream from Clark Canyon Creek, and 10 miles east of Grant.

DRAINAGE AREA.--2,321 sq mi.

PERIOD OF RECORD.--May 1964 to current year (monthend contents only).

GAGE.--Water-stage recorder in shaft house. Datum of gage is at mean sea level (levels by Bureau of Reclamation).

EXTREMES.--Current year: Maximum contents, 185,000 acre-ft July 1-3 (elevation, 5,547.44 ft); minimum, 134,900 acre-ft Oct. 16 (elevation, 5,537.32 ft).

Period of record: Maximum daily contents, 185,000 acre-ft July 1-3, 1971 (elevation, 5,547.44 ft); minimum since normal operating level was reached, 71,900 acre-ft Sept. 29 to Oct. 1, 1966 (elevation, 5,521.24 ft).

REMARKS.--Reservoir is formed by zoned earthfill dam with concrete control works and spillway completed in October 1964. Storage began Aug. 28, 1964 (uncontrolled storage began June 10, 1964). Usable capacity, 328,900 acre-ft between elevation 5,455.0 ft (invert of outlet works) and 5,571.9 ft (maximum water surface). Elevation of crest of uncontrolled spillway, 5,560.4 ft. Dead storage, 61 acre-ft below elevation 5,455.0 ft. Normal operating level, 177,500 acre-ft (elevation, 5,546.0 ft). Minimum operating level, 1,450 acre-ft (elevation, 5,470.6 ft). Figures given herein represent usable contents. Water is used for irrigation, flood control and recreation.

COOPERATION.--Elevations and capacity table furnished by Bureau of Reclamation.

## MONTHEND ELEVATION AND CONTENTS, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| Date        |    | Elevation<br>(feet)† | Contents<br>(acre-feet) | Change in contents<br>(acre-feet) |
|-------------|----|----------------------|-------------------------|-----------------------------------|
| Sept.       | 30 | 5,537.70             | 136,700                 | -                                 |
| Oct.        | 31 | 5,538.23             | 139,200                 | +2,500                            |
| Nov.        | 30 | 5,538.73             | 141,500                 | +2,300                            |
| Dec.        | 31 | 5,538.25             | 139,300                 | -2,200                            |
| CAL YR 1970 |    |                      |                         | -2,700                            |
| Jan.        | 31 | 5,538.23             | 139,200                 | -100                              |
| Feb.        | 28 | 5,537.91             | 137,700                 | -1,500                            |
| Mar.        | 31 | 5,537.81             | 137,200                 | -500                              |
| Apr.        | 30 | 5,539.10             | 143,300                 | +6,100                            |
| May         | 31 | 5,543.52             | 164,900                 | +21,600                           |
| June        | 30 | 5,547.40             | 184,800                 | +19,900                           |
| July        | 31 | 5,545.27             | 173,700                 | -11,100                           |
| Aug.        | 31 | 5,539.74             | 146,300                 | -27,400                           |
| Sept.       | 30 | 5,537.82             | 137,300                 | -9,000                            |
| WTR YR 1971 |    |                      |                         | +600                              |

† Elevations at 2400.

LOCATION.--Lat 45°00'12", long 112°51'10", in NW1/4SE1/4 sec.32, T.9 S., R.10 W., Beaverhead County, on right bank 0.4 mile downstream from Clark Canyon Dam, 1.3 miles upstream from Clark Canyon Creek, and 10.3 miles east of Grant.

AVERAGE DISCHARGE.--9 years, 365 cfs (264,400 acre-ft per year).

Period of record: Maximum discharge, 2,110 cfs Feb. 7, 1963 (gage height, 7.19 ft); minimum, no flow for part of Oct. 1, 1968 (gates in dam closed); minimum daily, 39 cfs Sept. 30, 1968.

REMARKS.--Records good. Diversions for irrigation of about 76,500 acres above station. Flow completely regulated by Clark Canyon Reservoir (see preceding page).

| DAY         | OCT           | NOV    | DEC      | JAN     | FEB     | MAR           | APR    | MAY    | JUN    | JUL    | AUG    | SEP    |
|-------------|---------------|--------|----------|---------|---------|---------------|--------|--------|--------|--------|--------|--------|
| 1           | 452           | 425    | 421      | 320     | 288     | 364           | 348    | 502    | 955    | 940    | 815    | 790    |
| 2           | 452           | 425    | 416      | 316     | 288     | 364           | 348    | 502    | 960    | 945    | 810    | 790    |
| 3           | 448           | 425    | 425      | 316     | 288     | 364           | 348    | 569    | 955    | 940    | 800    | 805    |
| 4           | 448           | 425    | 425      | 312     | 340     | 364           | 348    | 700    | 960    | 940    | 795    | 805    |
| 5           | 421           | 425    | 421      | 300     | 376     | 364           | 348    | 695    | 960    | 940    | 835    | 815    |
| 6           | 448           | 421    | 421      | 296     | 376     | 364           | 348    | 690    | 955    | 945    | 855    | 820    |
| 7           | 443           | 425    | 412      | 296     | 376     | 364           | 421    | 695    | 955    | 940    | 840    | 820    |
| 8           | 443           | 425    | 389      | 300     | 380     | 364           | 511    | 705    | 960    | 940    | 830    | 825    |
| 9           | 443           | 421    | 389      | 300     | 380     | 288           | 511    | 705    | 955    | 940    | 820    | 835    |
| 10          | 443           | 425    | 394      | 296     | 380     | 140           | 506    | 710    | 955    | 945    | 810    | 835    |
| 11          | 439           | 421    | 389      | 296     | 376     | 187           | 502    | 775    | 950    | 945    | 725    | 840    |
| 12          | 439           | 421    | 389      | 292     | 376     | 360           | 506    | 915    | 955    | 895    | 675    | 840    |
| 13          | 439           | 421    | 389      | 272     | 376     | 360           | 502    | 945    | 955    | 890    | 685    | 845    |
| 14          | 439           | 421    | 394      | 272     | 376     | 356           | 502    | 945    | 950    | 641    | 695    | 850    |
| 15          | 443           | 421    | 389      | 268     | 376     | 356           | 506    | 940    | 950    | 740    | 705    | 950    |
| 16          | 443           | 425    | 389      | 268     | 376     | 356           | 506    | 945    | 950    | 940    | 740    | 855    |
| 17          | 204           | 421    | 376      | 268     | 376     | 284           | 497    | 945    | 950    | 945    | 850    | 855    |
| 18          | 146           | 421    | 368      | 268     | 376     | 134           | 497    | 950    | 950    | 945    | 855    | 855    |
| 19          | 149           | 421    | 364      | 268     | 376     | 197           | 497    | 950    | 950    | 945    | 860    | 855    |
| 20          | 149           | 421    | 364      | 272     | 372     | 352           | 502    | 950    | 945    | 855    | 865    | 860    |
| 21          | 152           | 425    | 368      | 272     | 372     | 352           | 502    | 945    | 945    | 705    | 870    | 850    |
| 22          | 300           | 421    | 368      | 272     | 372     | 352           | 497    | 945    | 945    | 885    | 880    | 855    |
| 23          | 389           | 425    | 368      | 272     | 372     | 352           | 502    | 955    | 950    | 965    | 885    | 850    |
| 24          | 394           | 425    | 372      | 276     | 372     | 352           | 506    | 960    | 945    | 965    | 890    | 850    |
| 25          | 394           | 412    | 368      | 276     | 368     | 348           | 497    | 960    | 950    | 975    | 895    | 850    |
| 26          | 243           | 416    | 368      | 276     | 368     | 348           | 497    | 965    | 940    | 880    | 900    | 840    |
| 27          | 162           | 412    | 368      | 276     | 368     | 348           | 506    | 965    | 940    | 810    | 905    | 840    |
| 28          | 162           | 416    | 372      | 280     | 368     | 348           | 502    | 955    | 940    | 815    | 900    | 840    |
| 29          | 166           | 416    | 360      | 280     | -----   | 348           | 502    | 955    | 945    | 825    | 905    | 835    |
| 30          | 320           | 416    | 336      | 284     | -----   | 348           | 502    | 950    | 945    | 830    | 855    | 835    |
| 31          | 425           | -----  | 320      | 284     | -----   | 348           | -----  | 950    | -----  | 825    | 790    | -----  |
| TOTAL       | 10,838        | 12,640 | 11,892   | 8,844   | 10,188  | 10,126        | 14,067 | 26,238 | 28,520 | 27,426 | 25,540 | 25,090 |
| MEAN        | 350           | 421    | 384      | 285     | 364     | 327           | 469    | 846    | 951    | 885    | 824    | 836    |
| MAX         | 452           | 425    | 425      | 320     | 380     | 364           | 511    | 965    | 960    | 975    | 905    | 860    |
| MIN         | 146           | 412    | 320      | 268     | 288     | 134           | 348    | 502    | 940    | 641    | 675    | 790    |
| AC-FT       | 21,500        | 25,070 | 23,590   | 17,540  | 20,210  | 20,080        | 27,900 | 52,040 | 56,570 | 54,400 | 50,660 | 49,770 |
| CAL YR 1970 | TOTAL 165,828 |        | MEAN 454 | MAX 988 | MIN 98  | AC-FT 328,900 |        |        |        |        |        |        |
| WTR YR 1971 | TOTAL 211,409 |        | MEAN 579 | MAX 975 | MIN 134 | AC-FT 419,300 |        |        |        |        |        |        |



LOCATION.--Lat 45°06'59", long 112°04'59", in SW<sup>1</sup>SE<sup>4</sup> sec.19, T.8 S., R.9 W., Beaverhead County, on left bank 1 mile upstream from Barretts, 2 miles downstream from Grasshopper Creek, and 8.9 miles southwest of Dillon.

REMARKS.--Records good. Some regulation by Lima Reservoir (see p. 180) and nearly complete regulation by Clark Canyon Reservoir (see p. 23) since August 1964. Diversions for irrigation of about 90,000 acres above station. Records of chemical analyses and water temperatures for the current year are published in Part 2 of this report.

| DAY         | OCT           | NOV    | DEC      | JAN    | FEB       | MAR    | APR     | MAY    | JUN           | JUL    | AUG    | SEP    |
|-------------|---------------|--------|----------|--------|-----------|--------|---------|--------|---------------|--------|--------|--------|
| 1           | 524           | 528    | 509      | 390    | 528       | 433    | 464     | 758    | 1,500         | 1,220  | 845    | 845    |
| 2           | 524           | 524    | 500      | 385    | 440       | 428    | 450     | 737    | 1,500         | 1,200  | 840    | 856    |
| 3           | 528           | 514    | 505      | 385    | 428       | 437    | 450     | 780    | 1,470         | 1,200  | 850    | 867    |
| 4           | 528           | 514    | 505      | 394    | 420       | 442    | 446     | 968    | 1,380         | 1,190  | 856    | 867    |
| 5           | 505           | 533    | 505      | 390    | 482       | 442    | 446     | 990    | 1,340         | 1,180  | 884    | 867    |
| 6           | 519           | 528    | 509      | 365    | 473       | 442    | 455     | 996    | 1,310         | 1,160  | 928    | 872    |
| 7           | 519           | 524    | 505      | 365    | 459       | 433    | 514     | 1,010  | 1,270         | 1,140  | 923    | 906    |
| 8           | 524           | 524    | 491      | 365    | 455       | 437    | 626     | 1,010  | 1,280         | 1,120  | 923    | 906    |
| 9           | 533           | 528    | 486      | 365    | 455       | 411    | 621     | 1,000  | 1,270         | 1,120  | 917    | 906    |
| 10          | 538           | 528    | 477      | 360    | 459       | 273    | 626     | 1,050  | 1,290         | 1,090  | 895    | 912    |
| 11          | 538           | 514    | 473      | 360    | 459       | 285    | 606     | 1,070  | 1,380         | 1,100  | 845    | 912    |
| 12          | 543           | 519    | 464      | 360    | 468       | 433    | 601     | 1,190  | 1,380         | 1,090  | 774    | 912    |
| 13          | 543           | 524    | 455      | 340    | 482       | 437    | 596     | 1,280  | 1,340         | 872    | 774    | 912    |
| 14          | 548           | 509    | 455      | 340    | 473       | 437    | 591     | 1,310  | 1,310         | 774    | 774    | 917    |
| 15          | 543           | 500    | 455      | 340    | 482       | 433    | 626     | 1,330  | 1,290         | 791    | 780    | 917    |
| 16          | 538           | 514    | 459      | 340    | 477       | 433    | 626     | 1,310  | 1,270         | 1,040  | 785    | 912    |
| 17          | 402           | 519    | 455      | 340    | 464       | 411    | 606     | 1,310  | 1,270         | 1,060  | 878    | 912    |
| 18          | 332           | 519    | 446      | 345    | 459       | 266    | 601     | 1,320  | 1,260         | 1,060  | 900    | 912    |
| 19          | 336           | 519    | 437      | 345    | 459       | 281    | 601     | 1,290  | 1,260         | 1,050  | 889    | 912    |
| 20          | 336           | 519    | 437      | 345    | 450       | 420    | 611     | 1,270  | 1,250         | 1,020  | 884    | 917    |
| 21          | 332           | 505    | 442      | 350    | 428       | 424    | 636     | 1,260  | 1,240         | 801    | 884    | 912    |
| 22          | 407           | 486    | 442      | 350    | 433       | 428    | 662     | 1,270  | 1,240         | 878    | 878    | 900    |
| 23          | 505           | 500    | 437      | 350    | 442       | 433    | 657     | 1,240  | 1,260         | 1,030  | 872    | 889    |
| 24          | 509           | 528    | 437      | 355    | 446       | 437    | 699     | 1,210  | 1,230         | 1,040  | 872    | 884    |
| 25          | 500           | 533    | 437      | 360    | 446       | 450    | 683     | 1,220  | 1,230         | 1,030  | 878    | 884    |
| 26          | 424           | 519    | 442      | 360    | 437       | 459    | 731     | 1,220  | 1,230         | 979    | 878    | 889    |
| 27          | 324           | 509    | 437      | 365    | 428       | 509    | 720     | 1,240  | 1,330         | 862    | 878    | 889    |
| 28          | 328           | 509    | 433      | 370    | 428       | 468    | 726     | 1,260  | 1,340         | 856    | 878    | 884    |
| 29          | 328           | 509    | 428      | 380    | -----     | 464    | 774     | 1,290  | 1,330         | 856    | 889    | 878    |
| 30          | 407           | 519    | 407      | 450    | -----     | 473    | 812     | 1,330  | 1,260         | 856    | 912    | 889    |
| 31          | 524           | -----  | 394      | 530    | -----     | 482    | -----   | 1,400  | -----         | 856    | 850    | -----  |
| TOTAL       | 14,489        | 15,518 | 14,264   | 11,439 | 12,760    | 13,041 | 18,263  | 35,919 | 39,310        | 31,521 | 26,813 | 26,837 |
| MEAN        | 467           | 517    | 460      | 369    | 456       | 421    | 609     | 1,159  | 1,310         | 1,017  | 865    | 895    |
| MAX         | 548           | 533    | 509      | 530    | 528       | 509    | 812     | 1,400  | 1,500         | 1,220  | 928    | 917    |
| MIN         | 324           | 486    | 394      | 340    | 420       | 266    | 446     | 737    | 1,230         | 774    | 774    | 845    |
| AC-FT       | 28,740        | 30,780 | 28,290   | 22,690 | 25,310    | 25,870 | 36,220  | 71,250 | 77,970        | 62,520 | 53,180 | 53,230 |
| CAL YR 1970 | TOTAL 207,932 |        | MEAN 570 |        | MAX 1,47C |        | MIN 211 |        | AC-FT 412,400 |        |        |        |
| WTR YR 1971 | TOTAL 260,174 |        | MEAN 713 |        | MAX 1,500 |        | MIN 266 |        | AC-FT 516,100 |        |        |        |

## MISSOURI RIVER MAIN STEM

25

06017000 Beaverhead River at Dillon, Mont.

LOCATION.--Lat 45°13'06", long 112°39'15", on south line of sec.13, T.7 S., R.9 W., Beaverhead County, on right bank at old county bridge site on road to Jackson, at Dillon.

DRAINAGE AREA.--2,895 sq mi.

PERIOD OF RECORD.--August to September 1907 (gage heights only), October 1950 to September 1952, August 1963 to September 1971 (discontinued).

GAGE.--Water-stage recorder. Altitude of gage is 5,100 ft (from topographic map). Prior to Sept. 30, 1952, nonrecording gages at same site at different datum.

AVERAGE DISCHARGE.--10 years, 370 cfs (268,100 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 929 cfs June 29 (gage height, 5.47 ft); minimum daily, 165 cfs Aug. 14.

Period of record: Maximum discharge, 1,740 cfs June 21, 1964 (gage height, 6.63 ft); minimum observed, 18 cfs June 19, 20, 1952.

REMARKS.--Records food. Flow partly regulated by Lima Reservoir (see p. 180) and Clark Canyon Reservoir (see p. 23) since August 1964. Diversions for irrigation of about 125,400 acres of which about 22,700 acres lies below station.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY   | OCT    | NOV    | DEC    | JAN    | FEB    | MAR    | APR    | MAY    | JUN    | JUL    | AUG    | SEP    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 1     | 470    | 570    | 568    | 500    | 597    | 497    | 501    | 589    | 659    | 755    | 277    | 577    |
| 2     | 466    | 583    | 559    | 500    | 580    | 506    | 488    | 536    | 674    | 730    | 284    | 582    |
| 3     | 469    | 591    | 561    | 500    | 533    | 503    | 478    | 528    | 676    | 745    | 290    | 672    |
| 4     | 463    | 599    | 559    | 500    | 494    | 503    | 475    | 645    | 639    | 796    | 287    | 680    |
| 5     | 439    | 632    | 555    | 490    | 565    | 507    | 460    | 641    | 596    | 801    | 298    | 676    |
| 6     | 418    | 635    | 569    | 480    | 547    | 501    | 448    | 656    | 567    | 753    | 360    | 667    |
| 7     | 434    | 627    | 583    | 480    | 543    | 497    | 463    | 651    | 506    | 711    | 374    | 720    |
| 8     | 449    | 625    | 553    | 468    | 536    | 495    | 587    | 622    | 491    | 677    | 368    | 730    |
| 9     | 476    | 627    | 550    | 469    | 534    | 504    | 573    | 600    | 527    | 698    | 350    | 720    |
| 10    | 481    | 628    | 543    | 470    | 538    | 325    | 590    | 616    | 527    | 698    | 294    | 720    |
| 11    | 480    | 614    | 531    | 466    | 543    | 307    | 603    | 592    | 639    | 701    | 253    | 710    |
| 12    | 487    | 613    | 531    | 470    | 546    | 461    | 578    | 618    | 733    | 681    | 178    | 700    |
| 13    | 507    | 615    | 518    | 460    | 559    | 499    | 506    | 614    | 698    | 463    | 168    | 695    |
| 14    | 532    | 596    | 519    | 450    | 559    | 488    | 505    | 615    | 640    | 328    | 165    | 695    |
| 15    | 638    | 590    | 522    | 444    | 572    | 484    | 492    | 622    | 613    | 254    | 175    | 705    |
| 16    | 601    | 601    | 533    | 441    | 565    | 485    | 482    | 617    | 559    | 403    | 182    | 715    |
| 17    | 503    | 607    | 532    | 445    | 549    | 484    | 462    | 611    | 514    | 409    | 284    | 725    |
| 18    | 377    | 604    | 500    | 444    | 539    | 306    | 504    | 631    | 489    | 412    | 453    | 730    |
| 19    | 371    | 595    | 490    | 447    | 538    | 288    | 494    | 602    | 433    | 412    | 497    | 740    |
| 20    | 367    | 599    | 490    | 455    | 532    | 452    | 525    | 595    | 421    | 365    | 421    | 770    |
| 21    | 366    | 589    | 490    | 449    | 517    | 481    | 520    | 592    | 401    | 196    | 354    | 785    |
| 22    | 409    | 557    | 490    | 448    | 516    | 477    | 519    | 607    | 382    | 190    | 354    | 775    |
| 23    | 548    | 559    | 480    | 444    | 517    | 474    | 514    | 563    | 393    | 311    | 382    | 770    |
| 24    | 554    | 597    | 480    | 441    | 526    | 482    | 585    | 526    | 378    | 343    | 409    | 755    |
| 25    | 552    | 611    | 480    | 441    | 525    | 453    | 615    | 527    | 385    | 374    | 445    | 710    |
| 26    | 514    | 593    | 480    | 443    | 513    | 482    | 615    | 520    | 421    | 371    | 449    | 695    |
| 27    | 402    | 576    | 490    | 446    | 506    | 511    | 594    | 500    | 680    | 343    | 457    | 685    |
| 28    | 377    | 575    | 490    | 449    | 503    | 516    | 585    | 476    | 865    | 417    | 457    | 676    |
| 29    | 357    | 573    | 500    | 449    | -----  | 474    | 620    | 479    | 865    | 371    | 473    | 676    |
| 30    | 402    | 583    | 500    | 457    | -----  | 425    | 634    | 499    | 775    | 315    | 568    | 705    |
| 31    | 554    | -----  | 500    | 488    | -----  | 520    | -----  | 580    | -----  | 265    | 541    | -----  |
| TOTAL | 14,433 | 17,964 | 16,146 | 14,334 | 15,092 | 14,387 | 16,015 | 18,070 | 17,146 | 15,288 | 10,847 | 21,161 |
| MEAN  | 466    | 599    | 521    | 462    | 539    | 464    | 534    | 583    | 572    | 493    | 350    | 705    |
| MAX   | 608    | 635    | 583    | 500    | 597    | 520    | 634    | 656    | 865    | 801    | 568    | 785    |
| MIN   | 357    | 557    | 480    | 441    | 494    | 288    | 448    | 476    | 378    | 190    | 165    | 577    |
| AC-FT | 28,630 | 35,630 | 32,030 | 28,430 | 29,930 | 28,540 | 31,770 | 35,840 | 34,010 | 30,320 | 21,520 | 41,970 |

CAL YR 1970 TOTAL 151,363 MEAN 415 MAX 833 MIN 101 AC-FT 300,200  
WTR YR 1971 TOTAL 190,883 MEAN 523 MAX 865 MIN 165 AC-FT 378,600

## MISSOURI RIVER MAIN STEM

06018000 Beaverhead River near Dillon, Mont.

LOCATION.--Lat 45°18'18", long 112°33'45", in NW¼NE¼ sec.22, T.6 S., R.8 W., Beaverhead County, on right bank just upstream from county road bridge on Anderson lane, 7.0 miles northeast of Dillon.

DRAINAGE AREA.--3,484 sq mi.

PERIOD OF RECORD.--October 1950 to September 1952, August 1963 to current year.

GAGE.--Water-stage recorder. Altitude of gage is 4,960 ft (by barometer). Prior to September 1952, non-recording gage on upstream side of bridge at same datum.

AVERAGE DISCHARGE.--10 years, 376 cfs (272,400 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 886 cfs June 29 (gage height, 4.48 ft); maximum gage height, 4.65 ft Sept. 8 (backwater from vegetation); minimum daily discharge, 129 cfs Aug. 14.

Period of record: Maximum discharge, 1,570 cfs June 22, 1964 (gage height, 5.52 ft); maximum gage height, 6.35 ft Dec. 19, 1964 (backwater from ice); minimum discharge observed, 8.5 cfs June 21, 1952.

REMARKS.--Records good. Flow partly regulated by Lima Reservoir (see p. 180 ) and Clark Canyon Reservoir (see p. 23 ) since August 1964. Diversions above station for irrigation of about 133,400 acres of which about 5,000 acres are irrigated by imported water from Birch and Willow Creeks and of which about 17,100 acres lies below station including 600 acres in Ruby River drainage.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY   | OCT    | NOV    | DEC    | JAN    | FEB    | MAR    | APR    | MAY    | JUN    | JUL    | AUG    | SEP    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 1     | 470    | 584    | 698    | 525    | 626    | 550    | 547    | 603    | 526    | 792    | 182    | 626    |
| 2     | 446    | 594    | 680    | 520    | 626    | 556    | 533    | 552    | 597    | 756    | 190    | 627    |
| 3     | 446    | 598    | 668    | 510    | 588    | 551    | 519    | 550    | 646    | 734    | 194    | 707    |
| 4     | 427    | 605    | 657    | 490    | 529    | 559    | 515    | 620    | 624    | 757    | 202    | 746    |
| 5     | 420    | 633    | 649    | 470    | 540    | 562    | 505    | 674    | 587    | 789    | 210    | 734    |
| 6     | 379    | 633    | 660    | 490    | 560    | 559    | 493    | 670    | 556    | 758    | 251    | 726    |
| 7     | 400    | 627    | 688    | 520    | 574    | 550    | 489    | 670    | 520    | 716    | 275    | 764    |
| 8     | 412    | 627    | 675    | 540    | 575    | 549    | 607    | 660    | 483    | 655    | 274    | 800    |
| 9     | 434    | 631    | 679    | 518    | 572    | 561    | 615    | 614    | 509    | 672    | 273    | 779    |
| 10    | 438    | 641    | 669    | 511    | 573    | 426    | 615    | 591    | 519    | 718    | 241    | 752    |
| 11    | 447    | 639    | 645    | 500    | 589    | 391    | 636    | 556    | 611    | 709    | 236    | 729    |
| 12    | 475    | 642    | 630    | 500    | 599    | 508    | 614    | 523    | 724    | 676    | 166    | 699    |
| 13    | 496    | 655    | 613    | 500    | 618    | 569    | 546    | 507    | 686    | 529    | 141    | 689    |
| 14    | 492    | 661    | 607    | 500    | 625    | 558    | 527    | 502    | 634    | 391    | 129    | 686    |
| 15    | 578    | 658    | 609    | 498    | 639    | 553    | 517    | 519    | 570    | 316    | 132    | 683    |
| 16    | 580    | 668    | 617    | 499    | 625    | 550    | 512    | 516    | 507    | 389    | 135    | 716    |
| 17    | 567    | 680    | 617    | 503    | 616    | 547    | 477    | 494    | 467    | 399    | 169    | 737    |
| 18    | 370    | 680    | 600    | 502    | 605    | 408    | 514    | 500    | 432    | 367    | 296    | 736    |
| 19    | 397    | 683    | 600    | 504    | 606    | 361    | 506    | 493    | 382    | 389    | 357    | 740    |
| 20    | 389    | 680    | 595    | 508    | 592    | 482    | 535    | 482    | 379    | 351    | 330    | 759    |
| 21    | 385    | 683    | 594    | 493    | 575    | 534    | 541    | 464    | 359    | 263    | 272    | 799    |
| 22    | 390    | 641    | 589    | 500    | 571    | 533    | 538    | 485    | 320    | 209    | 280    | 779    |
| 23    | 532    | 636    | 580    | 492    | 577    | 527    | 532    | 454    | 292    | 286    | 309    | 769    |
| 24    | 536    | 672    | 580    | 484    | 591    | 531    | 582    | 409    | 275    | 277    | 358    | 764    |
| 25    | 540    | 708    | 581    | 485    | 596    | 509    | 685    | 392    | 274    | 277    | 376    | 717    |
| 26    | 537    | 695    | 580    | 486    | 564    | 535    | 649    | 384    | 306    | 298    | 384    | 700    |
| 27    | 423    | 680    | 570    | 490    | 552    | 557    | 624    | 398    | 465    | 259    | 391    | 695    |
| 28    | 409    | 680    | 570    | 495    | 549    | 582    | 588    | 372    | 702    | 312    | 400    | 689    |
| 29    | 387    | 689    | 569    | 496    | -----  | 531    | 605    | 373    | 846    | 297    | 426    | 686    |
| 30    | 407    | 701    | 552    | 504    | -----  | 480    | 634    | 389    | 806    | 245    | 578    | 719    |
| 31    | 565    | -----  | 535    | 519    | -----  | 550    | -----  | 463    | -----  | 195    | 621    | -----  |
| TOTAL | 14,174 | 19,604 | 19,156 | 15,552 | 16,452 | 16,219 | 16,800 | 15,879 | 15,604 | 14,781 | 8,778  | 21,752 |
| MEAN  | 457    | 653    | 618    | 502    | 588    | 523    | 560    | 512    | 520    | 477    | 283    | 725    |
| MAX   | 580    | 708    | 698    | 540    | 639    | 582    | 685    | 674    | 846    | 792    | 621    | 800    |
| MIN   | 370    | 584    | 535    | 470    | 529    | 361    | 477    | 372    | 274    | 195    | 129    | 626    |
| AC-FT | 28,110 | 38,880 | 38,000 | 30,850 | 32,630 | 32,170 | 33,320 | 31,500 | 30,950 | 29,320 | 17,410 | 43,150 |

CAL YR 1970 TOTAL 154,270 MEAN 423 MAX 755 MIN 122 AC-FT 306,000  
WTR YR 1971 TOTAL 194,751 MEAN 534 MAX 846 MIN 129 AC-FT 386,300

## MISSOURI RIVER MAIN STEM

27

06018500 Beaverhead River near Twin Bridges, Mont.

LOCATION.--Lat 45°23'01", long 112°27'07", in SW 1/4 sec. 22, T.5 S., R.7 W., Madison County, on left bank at downstream side of bridge on State Highway 41, 11.5 miles upstream from Ruby River, 12.7 miles southwest of Twin Bridges and 14.5 miles northeast of Dillon.

DRAINAGE AREA.--3,619 sq mi.

PERIOD OF RECORD.--August 1935 to current year. Prior to October 1968, published as "at Blaine."

GAGE.--Water-stage recorder. Altitude of gage is 4,810 ft (by barometer). Prior to Feb. 17, 1949, nonrecording gage at bridge 0.5 mile upstream at different datum. Feb. 17, 1949, to June 28, 1951, nonrecording gage at present site and datum.

AVERAGE DISCHARGE.--36 years, 401 cfs (290,500 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 969 cfs July 5 (gage height, 6.23 ft); minimum daily, 149 cfs Aug. 14.

Period of record: Maximum discharge observed, 3,130 cfs June 12, 1944 (gage height, 6.76 ft, site and datum then in use); minimum observed, 7.0 cfs May 25, 1940.

REMARKS.--Records good. Flow partly regulated by Lima Reservoir (see p. 180) and Clark Canyon Reservoir (see p. 23) since August 1964. Diversions above station for irrigation of about 135,400 acres of which about 5,000 acres are irrigated by imported water from Birch and Willow Creeks and of which about 9,200 acres lies below station including 600 acres in Ruby River drainage. Records of chemical analyses, water temperatures, and suspended sediment loads for the current year are published in Part 2 of this report.

REVISIONS (WATER YEARS).--WSP 1309: 1938(M), 1945(M). WSP 1559: Drainage area.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY   | OCT    | NOV    | DEC    | JAN    | FEB    | MAR    | APR    | MAY    | JUN    | JUL    | AUG    | SEP    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 1     | 646    | 680    | 757    | 604    | 721    | 610    | 686    | 755    | 488    | 894    | 236    | 760    |
| 2     | 618    | 687    | 722    | 564    | 741    | 606    | 665    | 684    | 578    | 928    | 233    | 722    |
| 3     | 614    | 693    | 722    | 574    | 715    | 611    | 651    | 673    | 629    | 904    | 209    | 768    |
| 4     | 608    | 684    | 709    | 557    | 633    | 617    | 645    | 705    | 634    | 905    | 208    | 854    |
| 5     | 600    | 704    | 695    | 544    | 677    | 624    | 643    | 764    | 599    | 950    | 209    | 886    |
| 6     | 519    | 716    | 704    | 577    | 671    | 614    | 624    | 778    | 574    | 944    | 234    | 875    |
| 7     | 566    | 724    | 736    | 584    | 681    | 617    | 614    | 771    | 537    | 892    | 254    | 899    |
| 8     | 594    | 725    | 742    | 613    | 671    | 609    | 717    | 752    | 501    | 813    | 265    | 957    |
| 9     | 613    | 728    | 737    | 616    | 665    | 627    | 768    | 682    | 539    | 809    | 261    | 925    |
| 10    | 629    | 752    | 738    | 603    | 674    | 536    | 761    | 681    | 582    | 800    | 225    | 911    |
| 11    | 637    | 741    | 710    | 555    | 681    | 465    | 784    | 649    | 696    | 821    | 226    | 893    |
| 12    | 637    | 736    | 676    | 549    | 690    | 543    | 754    | 601    | 842    | 780    | 195    | 853    |
| 13    | 656    | 738    | 637    | 543    | 715    | 650    | 716    | 585    | 843    | 675    | 162    | 869    |
| 14    | 660    | 735    | 661    | 536    | 718    | 642    | 659    | 566    | 795    | 517    | 149    | 855    |
| 15    | 721    | 722    | 676    | 578    | 735    | 636    | 667    | 589    | 726    | 434    | 154    | 847    |
| 16    | 756    | 726    | 688    | 568    | 729    | 635    | 651    | 599    | 610    | 468    | 162    | 874    |
| 17    | 747    | 737    | 693    | 576    | 716    | 635    | 614    | 588    | 549    | 526    | 167    | 901    |
| 18    | 564    | 741    | 662    | 577    | 698    | 533    | 645    | 576    | 512    | 475    | 242    | 905    |
| 19    | 536    | 742    | 609    | 584    | 698    | 450    | 649    | 591    | 445    | 512    | 324    | 915    |
| 20    | 521    | 736    | 636    | 601    | 684    | 538    | 662    | 552    | 406    | 499    | 340    | 926    |
| 21    | 508    | 733    | 688    | 573    | 658    | 632    | 680    | 526    | 418    | 436    | 286    | 962    |
| 22    | 507    | 672    | 655    | 538    | 645    | 634    | 671    | 557    | 389    | 365    | 288    | 965    |
| 23    | 617    | 676    | 640    | 577    | 652    | 636    | 674    | 517    | 355    | 406    | 362    | 949    |
| 24    | 668    | 718    | 641    | 573    | 667    | 634    | 707    | 420    | 327    | 395    | 400    | 941    |
| 25    | 669    | 768    | 641    | 576    | 677    | 639    | 874    | 382    | 309    | 368    | 425    | 923    |
| 26    | 675    | 758    | 618    | 576    | 639    | 645    | 812    | 371    | 335    | 372    | 459    | 920    |
| 27    | 567    | 738    | 655    | 585    | 616    | 667    | 788    | 343    | 483    | 325    | 445    | 905    |
| 28    | 517    | 723    | 659    | 583    | 609    | 713    | 751    | 316    | 692    | 364    | 441    | 892    |
| 29    | 482    | 730    | 684    | 585    | -----  | 682    | 744    | 306    | 890    | 373    | 472    | 885    |
| 30    | 498    | 747    | 645    | 616    | -----  | 613    | 778    | 322    | 929    | 316    | 673    | 910    |
| 31    | 609    | -----  | 635    | 639    | -----  | 656    | -----  | 403    | -----  | 259    | 805    | -----  |
| TOTAL | 18,759 | 21,710 | 21,071 | 17,924 | 19,076 | 18,949 | 21,054 | 17,604 | 17,212 | 18,525 | 9,511  | 26,647 |
| MEAN  | 605    | 724    | 680    | 578    | 681    | 611    | 702    | 568    | 574    | 598    | 307    | 888    |
| MAX   | 756    | 768    | 757    | 639    | 741    | 713    | 874    | 778    | 929    | 950    | 805    | 965    |
| MIN   | 482    | 672    | 609    | 536    | 609    | 450    | 614    | 306    | 309    | 259    | 149    | 722    |
| AC-FT | 37,210 | 43,060 | 41,790 | 35,550 | 37,840 | 37,590 | 41,760 | 34,920 | 34,140 | 36,740 | 18,870 | 52,850 |

CAL YR 1970 TOTAL 188,720 MEAN 517 MAX 790 MIN 203 AC-FT 374,300  
WTR YR 1971 TOTAL 228,042 MEAN 625 MAX 965 MIN 149 AC-FT 452,300



## RUBY RIVER BASIN

06019500 Ruby River above reservoir, near Alder, Mont.

LOCATION.--Lat 45°10'31", long 112°08'52", in SW 1/4 sec. 31, T.7 S., R.4 W., Madison County, on left bank at Puller Hot Springs 0.4 mile upstream from Cottonwood Creek, 6 miles upstream from Ruby Dam, and 10.5 miles south of Alder.

DRAINAGE AREA.--538 sq mi.

PERIOD OF RECORD.--May 1938 to current year. Monthly discharge only for May 1938, published in WSP 1309.

GAGE.--Water-stage recorder. Datum of gage is 5,440.2 ft above mean sea level (river-profile survey). Prior to Oct. 1, 1938, nonrecording gage at bridge 1,500 ft downstream at datum 5.2 ft lower. Oct. 1, 1938, to Aug. 5, 1955, water-stage recorder at site 500 ft downstream at datum 0.5 ft lower.

AVERAGE DISCHARGE.--33 years, 170 cfs (123,200 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 1,210 cfs May 29 (gage height, 5.01 ft); minimum daily, 90 cfs Jan. 5.

Period of record: Maximum discharge, 1,670 cfs June 10, 1970 (gage height, 5.62 ft); minimum daily, 35 cfs Jan. 23, 1962.

REMARKS.--Records good. Diversions for irrigation of about 3,000 acres above station.

REVISIONS (WATER YEARS).--WSP 1309: 1938(M). WSP 1559: Drainage area.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY   | OCT   | NOV   | DEC   | JAN   | FEB   | MAR   | APR    | MAY    | JUN    | JUL    | AUG   | SEP   |
|-------|-------|-------|-------|-------|-------|-------|--------|--------|--------|--------|-------|-------|
| 1     | 139   | 150   | 132   | 120   | 243   | 115   | 139    | 235    | 898    | 621    | 155   | 155   |
| 2     | 142   | 144   | 129   | 115   | 191   | 111   | 130    | 295    | 745    | 575    | 151   | 147   |
| 3     | 142   | 138   | 131   | 110   | 158   | 108   | 129    | 347    | 696    | 591    | 156   | 159   |
| 4     | 142   | 138   | 130   | 100   | 131   | 113   | 123    | 402    | 738    | 524    | 176   | 176   |
| 5     | 145   | 149   | 130   | 90    | 133   | 114   | 131    | 418    | 685    | 483    | 169   | 176   |
| 6     | 142   | 147   | 135   | 100   | 132   | 112   | 150    | 467    | 697    | 455    | 165   | 163   |
| 7     | 129   | 142   | 140   | 110   | 127   | 110   | 191    | 526    | 708    | 430    | 164   | 196   |
| 8     | 135   | 145   | 145   | 115   | 133   | 114   | 199    | 601    | 745    | 399    | 161   | 210   |
| 9     | 137   | 145   | 140   | 120   | 129   | 113   | 176    | 667    | 844    | 415    | 155   | 175   |
| 10    | 147   | 150   | 137   | 120   | 141   | 114   | 190    | 663    | 924    | 377    | 157   | 168   |
| 11    | 145   | 128   | 130   | 100   | 144   | 114   | 143    | 713    | 1,070  | 349    | 147   | 160   |
| 12    | 153   | 149   | 132   | 100   | 141   | 115   | 142    | 755    | 1,090  | 339    | 141   | 155   |
| 13    | 158   | 149   | 136   | 100   | 142   | 121   | 141    | 879    | 971    | 314    | 139   | 150   |
| 14    | 146   | 133   | 147   | 105   | 137   | 115   | 141    | 955    | 967    | 295    | 135   | 148   |
| 15    | 136   | 134   | 128   | 110   | 134   | 113   | 189    | 813    | 874    | 282    | 133   | 146   |
| 16    | 142   | 141   | 131   | 114   | 128   | 112   | 184    | 850    | 799    | 269    | 132   | 145   |
| 17    | 149   | 144   | 127   | 118   | 124   | 112   | 167    | 722    | 798    | 262    | 135   | 147   |
| 18    | 158   | 144   | 128   | 121   | 127   | 105   | 161    | 611    | 738    | 252    | 142   | 147   |
| 19    | 159   | 137   | 140   | 123   | 126   | 110   | 151    | 548    | 724    | 249    | 137   | 147   |
| 20    | 154   | 140   | 145   | 130   | 119   | 114   | 161    | 504    | 674    | 239    | 136   | 146   |
| 21    | 153   | 134   | 133   | 125   | 111   | 115   | 161    | 466    | 674    | 248    | 132   | 144   |
| 22    | 154   | 110   | 125   | 129   | 115   | 113   | 167    | 449    | 703    | 229    | 126   | 142   |
| 23    | 155   | 113   | 122   | 123   | 121   | 113   | 178    | 436    | 672    | 224    | 128   | 141   |
| 24    | 160   | 139   | 120   | 123   | 124   | 117   | 210    | 481    | 654    | 216    | 130   | 141   |
| 25    | 145   | 151   | 120   | 121   | 120   | 119   | 244    | 535    | 582    | 210    | 133   | 141   |
| 26    | 147   | 142   | 120   | 122   | 116   | 140   | 207    | 706    | 564    | 199    | 130   | 148   |
| 27    | 144   | 136   | 120   | 125   | 117   | 182   | 186    | 832    | 895    | 186    | 129   | 151   |
| 28    | 139   | 137   | 120   | 124   | 115   | 148   | 184    | 947    | 976    | 177    | 125   | 150   |
| 29    | 148   | 137   | 122   | 123   | ----- | 131   | 189    | 1,090  | 883    | 173    | 128   | 147   |
| 30    | 150   | 143   | 119   | 250   | ----- | 145   | 207    | 1,040  | 716    | 166    | 187   | 151   |
| 31    | 147   | ----- | 122   | 261   | ----- | 183   | -----  | 987    | -----  | 157    | 179   | ----- |
| TOTAL | 4,542 | 4,189 | 4,036 | 3,847 | 3,779 | 3,761 | 5,071  | 19,940 | 23,704 | 9,905  | 4,513 | 4,672 |
| MEAN  | 147   | 140   | 130   | 124   | 135   | 121   | 169    | 643    | 790    | 320    | 146   | 156   |
| MAX   | 160   | 151   | 147   | 261   | 243   | 183   | 244    | 1,090  | 1,090  | 621    | 187   | 210   |
| MIN   | 129   | 110   | 119   | 90    | 111   | 105   | 123    | 235    | 564    | 157    | 125   | 141   |
| AC-FT | 9,010 | 8,310 | 8,010 | 7,630 | 7,500 | 7,460 | 10,060 | 39,550 | 47,020 | 19,650 | 8,950 | 9,270 |

CAL YR 1970 TOTAL 89,206 MEAN 244 MAX 1,540 MIN 90 AC-FT 176,900  
 WTR YR 1971 TOTAL 91,959 MEAN 252 MAX 1,090 MIN 90 AC-FT 182,400

## PEAK DISCHARGE (BASE, 560 CFS)

| DATE | TIME | G.HT. | DISCHARGE | DATE | TIME | G.HT. | DISCHARGE |
|------|------|-------|-----------|------|------|-------|-----------|
| 5-14 | 1245 | 4.69  | 1,020     | 6-11 | 2030 | 4.87  | 1,140     |
| 5-29 | 2015 | 5.01  | 1,210     | 6-27 | 2300 | 4.85  | 1,110     |

| DAY         | OCT   | NOV    | DEC   | JAN   | FEB   | MAR   | APR   | MAY    | JUN    | JUL     | AUG    | SEP    |
|-------------|-------|--------|-------|-------|-------|-------|-------|--------|--------|---------|--------|--------|
| 1           | 220   | 96     | 80    | 53    | 60    | 100   | 157   | 160    | 655    | 735     | 355    | 260    |
| 2           | 220   | 96     | 67    | 54    | 60    | 100   | 157   | 160    | 762    | 735     | 350    | 260    |
| 3           | 220   | 96     | 50    | 54    | 60    | 100   | 160   | 160    | 762    | 605     | 350    | 260    |
| 4           | 220   | 96     | 50    | 54    | 69    | 100   | 160   | 163    | 705    | 565     | 346    | 260    |
| 5           | 223   | 96     | 50    | 54    | 94    | 100   | 160   | 223    | 650    | 525     | 346    | 260    |
| 6           | 223   | 96     | 50    | 54    | 94    | 100   | 160   | 290    | 650    | 485     | 346    | 260    |
| 7           | 220   | 96     | 50    | 54    | 96    | 100   | 160   | 365    | 655    | 450     | 342    | 260    |
| 8           | 220   | 96     | 51    | 56    | 96    | 100   | 160   | 500    | 605    | 425     | 342    | 263    |
| 9           | 220   | 96     | 53    | 56    | 96    | 100   | 160   | 555    | 540    | 393     | 405    | 263    |
| 10          | 220   | 63     | 53    | 56    | 96    | 100   | 160   | 550    | 540    | 440     | 460    | 239    |
| 11          | 220   | 75     | 53    | 56    | 96    | 100   | 160   | 550    | 545    | 410     | 455    | 220    |
| 12          | 220   | 77     | 53    | 57    | 96    | 100   | 160   | 605    | 555    | 405     | 450    | 223    |
| 13          | 220   | 80     | 53    | 56    | 96    | 100   | 160   | 635    | 680    | 405     | 415    | 226    |
| 14          | 203   | 80     | 51    | 57    | 96    | 100   | 160   | 640    | 943    | 405     | 390    | 229    |
| 15          | 140   | 80     | 51    | 58    | 98    | 100   | 157   | 705    | 992    | 400     | 390    | 232    |
| 16          | 140   | 80     | 51    | 58    | 98    | 100   | 157   | 647    | 880    | 395     | 385    | 232    |
| 17          | 140   | 80     | 51    | 58    | 98    | 100   | 157   | 745    | 810    | 395     | 380    | 232    |
| 18          | 140   | 82     | 51    | 58    | 98    | 100   | 160   | 740    | 780    | 390     | 375    | 235    |
| 19          | 140   | 82     | 51    | 58    | 98    | 100   | 160   | 740    | 720    | 445     | 375    | 235    |
| 20          | 143   | 58     | 51    | 58    | 99    | 100   | 160   | 740    | 685    | 480     | 275    | 239    |
| 21          | 143   | 77     | 53    | 58    | 98    | 100   | 160   | 735    | 665    | 480     | 90     | 239    |
| 22          | 123   | 77     | 53    | 58    | 98    | 100   | 160   | 730    | 670    | 475     | 90     | 242    |
| 23          | 92    | 78     | 53    | 58    | 98    | 100   | 160   | 725    | 680    | 475     | 90     | 242    |
| 24          | 92    | 78     | 53    | 58    | 100   | 100   | 160   | 720    | 665    | 470     | 173    | 242    |
| 25          | 92    | 78     | 53    | 58    | 100   | 100   | 160   | 715    | 615    | 475     | 360    | 242    |
| 26          | 94    | 78     | 53    | 58    | 100   | 102   | 160   | 710    | 570    | 470     | 425    | 242    |
| 27          | 94    | 78     | 53    | 61    | 100   | 102   | 160   | 710    | 685    | 470     | 360    | 242    |
| 28          | 94    | 78     | 53    | 60    | 100   | 102   | 160   | 710    | 1,100  | 465     | 310    | 246    |
| 29          | 94    | 80     | 53    | 60    | ----- | 102   | 160   | 720    | 1,090  | 465     | 290    | 246    |
| 30          | 96    | 80     | 53    | 63    | ----- | 102   | 160   | 539    | 929    | 430     | 290    | 246    |
| 31          | 96    | -----  | 53    | 61    | ----- | 120   | ----- | 465    | -----  | 375     | 270    | -----  |
| TOTAL       | 5,022 | 2,483  | 1,653 | 1,772 | 2,587 | 3,130 | 4,785 | 17,352 | 21,783 | 14,538  | 10,280 | 7,317  |
| MEAN        | 162   | 82.8   | 53.3  | 57.2  | 92.4  | 101   | 160   | 560    | 726    | 469     | 332    | 244    |
| MAX         | 223   | 96     | 80    | 63    | 100   | 120   | 160   | 745    | 1,100  | 735     | 460    | 263    |
| MIN         | 92    | 58     | 50    | 53    | 60    | 100   | 157   | 160    | 540    | 375     | 90     | 220    |
| AC-FT       | 9,960 | 4,930  | 3,280 | 3,510 | 5,130 | 6,210 | 9,490 | 34,420 | 43,210 | 28,840  | 20,390 | 14,510 |
| CAL YR 1970 | TOTAL | 99,173 | MEAN  | 272   | MAX   | 1,570 | MIN   | 39     | AC-FT  | 196,700 |        |        |
| WTR YR 1971 | TOTAL | 92,702 | MEAN  | 254   | MAX   | 1,100 | MIN   | 50     | AC-FT  | 183,900 |        |        |

## BIG HOLE RIVER BASIN

06024500 Trail Creek near Wisdom, Mont.

LOCATION.--Lat 45°39'24", long 113°42'56", in SW¼ sec.16, T.2 S., R.17 W., Beaverhead County, Beaverhead National Forest, on left bank 250 ft downstream from Runaway Creek, 4 miles upstream from Ruby Creek, and 13.1 miles west of Wisdom.

DRAINAGE AREA.--71.4 sq mi.

PERIOD OF RECORD.--June 1948 to October 1953 (no winter records after 1951), October 1966 to current year.

GAGE.--Water-stage recorder. Datum of gage is 6,249.70 ft above mean sea level. Prior to Oct. 20, 1966, water-stage recorder at site 100 ft upstream at different datum.

AVERAGE DISCHARGE.--8 years (1948-51, 1966-71), 85.3 cfs (61,800 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 980 cfs May 30 (gage height, 6.05 ft); minimum, 11 cfs Oct. 15 (gage height, 2.47 ft).

Period of record: Maximum discharge, 1,070 cfs June 2, 1953 (gage height, 5.89 ft, site and datum then in use); minimum, 1.6 cfs Nov. 9, 1969 (gage height, 2.23 ft) result of freezeup.

REMARKS.--Records good except those for winter period, which are poor. No regulation or diversion above station.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT            | NOV       | DEC     | JAN     | FEB          | MAR   | APR   | MAY    | JUN    | JUL   | AUG   | SEP   |
|-------------|----------------|-----------|---------|---------|--------------|-------|-------|--------|--------|-------|-------|-------|
| 1           | 24             | 29        | 24      | 17      | 30           | 23    | 23    | 119    | 784    | 112   | 28    | 25    |
| 2           | 23             | 29        | 24      | 16      | 29           | 22    | 24    | 179    | 717    | 107   | 29    | 28    |
| 3           | 23             | 30        | 23      | 15      | 28           | 22    | 24    | 247    | 636    | 102   | 34    | 26    |
| 4           | 22             | 30        | 24      | 14      | 28           | 21    | 25    | 319    | 604    | 92    | 38    | 25    |
| 5           | 21             | 30        | 22      | 15      | 28           | 21    | 25    | 362    | 581    | 86    | 32    | 22    |
| 6           | 24             | 30        | 23      | 16      | 28           | 21    | 26    | 386    | 547    | 81    | 34    | 21    |
| 7           | 24             | 30        | 23      | 17      | 27           | 20    | 27    | 470    | 528    | 77    | 33    | 22    |
| 8           | 24             | 30        | 23      | 18      | 27           | 20    | 28    | 540    | 553    | 73    | 29    | 21    |
| 9           | 25             | 30        | 23      | 18      | 28           | 20    | 28    | 574    | 563    | 69    | 26    | 20    |
| 10          | 28             | 30        | 23      | 18      | 28           | 20    | 28    | 618    | 535    | 64    | 24    | 19    |
| 11          | 26             | 30        | 23      | 18      | 28           | 19    | 29    | 639    | 510    | 62    | 24    | 18    |
| 12          | 32             | 30        | 21      | 18      | 28           | 19    | 29    | 721    | 451    | 60    | 23    | 17    |
| 13          | 30             | 30        | 19      | 17      | 29           | 19    | 30    | 868    | 435    | 56    | 22    | 17    |
| 14          | 25             | 30        | 19      | 17      | 29           | 19    | 30    | 879    | 400    | 53    | 22    | 16    |
| 15          | 22             | 29        | 19      | 18      | 29           | 19    | 30    | 798    | 363    | 51    | 22    | 16    |
| 16          | 23             | 28        | 19      | 19      | 29           | 19    | 31    | 802    | 327    | 48    | 22    | 17    |
| 17          | 22             | 29        | 19      | 19      | 29           | 19    | 32    | 698    | 297    | 47    | 21    | 18    |
| 18          | 22             | 30        | 19      | 19      | 29           | 19    | 34    | 592    | 272    | 44    | 24    | 18    |
| 19          | 22             | 30        | 19      | 20      | 28           | 19    | 36    | 510    | 253    | 43    | 22    | 18    |
| 20          | 21             | 30        | 19      | 20      | 28           | 19    | 37    | 448    | 234    | 43    | 21    | 18    |
| 21          | 22             | 25        | 19      | 20      | 28           | 19    | 39    | 379    | 214    | 43    | 20    | 19    |
| 22          | 22             | 17        | 19      | 20      | 27           | 19    | 42    | 334    | 207    | 42    | 19    | 18    |
| 23          | 22             | 20        | 19      | 20      | 27           | 19    | 45    | 313    | 186    | 41    | 19    | 18    |
| 24          | 24             | 22        | 19      | 21      | 26           | 19    | 48    | 344    | 169    | 41    | 20    | 17    |
| 25          | 24             | 22        | 19      | 22      | 25           | 20    | 51    | 353    | 154    | 38    | 19    | 19    |
| 26          | 25             | 23        | 19      | 22      | 25           | 20    | 54    | 438    | 183    | 37    | 18    | 22    |
| 27          | 26             | 23        | 19      | 22      | 24           | 20    | 60    | 584    | 182    | 35    | 18    | 22    |
| 28          | 27             | 24        | 19      | 22      | 23           | 21    | 65    | 758    | 164    | 34    | 18    | 21    |
| 29          | 28             | 24        | 19      | 25      | -----        | 21    | 76    | 905    | 147    | 33    | 18    | 20    |
| 30          | 28             | 24        | 19      | 28      | -----        | 22    | 82    | 919    | 126    | 31    | 34    | 20    |
| 31          | 28             | -----     | 18      | 30      | -----        | 23    | ----- | 894    | -----  | 29    | 31    | ----- |
| TOTAL       | 759            | 818       | 636     | 601     | 772          | 623   | 1,138 | 16,990 | 11,322 | 1,774 | 764   | 598   |
| MEAN        | 24.5           | 27.3      | 20.5    | 19.4    | 27.6         | 20.1  | 37.9  | 548    | 377    | 57.2  | 24.6  | 19.9  |
| MAX         | 32             | 30        | 24      | 30      | 30           | 23    | 82    | 919    | 784    | 112   | 38    | 28    |
| MIN         | 21             | 17        | 18      | 14      | 23           | 19    | 23    | 119    | 126    | 29    | 18    | 16    |
| AC-FT       | 1,510          | 1,620     | 1,260   | 1,190   | 1,530        | 1,240 | 2,260 | 33,700 | 22,460 | 3,520 | 1,520 | 1,190 |
| CAL YR 1970 | TOTAL 29,521.0 | MEAN 80.9 | MAX 809 | MIN 5.0 | AC-FT 58,550 |       |       |        |        |       |       |       |
| WTR YR 1971 | TOTAL 36,795.0 | MEAN 101  | MAX 919 | MIN 14  | AC-FT 72,980 |       |       |        |        |       |       |       |

## PEAK DISCHARGE (BASE, 200 CFS)

| DATE | TIME | G.HT. | DISCHARGE | DATE | TIME | G.HT. | DISCHARGE |
|------|------|-------|-----------|------|------|-------|-----------|
| 5-14 | 0130 | 5.97  | 948       | 5-30 | 0330 | 6.05  | 980       |

NOTE.--Stage-discharge relation affected by ice Oct. 25 to Apr. 28.

## BIG HOLE RIVER BASIN

31

06025500 Big Hole River near Melrose, Mont.

LOCATION.--Lat 45°31'36", long 112°42'03", in SE 1/4 SW 1/4 sec. 34, T.3 S., R.9 W., Madison County, on left bank at downstream side of bridge on Interstate Highway 15 and U.S. Highway 91, 0.1 mile downstream from Rock Creek, and 7 miles south of Melrose.

DRAINAGE AREA.--2,476 sq mi.

PERIOD OF RECORD.--October 1923 to current year. Monthly discharge only for some periods, published in WSP 1309.

GAGE.--Water-stage recorder. Datum of gage is 5,032.87 ft above mean sea level. Prior to June 14, 1927, water-stage recorder, and July 17, 1927, to Sept. 30, 1931, nonrecording gage, at site 1.7 miles upstream at different datum.

AVERAGE DISCHARGE.--48 years, 1,140 cfs (825,900 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 9,430 cfs June 1 (gage height, 6.35 ft); minimum, 205 cfs Nov. 23 (gage height, 1.10 ft).

Period of record: Maximum discharge, 23,000 cfs June 14, 1927, when Wise River Reservoir dam failed (gage-height, 14.0 ft, from floodmark, site and datum then in use), from rating curve extended above 8,000 cfs; maximum discharge unaffected by dam failure, 14,100 cfs June 3, 1948 (gage height, 7.76 ft); minimum observed, 49 cfs Aug. 17, 1931 (gage height, 0.70 ft, site and datum then in use).

REMARKS.--Records good except those for winter period, which are poor. Diversions for irrigation of about 136,000 acres above station.

REVISIONS.--WSP 1559: Drainage area.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT           | NOV        | DEC       | JAN     | FEB             | MAR    | APR    | MAY     | JUN     | JUL     | AUG    | SEP    |
|-------------|---------------|------------|-----------|---------|-----------------|--------|--------|---------|---------|---------|--------|--------|
| 1           | 537           | 600        | 680       | 390     | 1,100           | 476    | 1,020  | 2,780   | 9,300   | 3,990   | 925    | 452    |
| 2           | 513           | 609        | 604       | 380     | 1,200           | 448    | 936    | 3,180   | 9,180   | 3,140   | 872    | 462    |
| 3           | 498           | 595        | 554       | 370     | 1,100           | 479    | 920    | 3,630   | 8,140   | 3,030   | 893    | 465    |
| 4           | 498           | 550        | 513       | 360     | 1,000           | 453    | 896    | 4,390   | 7,370   | 2,870   | 925    | 449    |
| 5           | 505           | 554        | 490       | 320     | 1,000           | 444    | 927    | 5,130   | 7,020   | 2,590   | 938    | 447    |
| 6           | 513           | 679        | 528       | 330     | 1,000           | 435    | 1,010  | 5,520   | 6,580   | 2,290   | 892    | 447    |
| 7           | 545           | 682        | 583       | 350     | 1,000           | 455    | 1,270  | 5,990   | 6,120   | 2,120   | 983    | 441    |
| 8           | 577           | 678        | 614       | 370     | 1,050           | 454    | 1,310  | 6,270   | 6,160   | 1,950   | 937    | 419    |
| 9           | 593           | 674        | 577       | 380     | 1,090           | 445    | 1,290  | 6,500   | 6,760   | 1,860   | 881    | 407    |
| 10          | 641           | 685        | 540       | 380     | 1,110           | 440    | 1,480  | 6,760   | 6,960   | 1,850   | 799    | 395    |
| 11          | 665           | 641        | 524       | 350     | 1,160           | 447    | 1,410  | 6,800   | 7,450   | 1,780   | 726    | 390    |
| 12          | 679           | 631        | 452       | 360     | 991             | 453    | 1,220  | 7,030   | 7,380   | 1,760   | 674    | 372    |
| 13          | 721           | 620        | 411       | 370     | 742             | 459    | 1,030  | 7,720   | 7,580   | 1,690   | 615    | 355    |
| 14          | 708           | 595        | 313       | 380     | 737             | 448    | 963    | 8,390   | 7,580   | 1,640   | 572    | 332    |
| 15          | 693           | 519        | 404       | 380     | 727             | 446    | 1,380  | 8,420   | 6,960   | 1,540   | 551    | 325    |
| 16          | 654           | 459        | 454       | 390     | 702             | 435    | 1,830  | 8,510   | 6,510   | 1,490   | 529    | 330    |
| 17          | 627           | 616        | 458       | 400     | 673             | 434    | 1,650  | 7,930   | 6,070   | 1,460   | 500    | 332    |
| 18          | 619           | 607        | 394       | 410     | 677             | 429    | 1,480  | 7,230   | 5,530   | 1,430   | 504    | 343    |
| 19          | 618           | 564        | 337       | 420     | 646             | 423    | 1,250  | 6,420   | 5,220   | 1,410   | 503    | 358    |
| 20          | 628           | 530        | 347       | 410     | 585             | 426    | 1,500  | 5,530   | 4,970   | 1,350   | 490    | 374    |
| 21          | 629           | 504        | 340       | 360     | 551             | 422    | 1,850  | 4,760   | 4,860   | 1,350   | 479    | 406    |
| 22          | 625           | 331        | 340       | 370     | 535             | 406    | 1,970  | 4,210   | 4,930   | 1,370   | 460    | 405    |
| 23          | 630           | 304        | 340       | 370     | 550             | 423    | 2,410  | 3,870   | 5,220   | 1,330   | 435    | 408    |
| 24          | 663           | 503        | 350       | 380     | 521             | 422    | 2,920  | 3,580   | 5,100   | 1,270   | 407    | 419    |
| 25          | 654           | 1,090      | 350       | 390     | 502             | 434    | 3,630  | 3,460   | 4,800   | 1,180   | 384    | 434    |
| 26          | 656           | 817        | 350       | 400     | 500             | 463    | 3,030  | 3,690   | 4,860   | 1,080   | 363    | 476    |
| 27          | 608           | 794        | 360       | 420     | 469             | 526    | 2,480  | 4,330   | 5,570   | 1,020   | 331    | 536    |
| 28          | 613           | 716        | 370       | 440     | 480             | 580    | 2,060  | 5,490   | 5,890   | 1,000   | 306    | 593    |
| 29          | 573           | 697        | 380       | 460     | -----           | 584    | 2,080  | 7,130   | 6,500   | 982     | 301    | 628    |
| 30          | 582           | 693        | 390       | 600     | -----           | 664    | 2,420  | 8,240   | 5,330   | 978     | 353    | 639    |
| 31          | 597           | -----      | 400       | 1,000   | -----           | 951    | -----  | 8,990   | -----   | 970     | 411    | -----  |
| TOTAL       | 18,862        | 18,537     | 13,747    | 12,690  | 22,398          | 14,804 | 49,622 | 181,880 | 191,900 | 53,770  | 18,939 | 12,839 |
| MEAN        | 608           | 618        | 443       | 409     | 800             | 478    | 1,654  | 5,867   | 6,397   | 1,735   | 611    | 428    |
| MAX         | 721           | 1,090      | 680       | 1,000   | 1,200           | 951    | 3,630  | 8,990   | 9,300   | 3,990   | 983    | 639    |
| MIN         | 498           | 304        | 313       | 320     | 469             | 406    | 896    | 2,780   | 4,800   | 970     | 301    | 325    |
| AC-FT       | 37,410        | 36,770     | 27,270    | 25,170  | 44,430          | 29,360 | 98,430 | 360,800 | 380,600 | 106,700 | 37,570 | 25,470 |
| CAL YR 1970 | TOTAL 492,923 | MEAN 1,350 | MAX 8,650 | MIN 248 | AC-FT 977,700   |        |        |         |         |         |        |        |
| WTR YR 1971 | TOTAL 609,988 | MEAN 1,671 | MAX 9,300 | MIN 301 | AC-FT 1,210,000 |        |        |         |         |         |        |        |

## PEAK DISCHARGE (BASE, 3,400 CFS)

NOTE.--Stage-discharge relation affected by ice Dec. 21 to Feb. 8.

| DATE | TIME | G.HT. | DISCHARGE | DATE | TIME | G.HT. | DISCHARGE |
|------|------|-------|-----------|------|------|-------|-----------|
| 4-25 | 0945 | 4.28  | 3,940     | 6-1  | 1430 | 6.35  | 9,430     |
| 5-16 | 1715 | 6.14  | 8,800     | 6-29 | 0900 | 5.41  | 6,730     |



## BIG HOLE RIVER BASIN

06026000 Birch Creek near Glen, Mont.

LOCATION.--Lat 45°22'46", long 112°47'48", in SE $\frac{1}{4}$ SE $\frac{1}{4}$  sec.23, T.5 S., R.10 W., Beaverhead County, Beaverhead National Forest, on left bank 2.3 miles downstream from Sheep Creek and 8.5 miles southwest of Glen.

DRAINAGE AREA.--36.0 sq mi.

PERIOD OF RECORD.--May 1946 to September 1953, April 1955 to current year. Monthly discharge only for May 1946, published in WSP 1309. Prior to October 1950, published as "near Reichle."

GAGE.--Water-stage recorder. Concrete control since May 19, 1966. Altitude of gage is 5,860 ft (from topographic map). Prior to Nov. 16, 1949, at site 1.5 miles upstream at different datum.

AVERAGE DISCHARGE.--23 years, 29.6 cfs (21,450 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 274 cfs June 24 (gage height, 5.22 ft); minimum, 1.2 cfs Apr. 11.

Period of record: Maximum discharge, 362 cfs June 21, 1963; maximum gage height recorded, 5.49 ft June 27, 1967; minimum discharge, 0.8 cfs Nov. 17, 1958.

REMARKS.--Records good. Some regulation at lakes in headwaters. Minor diversions for irrigation above station. Recorded diversions from Willow Creek basin into Birch Creek above station for current year are listed below.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY   | OCT  | NOV   | DEC   | JAN   | FEB   | MAR   | APR   | MAY   | JUN   | JUL   | AUG   | SEP   |
|-------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1     | 12   | 16    | 9.7   | 12    | 13    | 7.9   | 6.0   | 12    | 114   | 109   | 66    | 17    |
| 2     | 12   | 14    | 9.0   | 12    | 12    | 6.7   | 6.7   | 15    | 100   | 114   | 64    | 16    |
| 3     | 12   | 12    | 7.6   | 12    | 8.1   | 8.1   | 6.7   | 20    | 94    | 110   | 62    | 16    |
| 4     | 11   | 12    | 7.4   | 11    | 7.6   | 8.2   | 6.6   | 25    | 87    | 103   | 60    | 16    |
| 5     | 12   | 14    | 5.8   | 9.9   | 8.1   | 8.2   | 7.2   | 30    | 86    | 98    | 57    | 15    |
| 6     | 12   | 14    | 7.7   | 9.7   | 6.9   | 8.3   | 8.5   | 35    | 90    | 93    | 59    | 14    |
| 7     | 12   | 14    | 8.9   | 10    | 9.5   | 8.2   | 9.2   | 40    | 101   | 79    | 55    | 15    |
| 8     | 13   | 13    | 11    | 11    | 9.3   | 8.2   | 8.4   | 45    | 134   | 72    | 52    | 15    |
| 9     | 13   | 14    | 12    | 11    | 9.1   | 7.7   | 8.8   | 50    | 166   | 74    | 50    | 14    |
| 10    | 13   | 12    | 8.8   | 11    | 11    | 7.6   | 8.4   | 55    | 166   | 71    | 49    | 14    |
| 11    | 13   | 12    | 9.1   | 11    | 10    | 7.4   | 6.6   | 60    | 180   | 62    | 47    | 14    |
| 12    | 14   | 13    | 5.6   | 10    | 10    | 7.2   | 6.9   | 70    | 158   | 58    | 45    | 14    |
| 13    | 13   | 12    | 4.2   | 10    | 9.8   | 7.1   | 7.0   | 91    | 178   | 53    | 44    | 13    |
| 14    | 13   | 8.3   | 3.8   | 10    | 9.4   | 7.0   | 8.7   | 86    | 180   | 55    | 44    | 13    |
| 15    | 12   | 10    | 4.8   | 9.9   | 9.2   | 6.9   | 10    | 79    | 166   | 58    | 43    | 13    |
| 16    | 13   | 12    | 4.9   | 9.7   | 9.0   | 6.9   | 8.5   | 97    | 154   | 56    | 41    | 13    |
| 17    | 13   | 12    | 4.2   | 9.7   | 8.6   | 7.0   | 8.1   | 79    | 160   | 59    | 40    | 14    |
| 18    | 13   | 12    | 3.5   | 9.2   | 9.1   | 7.7   | 7.6   | 69    | 138   | 68    | 41    | 14    |
| 19    | 13   | 11    | 3.3   | 9.5   | 8.9   | 6.8   | 7.8   | 62    | 140   | 65    | 36    | 13    |
| 20    | 13   | 11    | 3.5   | 9.5   | 7.7   | 7.4   | 9.3   | 56    | 140   | 62    | 26    | 13    |
| 21    | 13   | 9.5   | 4.4   | 8.5   | 7.0   | 7.2   | 9.3   | 51    | 160   | 61    | 23    | 13    |
| 22    | 14   | 3.7   | 5.1   | 8.4   | 7.8   | 7.2   | 9.2   | 46    | 186   | 59    | 20    | 13    |
| 23    | 14   | 3.9   | 5.2   | 9.3   | 8.8   | 7.3   | 9.9   | 42    | 221   | 57    | 20    | 13    |
| 24    | 15   | 13    | 5.8   | 9.1   | 8.9   | 7.6   | 12    | 45    | 229   | 55    | 19    | 12    |
| 25    | 16   | 16    | 6.9   | 8.9   | 8.5   | 7.4   | 12    | 52    | 192   | 52    | 18    | 13    |
| 26    | 16   | 12    | 8.1   | 8.8   | 7.7   | 8.2   | 10    | 68    | 219   | 55    | 18    | 14    |
| 27    | 14   | 9.6   | 9.8   | 8.8   | 7.8   | 8.0   | 9.1   | 101   | 192   | 66    | 17    | 14    |
| 28    | 15   | 9.2   | 11    | 8.4   | 8.2   | 7.6   | 9.3   | 144   | 160   | 65    | 16    | 13    |
| 29    | 15   | 9.1   | 11    | 8.5   | ----- | 8.1   | 9.9   | 190   | 134   | 66    | 18    | 14    |
| 30    | 16   | 10    | 12    | 13    | ----- | 8.8   | 11    | 156   | 117   | 63    | 26    | 14    |
| 31    | 16   | ----- | 12    | 14    | ----- | 7.0   | ----- | 133   | ----- | 62    | 19    | ----- |
| TOTAL | 416  | 344.3 | 226.1 | 313.8 | 251.0 | 238.2 | 258.7 | 2,104 | 4,542 | 2,180 | 1,195 | 419   |
| MEAN  | 13.4 | 11.5  | 7.29  | 10.1  | 8.96  | 7.68  | 8.62  | 67.9  | 151   | 70.3  | 38.5  | 14.0  |
| MAX   | 16   | 16    | 12    | 14    | 13    | 10    | 12    | 190   | 229   | 114   | 66    | 17    |
| MIN   | 11   | 3.7   | 3.3   | 8.4   | 6.9   | 6.8   | 6.0   | 12    | 86    | 52    | 16    | 12    |
| AC-FT | 825  | 683   | 448   | 622   | 498   | 472   | 513   | 4,170 | 9,010 | 4,320 | 2,370 | 831   |
| (+)   | 0    | 0     | 0     | 0     | 0     | 0     | 0     | 778   | 2,580 | 1,580 | 276   | 814   |

CAL YR 1970 TOTAL 10,410.2 MEAN 28.5 MAX 207 MIN 2.5 AC-FT 20,650  
WTR YR 1971 TOTAL 12,488.1 MEAN 34.2 MAX 229 MIN 3.3 AC-FT 24,770

(+) 4,230  
(+) 6,030

+ Diversions, in acre-feet, into Birch Creek from Willow Creek basin.

## MISSOURI RIVER MAIN STEM

33

06026500 Jefferson River near Twin Bridges, Mont.

LOCATION.--Lat 45°36'50", long 112°19'45", in SE 1/4 sec. 34, T.2 S., R.6 W., Madison County, on left bank 250 ft upstream from private bridge, 0.3 mile upstream from Hell Canyon Creek, 4 miles downstream from confluence of Beaverhead and Big Hole Rivers, and 5 miles north of Twin Bridges.

DRAINAGE AREA.--7,632 sq mi.

PERIOD OF RECORD.--August 1940 to September 1943, October 1957 to current year. Monthly discharge only for some periods, published in WSP 1309.

GAGE.--Water-stage recorder. Altitude of gage is 4,560 ft (from topographic map). August 1940 to September 1943, nonrecording gage at site 250 ft downstream at datum 4.46 ft lower.

AVERAGE DISCHARGE.--17 years, 1,990 cfs (1,442,000 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 10,000 cfs June 2 (gage height, 7.34 ft); minimum daily, 870 cfs Aug. 15, 17.

Period of record: Maximum discharge, 16,500 cfs June 10, 1964 (gage height, 9.04 ft); minimum, 82 cfs Aug. 17, 1966.

REMARKS.--Records good. Diversions for irrigation of about 319,700 acres above station. Some regulation by Lima and Ruby River Reservoirs (see p. 180) and Clark Canyon Reservoir (see p. 23). Records of chemical analyses, water temperatures, and suspended sediment loads for the current year are published in Part 2 of this report.

## DISCHARGE, IN CUBIC FEET PER SECCND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT           | NOV     | DEC        | JAN    | FEB        | MAR    | APR     | MAY     | JUN             | JUL     | AUG    | SEP    |
|-------------|---------------|---------|------------|--------|------------|--------|---------|---------|-----------------|---------|--------|--------|
| 1           | 1,550         | 1,660   | 1,830      | 1,350  | 2,050      | 1,360  | 1,900   | 3,690   | 9,690           | 6,780   | 1,320  | 1,520  |
| 2           | 1,540         | 1,700   | 1,700      | 1,300  | 2,360      | 1,400  | 1,900   | 4,020   | 9,890           | 5,650   | 1,270  | 1,490  |
| 3           | 1,530         | 1,700   | 1,600      | 1,250  | 2,120      | 1,330  | 1,850   | 4,360   | 9,610           | 5,210   | 1,210  | 1,550  |
| 4           | 1,450         | 1,660   | 1,600      | 1,200  | 1,790      | 1,350  | 1,790   | 4,870   | 8,600           | 4,960   | 1,240  | 1,610  |
| 5           | 1,460         | 1,670   | 1,600      | 1,150  | 1,760      | 1,330  | 1,810   | 5,670   | 8,110           | 4,810   | 1,280  | 1,650  |
| 6           | 1,470         | 1,720   | 1,590      | 1,200  | 1,740      | 1,280  | 1,850   | 6,160   | 7,630           | 4,460   | 1,270  | 1,650  |
| 7           | 1,490         | 1,780   | 1,610      | 1,300  | 1,730      | 1,320  | 1,990   | 6,650   | 7,280           | 4,140   | 1,290  | 1,730  |
| 8           | 1,520         | 1,780   | 1,670      | 1,350  | 1,730      | 1,350  | 2,210   | 6,980   | 6,900           | 3,850   | 1,330  | 1,740  |
| 9           | 1,590         | 1,770   | 1,680      | 1,400  | 1,650      | 1,350  | 2,270   | 7,280   | 7,300           | 3,580   | 1,280  | 1,730  |
| 10          | 1,640         | 1,810   | 1,620      | 1,400  | 1,650      | 1,350  | 2,350   | 7,500   | 7,750           | 3,370   | 1,190  | 1,720  |
| 11          | 1,680         | 1,780   | 1,580      | 1,400  | 1,720      | 1,240  | 2,570   | 7,600   | 8,420           | 3,260   | 1,130  | 1,680  |
| 12          | 1,700         | 1,740   | 1,550      | 1,400  | 1,740      | 1,250  | 2,330   | 7,530   | 8,710           | 3,120   | 1,080  | 1,640  |
| 13          | 1,780         | 1,730   | 1,540      | 1,250  | 1,760      | 1,380  | 2,150   | 7,780   | 8,730           | 3,010   | 1,030  | 1,590  |
| 14          | 1,790         | 1,720   | 1,450      | 1,100  | 1,760      | 1,360  | 1,980   | 8,650   | 9,100           | 2,770   | 900    | 1,550  |
| 15          | 1,790         | 1,650   | 1,440      | 1,200  | 1,780      | 1,360  | 2,040   | 8,990   | 8,810           | 2,470   | 870    | 1,530  |
| 16          | 1,820         | 1,610   | 1,490      | 1,300  | 1,740      | 1,340  | 2,680   | 9,070   | 8,320           | 2,320   | 900    | 1,530  |
| 17          | 1,780         | 1,640   | 1,450      | 1,400  | 1,700      | 1,330  | 2,700   | 9,100   | 7,800           | 2,320   | 870    | 1,560  |
| 18          | 1,730         | 1,710   | 1,410      | 1,450  | 1,680      | 1,280  | 2,540   | 8,340   | 7,230           | 2,300   | 920    | 1,590  |
| 19          | 1,620         | 1,710   | 1,360      | 1,450  | 1,650      | 1,180  | 2,300   | 7,750   | 6,700           | 2,170   | 1,000  | 1,590  |
| 20          | 1,620         | 1,650   | 1,350      | 1,460  | 1,550      | 1,180  | 2,290   | 6,750   | 6,300           | 2,170   | 1,050  | 1,600  |
| 21          | 1,600         | 1,620   | 1,350      | 1,320  | 1,500      | 1,310  | 2,750   | 5,870   | 6,090           | 2,140   | 1,030  | 1,620  |
| 22          | 1,600         | 1,540   | 1,350      | 1,390  | 1,460      | 1,300  | 2,990   | 5,320   | 6,060           | 2,080   | 970    | 1,660  |
| 23          | 1,600         | 1,470   | 1,300      | 1,330  | 1,510      | 1,330  | 3,390   | 4,810   | 6,280           | 2,030   | 1,010  | 1,640  |
| 24          | 1,680         | 1,510   | 1,300      | 1,340  | 1,470      | 1,330  | 3,820   | 4,400   | 6,450           | 1,980   | 1,030  | 1,620  |
| 25          | 1,720         | 1,900   | 1,350      | 1,310  | 1,460      | 1,350  | 4,420   | 4,140   | 6,090           | 1,860   | 1,050  | 1,640  |
| 26          | 1,700         | 2,040   | 1,450      | 1,330  | 1,390      | 1,360  | 4,460   | 4,200   | 6,090           | 1,730   | 1,110  | 1,720  |
| 27          | 1,670         | 1,860   | 1,480      | 1,350  | 1,440      | 1,430  | 3,780   | 4,500   | 7,030           | 1,590   | 1,100  | 1,730  |
| 28          | 1,580         | 1,850   | 1,500      | 1,360  | 1,430      | 1,490  | 3,280   | 5,210   | 7,600           | 1,490   | 1,070  | 1,700  |
| 29          | 1,540         | 1,780   | 1,500      | 1,360  | -----      | 1,520  | 3,080   | 6,600   | 8,320           | 1,500   | 1,060  | 1,740  |
| 30          | 1,520         | 1,830   | 1,480      | 1,490  | -----      | 1,510  | 3,310   | 7,950   | 8,080           | 1,460   | 1,310  | 1,790  |
| 31          | 1,550         | -----   | 1,450      | 1,740  | -----      | 1,620  | -----   | 9,020   | -----           | 1,390   | 1,520  | -----  |
| TOTAL       | 50,310        | 51,590  | 46,630     | 41,630 | 47,320     | 41,870 | 78,780  | 200,760 | 230,970         | 91,970  | 34,690 | 49,110 |
| MEAN        | 1,623         | 1,720   | 1,504      | 1,343  | 1,690      | 1,351  | 2,626   | 6,476   | 7,699           | 2,967   | 1,119  | 1,637  |
| MAX         | 1,820         | 2,040   | 1,830      | 1,740  | 2,360      | 1,620  | 4,460   | 9,100   | 9,890           | 6,780   | 1,520  | 1,790  |
| MIN         | 1,450         | 1,470   | 1,300      | 1,100  | 1,390      | 1,180  | 1,790   | 3,690   | 6,060           | 1,390   | 870    | 1,490  |
| AC-FT       | 99,790        | 102,300 | 92,490     | 82,570 | 93,860     | 83,050 | 156,300 | 398,200 | 458,100         | 182,400 | 68,810 | 97,410 |
| CAL YR 1970 | TOTAL 820,620 |         | MEAN 2,248 |        | MAX 10,300 |        | MIN 650 |         | AC-FT 1,628,000 |         |        |        |
| WTR YR 1971 | TOTAL 965,630 |         | MEAN 2,646 |        | MAX 9,890  |        | MIN 870 |         | AC-FT 1,915,000 |         |        |        |

NOTE.--Stage-discharge relation affected by ice Dec. 20 to Jan. 19.

## BOULDER RIVER BASIN

06033000 Boulder River near Boulder, Mont.

LOCATION.--Lat 46°12'40", long 112°05'27", in NE $\frac{1}{4}$ SW $\frac{1}{4}$  sec.3, T.5 N., R.4 W., Jefferson County, on left bank at downstream side of highway bridge, 0.8 mile downstream from Muskrat Creek and 2.2 miles southeast of Boulder.

DRAINAGE AREA.--381 sq mi.

PERIOD OF RECORD.--April 1929 to December 1932, March 1934 to current year. Monthly discharge only for some periods, published in WSP 1309.

GAGE.--Water-stage recorder. Altitude of gage is 4,810 ft (by barometer). Prior to Aug. 29, 1946, nonrecording gage.

AVERAGE DISCHARGE.--40 years, 121 cfs (87,660 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 1,550 cfs May 29 (gage height, 9.49 ft); minimum, 15 cfs Aug. 27, 28 (gage height, 5.78 ft).

Period of record: Maximum discharge, 3,490 cfs June 9, 1964 (gage height, 10.90 ft); no flow July 15-17, 21, 1931.

REMARKS.--Records good. Diversions for irrigation of about 3,500 acres above station.

REVISIONS (WATER YEARS).--WSP 1279: 1931.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT          | NOV   | DEC      | JAN   | FEB       | MAR   | APR    | MAY    | JUN           | JUL   | AUG   | SEP   |
|-------------|--------------|-------|----------|-------|-----------|-------|--------|--------|---------------|-------|-------|-------|
| 1           | 34           | 40    | 43       | 33    | 246       | 36    | 60     | 240    | 880           | 157   | 34    | 28    |
| 2           | 33           | 35    | 40       | 32    | 223       | 35    | 61     | 310    | 790           | 132   | 32    | 23    |
| 3           | 33           | 29    | 41       | 29    | 130       | 37    | 61     | 361    | 735           | 138   | 29    | 22    |
| 4           | 33           | 31    | 40       | 28    | 74        | 37    | 71     | 395    | 828           | 117   | 26    | 23    |
| 5           | 33           | 40    | 37       | 27    | 61        | 36    | 81     | 446    | 779           | 105   | 25    | 22    |
| 6           | 35           | 49    | 39       | 26    | 51        | 36    | 97     | 494    | 715           | 93    | 23    | 22    |
| 7           | 37           | 47    | 42       | 25    | 51        | 36    | 182    | 494    | 665           | 88    | 23    | 23    |
| 8           | 37           | 41    | 42       | 27    | 61        | 36    | 169    | 546    | 695           | 82    | 24    | 22    |
| 9           | 37           | 47    | 40       | 28    | 60        | 38    | 164    | 591    | 715           | 79    | 23    | 22    |
| 10          | 42           | 46    | 41       | 30    | 67        | 39    | 183    | 627    | 636           | 78    | 20    | 22    |
| 11          | 44           | 32    | 40       | 32    | 77        | 40    | 143    | 640    | 609           | 75    | 20    | 22    |
| 12          | 48           | 51    | 38       | 34    | 69        | 40    | 107    | 784    | 555           | 69    | 19    | 21    |
| 13          | 57           | 46    | 35       | 35    | 67        | 41    | 85     | 892    | 538           | 65    | 19    | 21    |
| 14          | 49           | 31    | 35       | 35    | 64        | 40    | 97     | 795    | 502           | 61    | 18    | 21    |
| 15          | 44           | 36    | 36       | 34    | 59        | 39    | 221    | 695    | 416           | 57    | 18    | 22    |
| 16          | 42           | 46    | 37       | 34    | 51        | 37    | 195    | 751    | 362           | 51    | 19    | 23    |
| 17          | 44           | 49    | 37       | 34    | 48        | 38    | 142    | 618    | 330           | 48    | 18    | 26    |
| 18          | 44           | 43    | 36       | 34    | 50        | 36    | 109    | 530    | 302           | 45    | 18    | 27    |
| 19          | 45           | 41    | 35       | 36    | 48        | 39    | 89     | 490    | 294           | 42    | 18    | 28    |
| 20          | 45           | 43    | 35       | 37    | 43        | 41    | 138    | 474    | 270           | 41    | 18    | 31    |
| 21          | 46           | 33    | 35       | 37    | 36        | 41    | 161    | 430    | 249           | 42    | 18    | 32    |
| 22          | 46           | 24    | 36       | 36    | 39        | 38    | 172    | 389    | 226           | 43    | 18    | 30    |
| 23          | 43           | 23    | 35       | 36    | 45        | 42    | 197    | 362    | 202           | 44    | 17    | 31    |
| 24          | 46           | 47    | 33       | 38    | 46        | 45    | 233    | 380    | 175           | 40    | 16    | 31    |
| 25          | 41           | 53    | 33       | 40    | 43        | 46    | 301    | 406    | 162           | 39    | 16    | 35    |
| 26          | 39           | 46    | 32       | 39    | 38        | 49    | 233    | 526    | 173           | 36    | 16    | 46    |
| 27          | 38           | 47    | 32       | 40    | 35        | 56    | 171    | 725    | 197           | 33    | 15    | 50    |
| 28          | 34           | 46    | 32       | 40    | 35        | 49    | 158    | 969    | 205           | 35    | 16    | 50    |
| 29          | 36           | 46    | 32       | 41    | -----     | 53    | 168    | 1,320  | 240           | 38    | 19    | 52    |
| 30          | 39           | 47    | 32       | 83    | -----     | 70    | 202    | 1,070  | 197           | 36    | 20    | 55    |
| 31          | 39           | ----- | 32       | 147   | -----     | 78    | -----  | 1,020  | -----         | 34    | 27    | ----- |
| TOTAL       | 1,263        | 1,235 | 1,133    | 1,207 | 1,917     | 1,324 | 4,451  | 18,770 | 13,642        | 2,043 | 642   | 883   |
| MEAN        | 40.7         | 41.2  | 36.5     | 38.9  | 68.5      | 42.7  | 148    | 605    | 455           | 65.9  | 20.7  | 29.4  |
| MAX         | 57           | 53    | 43       | 147   | 246       | 78    | 301    | 1,320  | 880           | 157   | 34    | 55    |
| MIN         | 33           | 23    | 32       | 25    | 35        | 35    | 60     | 240    | 162           | 33    | 15    | 21    |
| AC-FT       | 2,510        | 2,450 | 2,250    | 2,390 | 3,800     | 2,630 | 8,830  | 37,230 | 27,060        | 4,050 | 1,270 | 1,750 |
| CAL YR 1970 | TOTAL 57,426 |       | MEAN 157 |       | MAX 1,540 |       | MIN 15 |        | AC-FT 113,900 |       |       |       |
| WTR YR 1971 | TOTAL 48,510 |       | MEAN 133 |       | MAX 1,320 |       | MIN 15 |        | AC-FT 96,220  |       |       |       |

## PEAK DISCHARGE (BASE, 420 CFS)

| DATE | TIME | G.HT. | DISCHARGE | DATE | TIME | G.HT. | DISCHARGE |
|------|------|-------|-----------|------|------|-------|-----------|
| 5-13 | 0715 | 8.69  | 923       | 5-29 | 0730 | 9.49  | 1,550     |

## WILLOW CREEK BASIN

35

06035000 Willow Creek near Harrison, Mont.

LOCATION.--Lat 45°43'21", long 111°44'17", in SW¼NW¼ sec.28, T.1 S., R.1 W., Madison County, on right bank 2.2 miles upstream from Willow Creek Dam, 2.5 miles northeast of Harrison, and 11 miles upstream from mouth.

DRAINAGE AREA.--83.8 sq mi.

PERIOD OF RECORD.--April 1938 to current year. Monthly discharge only for some periods, published in WSP 1309.

GAGE.--Water-stage recorder and concrete control. Altitude of gage is 4,750 ft (from topographic map). Prior to Oct. 8, 1946, water-stage recorder at datum 0.22 ft higher, with different concrete control.

AVERAGE DISCHARGE.--33 years, 39.4 cfs (28,550 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 392 cfs June 27 (gage height, 2.96 ft); minimum, 8.2 cfs Aug. 11, 13, 14.

Period of record: Maximum discharge, 813 cfs Feb. 3, 1963 (gage height, 4.24 ft, from floodmarks), from rating curve extended above 300 cfs; minimum, 1.4 cfs Sept. 17, 1956 (gage height, 0.39 ft).

REMARKS.--Records good except those for winter period, which are poor. Diversions for irrigation of about 12,500 acres of which 3,500 acres is in Norwegian Creek drainage.

REVISIONS.--WSP 1559: Drainage area.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT                                                   | NOV   | DEC   | JAN   | FEB   | MAR   | APR   | MAY   | JUN   | JUL   | AUG   | SEP   |
|-------------|-------------------------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1           | 52                                                    | 42    | 46    | 23    | 51    | 32    | 31    | 45    | 48    | 147   | 12    | 30    |
| 2           | 52                                                    | 41    | 48    | 22    | 43    | 32    | 33    | 55    | 40    | 150   | 11    | 28    |
| 3           | 48                                                    | 42    | 44    | 21    | 37    | 37    | 31    | 63    | 39    | 168   | 13    | 37    |
| 4           | 46                                                    | 42    | 43    | 20    | 38    | 38    | 30    | 67    | 37    | 169   | 13    | 35    |
| 5           | 45                                                    | 41    | 42    | 20    | 44    | 38    | 31    | 76    | 32    | 169   | 10    | 32    |
| 6           | 51                                                    | 42    | 41    | 21    | 100   | 33    | 33    | 97    | 29    | 175   | 11    | 28    |
| 7           | 51                                                    | 41    | 40    | 21    | 136   | 40    | 37    | 90    | 27    | 163   | 12    | 40    |
| 8           | 51                                                    | 41    | 38    | 21    | 126   | 39    | 37    | 95    | 33    | 157   | 11    | 34    |
| 9           | 51                                                    | 41    | 36    | 21    | 106   | 34    | 35    | 99    | 53    | 148   | 10    | 31    |
| 10          | 53                                                    | 43    | 35    | 20    | 96    | 35    | 38    | 94    | 70    | 152   | 11    | 32    |
| 11          | 52                                                    | 40    | 34    | 19    | 71    | 34    | 34    | 96    | 110   | 143   | 9.7   | 33    |
| 12          | 61                                                    | 44    | 33    | 18    | 43    | 33    | 34    | 104   | 107   | 124   | 10    | 35    |
| 13          | 55                                                    | 43    | 33    | 17    | 41    | 32    | 31    | 123   | 124   | 109   | 9.7   | 35    |
| 14          | 48                                                    | 41    | 32    | 18    | 39    | 30    | 33    | 130   | 144   | 103   | 9.3   | 35    |
| 15          | 47                                                    | 43    | 31    | 20    | 37    | 30    | 42    | 115   | 146   | 92    | 11    | 37    |
| 16          | 46                                                    | 43    | 30    | 22    | 35    | 31    | 38    | 123   | 141   | 93    | 13    | 39    |
| 17          | 45                                                    | 43    | 29    | 24    | 38    | 27    | 36    | 114   | 149   | 90    | 11    | 42    |
| 18          | 45                                                    | 44    | 27    | 26    | 37    | 29    | 38    | 74    | 143   | 81    | 12    | 38    |
| 19          | 45                                                    | 43    | 26    | 27    | 35    | 35    | 36    | 50    | 146   | 74    | 11    | 38    |
| 20          | 44                                                    | 43    | 25    | 28    | 35    | 35    | 37    | 39    | 170   | 65    | 11    | 51    |
| 21          | 43                                                    | 39    | 24    | 30    | 35    | 30    | 38    | 29    | 194   | 57    | 11    | 59    |
| 22          | 44                                                    | 37    | 23    | 31    | 37    | 28    | 46    | 23    | 219   | 52    | 11    | 58    |
| 23          | 44                                                    | 45    | 23    | 35    | 39    | 34    | 38    | 18    | 254   | 46    | 12    | 55    |
| 24          | 44                                                    | 50    | 24    | 40    | 40    | 31    | 38    | 17    | 272   | 38    | 12    | 53    |
| 25          | 42                                                    | 55    | 25    | 59    | 33    | 32    | 54    | 12    | 262   | 33    | 9.1   | 51    |
| 26          | 42                                                    | 49    | 26    | 66    | 35    | 36    | 46    | 13    | 286   | 29    | 8.8   | 56    |
| 27          | 38                                                    | 45    | 26    | 70    | 30    | 36    | 44    | 17    | 362   | 23    | 10    | 55    |
| 28          | 39                                                    | 56    | 26    | 64    | 32    | 32    | 42    | 28    | 275   | 22    | 12    | 54    |
| 29          | 40                                                    | 52    | 25    | 67    | ----- | 32    | 43    | 55    | 219   | 18    | 14    | 53    |
| 30          | 39                                                    | 51    | 25    | 122   | ----- | 37    | 42    | 43    | 168   | 14    | 66    | 56    |
| 31          | 39                                                    | ----- | 24    | 82    | ----- | 38    | ----- | 68    | ----- | 13    | 38    | ----- |
| TOTAL       | 1,442                                                 | 1,322 | 984   | 1,095 | 1,469 | 1,040 | 1,126 | 2,072 | 4,299 | 2,917 | 425.6 | 1,260 |
| MEAN        | 46.5                                                  | 44.1  | 31.7  | 35.3  | 52.5  | 33.5  | 37.5  | 66.8  | 143   | 94.1  | 13.7  | 42.0  |
| MAX         | 61                                                    | 56    | 48    | 122   | 136   | 40    | 54    | 130   | 362   | 175   | 66    | 59    |
| MIN         | 38                                                    | 37    | 23    | 17    | 30    | 27    | 30    | 12    | 27    | 13    | 8.8   | 28    |
| AC-FT       | 2,860                                                 | 2,620 | 1,950 | 2,170 | 2,910 | 2,060 | 2,230 | 4,110 | 8,530 | 5,790 | 844   | 2,500 |
| CAL YR 1970 | TOTAL 22,256.0 MEAN 61.0 MAX 282 MIN 5.0 AC-FT 44,140 |       |       |       |       |       |       |       |       |       |       |       |
| WTR YR 1971 | TOTAL 19,451.6 MEAN 53.3 MAX 362 MIN 8.8 AC-FT 38,580 |       |       |       |       |       |       |       |       |       |       |       |

NOTE.--Stage-discharge relation affected by ice Dec. 4 to Jan. 24.



06037500 Madison River near West Yellowstone, Mont.

LOCATION.--Lat  $44^{\circ}39'24''$ , long  $111^{\circ}04'00''$ , in SW  $\frac{1}{4}$  sec.36, T.13 S., R.5 E., (unsurveyed), Yellowstone National Park, on left bank 0.3 mile upstream from Riverside ranger station, 1.6 miles east of West Yellowstone and west boundary of Yellowstone National Park, 12.5 miles downstream from confluence of Firehole and Gibbon Rivers, and at mile 120.

DRAINAGE AREA.--420 sq mi.

PERIOD OF RECORD.--June 1913 to December 1917, July 1918 to October 1921, June 1922 to current year. Monthly discharge only for some periods, published in WSP 1309.

GAGE.--Water-stage recorder. Altitude of gage is 6,650 ft (from topographic map). Prior to Oct. 20, 1918, nonrecording gage, and Oct. 20, 1918, to June 29, 1930, nonrecording gage or water-stage recorder, at sites 2.5 miles upstream at different datums. Supplementary nonrecording gage at site 0.3 mile downstream at different datum used at times during 1927-30.

AVERAGE DISCHARGE.--56 years (1913-17, 1918-21, 1922-71), 485 cfs (15.68 inches per year, 351,400 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, about 2,050 cfs June 15; minimum, 372 cfs Dec. 23.

Period of record: Maximum discharge, 2,150 cfs May 24, 1956 (gage height, 3.44 ft); maximum gage height, about 10.0 ft Jan. 8, 1937 (ice jam); minimum discharge, 100 cfs (estimated) Feb. 7, 1933.

REMARKS.--Records good except those for period of no gage height record, which are poor. No regulation or diversion above station.

REVISIONS (WATER YEARS).--WSP 1439: 1942. WSP 1729: Drainage area.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT           | NOV    | DEC      | JAN       | FEB     | MAR       | APR      | MAY           | JUN    | JUL    | AUG    | SEP    |
|-------------|---------------|--------|----------|-----------|---------|-----------|----------|---------------|--------|--------|--------|--------|
| 1           | 448           | 448    | 511      | 450       | 463     | 448       | 448      | 633           | 1,650  | 935    | 633    | 591    |
| 2           | 448           | 448    | 495      | 441       | 455     | 434       | 441      | 714           | 1,600  | 905    | 633    | 575    |
| 3           | 441           | 441    | 487      | 448       | 450     | 448       | 448      | 795           | 1,500  | 1,070  | 642    | 633    |
| 4           | 441           | 441    | 479      | 450       | 435     | 463       | 434      | 815           | 1,300  | 1,050  | 651    | 723    |
| 5           | 441           | 441    | 471      | 450       | 435     | 455       | 434      | 805           | 1,350  | 905    | 642    | 651    |
| 6           | 471           | 448    | 479      | 450       | 435     | 441       | 441      | 835           | 1,400  | 865    | 633    | 599    |
| 7           | 471           | 455    | 479      | 455       | 440     | 434       | 470      | 895           | 1,450  | 835    | 669    | 600    |
| 8           | 463           | 455    | 487      | 460       | 455     | 441       | 495      | 975           | 1,500  | 825    | 651    | 600    |
| 9           | 463           | 448    | 487      | 463       | 441     | 441       | 479      | 965           | 1,550  | 815    | 624    | 600    |
| 10          | 471           | 479    | 471      | 471       | 448     | 441       | 511      | 975           | 1,650  | 805    | 599    | 605    |
| 11          | 471           | 463    | 471      | 471       | 463     | 441       | 487      | 1,020         | 1,750  | 786    | 591    | 607    |
| 12          | 471           | 471    | 455      | 471       | 448     | 455       | 471      | 1,110         | 1,600  | 768    | 591    | 590    |
| 13          | 487           | 455    | 448      | 463       | 455     | 470       | 455      | 1,260         | 1,450  | 750    | 583    | 575    |
| 14          | 463           | 448    | 455      | 463       | 455     | 455       | 471      | 1,260         | 1,750  | 741    | 583    | 559    |
| 15          | 455           | 455    | 463      | 463       | 471     | 441       | 551      | 1,230         | 2,000  | 732    | 575    | 551    |
| 16          | 455           | 455    | 471      | 471       | 455     | 448       | 575      | 1,350         | 1,750  | 723    | 575    | 551    |
| 17          | 455           | 455    | 471      | 479       | 455     | 463       | 551      | 1,350         | 1,500  | 714    | 567    | 551    |
| 18          | 455           | 471    | 471      | 463       | 463     | 455       | 535      | 1,180         | 1,300  | 705    | 575    | 551    |
| 19          | 455           | 471    | 463      | 455       | 463     | 455       | 511      | 1,080         | 1,200  | 696    | 567    | 543    |
| 20          | 455           | 463    | 455      | 455       | 455     | 455       | 519      | 1,020         | 1,150  | 696    | 559    | 551    |
| 21          | 455           | 455    | 463      | 455       | 434     | 455       | 519      | 965           | 1,240  | 741    | 559    | 543    |
| 22          | 463           | 441    | 471      | 463       | 448     | 455       | 527      | 1,060         | 1,300  | 732    | 559    | 543    |
| 23          | 463           | 441    | 427      | 463       | 448     | 463       | 535      | 1,050         | 1,330  | 741    | 559    | 543    |
| 24          | 479           | 471    | 441      | 463       | 448     | 463       | 575      | 1,070         | 1,270  | 705    | 551    | 535    |
| 25          | 471           | 591    | 455      | 463       | 455     | 471       | 633      | 1,150         | 1,220  | 687    | 551    | 535    |
| 26          | 471           | 559    | 455      | 463       | 455     | 479       | 591      | 1,280         | 1,140  | 678    | 543    | 551    |
| 27          | 455           | 527    | 455      | 463       | 448     | 479       | 567      | 1,450         | 1,220  | 669    | 543    | 551    |
| 28          | 448           | 519    | 455      | 455       | 455     | 463       | 551      | 1,670         | 1,240  | 660    | 543    | 551    |
| 29          | 448           | 503    | 471      | 455       | -----   | 455       | 559      | 1,850         | 1,120  | 660    | 599    | 543    |
| 30          | 448           | 535    | 463      | 463       | -----   | 463       | 583      | 1,850         | 985    | 651    | 795    | 575    |
| 31          | 448           | -----  | 455      | 463       | -----   | 471       | -----    | 1,750         | -----  | 642    | 660    | -----  |
| TOTAL       | 14,229        | 14,153 | 14,480   | 14,261    | 12,631  | 14,101    | 15,367   | 35,412        | 42,465 | 23,887 | 18,605 | 17,276 |
| MEAN        | 459           | 472    | 467      | 460       | 451     | 455       | 512      | 1,142         | 1,416  | 771    | 600    | 576    |
| MAX         | 487           | 591    | 511      | 479       | 471     | 479       | 633      | 1,850         | 2,000  | 1,070  | 795    | 723    |
| MIN         | 441           | 441    | 427      | 441       | 434     | 434       | 434      | 633           | 985    | 642    | 543    | 535    |
| CFSM        | 1.09          | 1.12   | 1.11     | 1.10      | 1.07    | 1.08      | 1.22     | 2.72          | 3.37   | 1.84   | 1.43   | 1.37   |
| IN.         | 1.26          | 1.25   | 1.28     | 1.26      | 1.12    | 1.25      | 1.36     | 3.14          | 3.76   | 2.12   | 1.65   | 1.53   |
| AC-FT       | 28,220        | 28,070 | 28,720   | 28,290    | 25,050  | 27,970    | 30,480   | 70,240        | 84,230 | 47,380 | 36,900 | 34,270 |
| CAL YR 1970 | TOTAL 199,249 |        | MEAN 546 | MAX 1,630 | MIN 350 | CFSM 1.30 | IN 17.65 | AC-FT 395,200 |        |        |        |        |
| WTR YR 1971 | TOTAL 236,867 |        | MEAN 649 | MAX 2,000 | MIN 427 | CFSM 1.55 | IN 20.98 | AC-FT 469,800 |        |        |        |        |

PEAK DISCHARGE (BASE, 950 CFS)

NOTE.--No gage-height record May 30 to June 20.

| DATE | TIME | G.HT. | DISCHARGE | DATE | TIME | G.HT. | DISCHARGE |
|------|------|-------|-----------|------|------|-------|-----------|
| 5-16 | 1200 | 2.89  | 1,410     | 6-15 | --   | --    | a2,050    |
| 5-30 | --   | --    | a1,900    | 7-3  | 1800 | 2.75  | 1,180     |

a About.

06038500 Madison River below Hebgen Lake, near Grayling, Mont.

LOCATION.--Lat 44°52'00", long 111°20'15", near northeast corner of sec.22, T.11 S., R.3 E., Gallatin County, on right bank 1,500 ft downstream from Hebgen Dam, 8 miles northwest of Grayling, 17 miles upstream from West Fork, and at mile 103.

DRAINAGE AREA.--905 sq mi.

PERIOD OF RECORD.--June 1909 to current year. Prior to October 1938 adjusted runoff only, published in WSP 1309. Prior to October 1949, published as "below Hebgen Reservoir".

GAGE.--Water-stage recorder. Datum of gage is 6,448.47 ft above mean sea level (after 1959 earthquake). Prior to July 13, 1943, nonrecording gage in stilling well.

AVERAGE DISCHARGE.--62 years, 978 cfs (14.68 inches per year, 708,600 acre-ft per year), adjusted for storage.

EXTREMES.--Current year: Maximum discharge, 3,250 cfs June 28 (gage height, 3.13 ft); minimum daily, 395 cfs Sept. 13.

Period of record: Maximum discharge, 10,200 cfs Aug. 17, 1959, caused by wave over Hebgen Dam during earthquake (gage height, 5.3 ft, from floodmark), from rating curve extended above 3,500 cfs on basis of slope-area measurement of peak flow; minimum daily, 5 cfs May 9-12, 1960.

REMARKS.--Records good. Flow completely regulated by Hebgen Lake (see p. 180 ). Diversions for irrigation of about 1,100 acres above station.

REVISIONS (WATER YEARS).--WSP 1509: 1948. WSP 1559: Drainage area. WSP 1629: 1943. WSP 1709: 1959. WSP 1729: 1943.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY    | OCT    | NOV    | DEC    | JAN    | FEB    | MAR    | APR     | MAY     | JUN     | JUL    | AUG     | SEP    |
|--------|--------|--------|--------|--------|--------|--------|---------|---------|---------|--------|---------|--------|
| 1      | 1,660  | 1,550  | 860    | 1,030  | 810    | 750    | 930     | 2,170   | 1,330   | 2,050  | 1,640   | 1,870  |
| 2      | 1,660  | 1,560  | 860    | 1,030  | 820    | 750    | 1,110   | 2,270   | 1,570   | 1,940  | 1,640   | 1,810  |
| 3      | 1,640  | 1,550  | 860    | 993    | 820    | 720    | 1,360   | 2,270   | 1,680   | 1,640  | 1,640   | 1,810  |
| 4      | 1,420  | 1,550  | 920    | 960    | 820    | 690    | 1,360   | 2,270   | 1,680   | 1,500  | 1,640   | 1,810  |
| 5      | 900    | 1,550  | 971    | 960    | 820    | 690    | 1,350   | 2,290   | 1,650   | 1,670  | 1,680   | 1,810  |
| 6      | 910    | 1,550  | 971    | 960    | 820    | 700    | 1,350   | 2,300   | 1,670   | 1,860  | 1,810   | 1,800  |
| 7      | 910    | 1,550  | 971    | 920    | 820    | 700    | 1,350   | 2,100   | 1,670   | 1,930  | 1,810   | 1,800  |
| 8      | 890    | 1,550  | 971    | 880    | 820    | 700    | 1,350   | 1,610   | 1,680   | 1,930  | 1,790   | 1,880  |
| 9      | 840    | 1,550  | 971    | 880    | 830    | 650    | 1,350   | 1,610   | 1,700   | 1,840  | 1,790   | 2,080  |
| 10     | 830    | 1,570  | 982    | 880    | 840    | 610    | 1,350   | 1,190   | 1,680   | 1,790  | 1,820   | 2,100  |
| 11     | 830    | 1,570  | 982    | 880    | 840    | 610    | 1,350   | 468     | 1,680   | 1,540  | 1,820   | 2,100  |
| 12     | 930    | 1,570  | 982    | 880    | 840    | 600    | 1,350   | 864     | 1,620   | 1,390  | 1,820   | 1,930  |
| 13     | 971    | 1,560  | 971    | 890    | 840    | 610    | 1,530   | 1,620   | 1,610   | 1,240  | 1,820   | 395    |
| 14     | 1,310  | 1,560  | 1,000  | 890    | 840    | 620    | 1,700   | 1,620   | 1,620   | 1,150  | 1,910   | 534    |
| 15     | 1,460  | 1,560  | 1,030  | 890    | 840    | 630    | 1,820   | 1,620   | 1,760   | 1,150  | 1,820   | 1,170  |
| 16     | 1,460  | 1,560  | 1,030  | 890    | 840    | 600    | 1,840   | 1,650   | 2,120   | 1,230  | 1,810   | 1,160  |
| 17     | 1,450  | 1,560  | 1,030  | 890    | 850    | 560    | 1,840   | 1,650   | 2,380   | 1,350  | 1,810   | 1,160  |
| 18     | 1,450  | 1,560  | 1,030  | 890    | 850    | 572    | 1,820   | 1,620   | 2,440   | 1,400  | 1,810   | 1,160  |
| 19     | 1,520  | 1,550  | 1,030  | 860    | 850    | 560    | 1,820   | 1,640   | 2,860   | 1,400  | 1,800   | 1,160  |
| 20     | 1,670  | 1,550  | 1,030  | 820    | 850    | 560    | 1,810   | 1,650   | 2,760   | 1,400  | 1,800   | 1,000  |
| 21     | 1,590  | 1,550  | 1,030  | 820    | 850    | 560    | 1,790   | 1,650   | 2,500   | 1,400  | 1,790   | 919    |
| 22     | 1,560  | 1,550  | 1,030  | 820    | 850    | 560    | 1,930   | 1,680   | 2,380   | 1,390  | 1,100   | 1,190  |
| 23     | 1,590  | 1,550  | 1,030  | 810    | 850    | 560    | 2,290   | 1,670   | 2,460   | 1,390  | 800     | 1,190  |
| 24     | 1,570  | 1,410  | 1,030  | 810    | 810    | 560    | 2,290   | 1,680   | 2,660   | 1,390  | 798     | 1,220  |
| 25     | 1,560  | 1,040  | 1,030  | 810    | 770    | 570    | 2,290   | 1,700   | 2,940   | 1,350  | 963     | 1,290  |
| 26     | 1,560  | 780    | 1,030  | 810    | 770    | 580    | 2,280   | 1,710   | 2,700   | 1,210  | 1,810   | 1,290  |
| 27     | 1,560  | 780    | 1,030  | 810    | 760    | 570    | 2,280   | 1,730   | 2,640   | 1,170  | 1,810   | 1,300  |
| 28     | 1,550  | 810    | 1,030  | 810    | 750    | 570    | 2,270   | 1,680   | 2,820   | 1,480  | 1,800   | 1,310  |
| 29     | 1,450  | 860    | 1,030  | 880    | -----  | 640    | 2,270   | 1,540   | 3,020   | 1,600  | 1,810   | 1,300  |
| 30     | 1,530  | 860    | 1,030  | 810    | -----  | 790    | 2,280   | 1,540   | 2,440   | 1,600  | 1,820   | 1,380  |
| 31     | 1,530  | -----  | 1,030  | 810    | -----  | 890    | -----   | 1,530   | -----   | 1,610  | 1,820   | -----  |
| TOTAL  | 41,661 | 42,320 | 30,782 | 27,273 | 23,070 | 19,732 | 51,710  | 52,592  | 63,720  | 46,990 | 51,801  | 42,878 |
| MEAN   | 1,344  | 1,411  | 993    | 880    | 824    | 637    | 1,724   | 1,697   | 2,124   | 1,516  | 1,671   | 1,429  |
| MAX    | 1,670  | 1,570  | 1,030  | 1,030  | 850    | 890    | 2,290   | 2,300   | 3,020   | 2,050  | 1,910   | 2,100  |
| MIN    | 430    | 780    | 860    | 810    | 750    | 560    | 930     | 468     | 1,330   | 1,150  | 798     | 395    |
| AC-FT  | 82,630 | 83,940 | 61,060 | 54,100 | 45,760 | 39,140 | 102,600 | 104,300 | 126,400 | 93,200 | 102,700 | 85,050 |
| MEAN†  | 934    | 828    | 993    | 880    | 824    | 889    | 1,039   | 2,578   | 3,499   | 1,462  | 1,140   | 1,086  |
| CFSM†  | 1.03   | .91    | 1.10   | .97    | .91    | .98    | 1.15    | 2.85    | 3.87    | 1.62   | 1.26    | 1.20   |
| IN.†   | 1.19   | 1.02   | 1.27   | 1.12   | .95    | 1.13   | 1.28    | 3.28    | 4.31    | 1.86   | 1.45    | 1.34   |
| AC-FT† | 57,430 | 49,240 | 61,060 | 54,100 | 45,760 | 54,640 | 61,800  | 158,500 | 208,200 | 89,900 | 70,100  | 64,650 |

## OBSERVED

|             |       |         |      |       |     |       |     |     |       |         |
|-------------|-------|---------|------|-------|-----|-------|-----|-----|-------|---------|
| CAL YR 1970 | TOTAL | 430,918 | MEAN | 1,181 | MAX | 4,000 | MIN | 368 | AC-FT | 854,700 |
| WTR YR 1971 | TOTAL | 494,529 | MEAN | 1,355 | MAX | 3,020 | MIN | 395 | AC-FT | 980,900 |

## ADJUSTED

|             |       |         |      |       |      |      |     |       |       |         |
|-------------|-------|---------|------|-------|------|------|-----|-------|-------|---------|
| CAL YR 1970 | TOTAL | 430,950 | MEAN | 1,181 | CFSM | 1.30 | IN. | 17.72 | AC-FT | 854,800 |
| WTR YR 1971 | TOTAL | 491,743 | MEAN | 1,347 | CFSM | 1.49 | IN. | 20.20 | AC-FT | 975,400 |

† Adjusted for change in contents in Hebgen Lake.

## MADISON RIVER BASIN

06041000 Madison River below Ennis Lake, near McAllister, Mont.

LOCATION.--Lat 45°29'25", long 111°38'00", in NW¼ sec.17, T.4 S., R.1 E., Madison County, on right bank 500 ft downstream from Madison Powerplant, 1.5 miles downstream from Ennis Lake, and 5.7 miles northeast of McAllister.

DRAINAGE AREA.--2,186 sq mi.

PERIOD OF RECORD.--October 1901 to December 1905, October 1906 to current year. Prior to October 1938 adjusted monthly runoff only, published in WSP 1309. Published as "below Madison Reservoir" 1938-49. Records published as "near Red Bluff" 1890-94 and as "near Norris" 1910 are not equivalent and are published as "near Norris" in WSP 1309.

GAGE.--Water-stage recorder. Altitude of gage is 4,700 ft (from topographic map). Prior to May 7, 1941, non-recording gage in wooden stilling well at present site at different datum. May 7, 1941, to Jan. 13, 1945, nonrecording gages in concrete stilling well at present site and datum.

AVERAGE DISCHARGE.--33 years (1938-71), 1,712 cfs (1,240,000 acre-ft per year), unadjusted.

EXTREMES.--Current year: Maximum discharge, 8,730 cfs June 28 (gage height, 7.92 ft); minimum daily, 923 cfs Mar. 3.

Period of record: Maximum discharge observed, 9,550 cfs June 12, 1970 (gage height, 8.01 ft); minimum daily, 210 cfs Aug. 25, 26, 1959.

REMARKS.--Records good. Flow regulated by Hebgen and Ennis Lakes (see p. 180). Diversions for irrigation of about 23,000 acres above station.

REVISIONS.--WSP 1559: Drainage area.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT           | NOV     | DEC        | JAN    | FEB       | MAR    | APR       | MAY     | JUN             | JUL     | AUG     | SEP     |
|-------------|---------------|---------|------------|--------|-----------|--------|-----------|---------|-----------------|---------|---------|---------|
| 1           | 3,030         | 2,490   | 1,550      | 1,930  | 1,970     | 1,300  | 1,500     | 3,260   | 4,300           | 5,110   | 2,390   | 3,000   |
| 2           | 2,950         | 2,120   | 1,560      | 1,910  | 1,960     | 1,130  | 1,730     | 3,270   | 3,560           | 4,090   | 2,410   | 2,160   |
| 3           | 2,810         | 2,040   | 1,250      | 1,700  | 1,880     | 923    | 1,750     | 3,430   | 3,250           | 3,930   | 2,400   | 2,370   |
| 4           | 2,710         | 2,280   | 1,440      | 1,080  | 1,650     | 1,100  | 1,770     | 3,670   | 3,280           | 4,010   | 2,440   | 2,590   |
| 5           | 2,010         | 2,280   | 1,990      | 1,140  | 1,350     | 1,270  | 1,840     | 3,690   | 3,310           | 3,950   | 2,450   | 2,550   |
| 6           | 1,530         | 2,260   | 1,970      | 1,250  | 1,240     | 1,270  | 1,910     | 3,610   | 3,340           | 3,740   | 2,430   | 2,540   |
| 7           | 1,530         | 2,270   | 1,960      | 1,300  | 1,320     | 1,260  | 2,210     | 3,590   | 3,410           | 3,680   | 2,650   | 2,530   |
| 8           | 1,540         | 2,290   | 1,940      | 1,380  | 1,410     | 1,270  | 2,430     | 3,550   | 3,740           | 3,720   | 2,750   | 2,570   |
| 9           | 1,540         | 2,280   | 1,980      | 1,190  | 1,570     | 1,480  | 2,440     | 3,430   | 4,220           | 3,740   | 2,700   | 2,650   |
| 10          | 1,540         | 2,290   | 2,040      | 1,390  | 1,570     | 1,590  | 2,400     | 3,370   | 4,450           | 3,810   | 2,550   | 2,810   |
| 11          | 1,550         | 2,330   | 1,980      | 1,570  | 1,580     | 1,560  | 2,310     | 3,150   | 4,930           | 3,730   | 2,480   | 2,740   |
| 12          | 1,560         | 2,310   | 1,810      | 1,570  | 1,730     | 1,590  | 2,060     | 2,760   | 5,360           | 3,570   | 2,470   | 2,720   |
| 13          | 1,560         | 2,330   | 1,110      | 1,570  | 1,830     | 1,580  | 1,990     | 2,740   | 5,250           | 3,170   | 2,470   | 2,110   |
| 14          | 1,560         | 2,350   | 1,210      | 1,570  | 1,820     | 1,580  | 2,170     | 3,440   | 5,180           | 2,530   | 2,450   | 1,460   |
| 15          | 1,660         | 2,360   | 1,570      | 1,560  | 1,810     | 1,580  | 2,500     | 3,520   | 5,050           | 2,170   | 2,450   | 1,860   |
| 16          | 2,110         | 2,360   | 1,850      | 1,620  | 1,800     | 1,410  | 2,990     | 3,480   | 4,970           | 2,200   | 2,440   | 1,790   |
| 17          | 1,990         | 2,430   | 2,070      | 1,570  | 1,700     | 1,160  | 3,020     | 3,530   | 5,120           | 2,330   | 2,440   | 1,780   |
| 18          | 2,030         | 2,450   | 2,020      | 1,830  | 1,590     | 1,330  | 2,940     | 3,430   | 5,320           | 2,560   | 2,430   | 1,770   |
| 19          | 1,900         | 2,410   | 1,610      | 2,000  | 1,590     | 1,290  | 2,850     | 3,170   | 5,380           | 2,850   | 2,420   | 1,770   |
| 20          | 2,090         | 2,330   | 1,610      | 2,340  | 1,590     | 1,150  | 2,800     | 2,510   | 5,580           | 2,940   | 2,250   | 1,760   |
| 21          | 2,240         | 2,320   | 1,550      | 2,390  | 1,580     | 1,150  | 2,770     | 2,290   | 5,930           | 2,900   | 2,030   | 1,520   |
| 22          | 2,370         | 2,390   | 1,440      | 1,730  | 1,440     | 1,230  | 2,770     | 2,550   | 6,020           | 2,860   | 2,100   | 1,340   |
| 23          | 2,470         | 2,400   | 1,440      | 1,130  | 1,360     | 1,230  | 2,890     | 2,600   | 6,130           | 2,640   | 2,050   | 1,350   |
| 24          | 2,720         | 2,400   | 1,390      | 1,070  | 1,530     | 1,230  | 3,090     | 2,760   | 6,200           | 2,490   | 1,790   | 1,470   |
| 25          | 2,650         | 2,400   | 1,370      | 1,340  | 1,580     | 1,070  | 3,130     | 2,990   | 6,180           | 2,410   | 1,550   | 1,660   |
| 26          | 2,290         | 2,310   | 1,520      | 1,640  | 1,470     | 1,220  | 3,210     | 3,100   | 6,150           | 2,260   | 1,480   | 1,700   |
| 27          | 2,320         | 1,870   | 1,580      | 1,800  | 1,410     | 1,250  | 3,290     | 3,170   | 7,130           | 2,270   | 1,590   | 1,740   |
| 28          | 2,210         | 1,520   | 1,470      | 1,890  | 1,400     | 1,350  | 3,240     | 3,630   | 8,320           | 2,290   | 1,880   | 1,770   |
| 29          | 2,270         | 1,530   | 1,470      | 1,940  | -----     | 1,350  | 3,200     | 4,630   | 7,530           | 2,350   | 2,350   | 1,900   |
| 30          | 2,220         | 1,540   | 1,580      | 1,940  | -----     | 1,370  | 3,230     | 4,860   | 6,580           | 2,360   | 3,060   | 2,370   |
| 31          | 2,570         | -----   | 1,750      | 1,960  | -----     | 1,380  | -----     | 4,560   | -----           | 2,380   | 3,160   | -----   |
| TOTAL       | 65,530        | 66,940  | 51,080     | 50,300 | 44,730    | 40,653 | 76,430    | 103,740 | 155,170         | 95,040  | 72,510  | 62,350  |
| MEAN        | 2,114         | 2,231   | 1,648      | 1,623  | 1,598     | 1,311  | 2,548     | 3,346   | 5,172           | 3,066   | 2,339   | 2,078   |
| MAX         | 3,030         | 2,490   | 2,070      | 2,390  | 1,970     | 1,590  | 3,290     | 4,860   | 8,320           | 5,110   | 3,160   | 3,000   |
| MIN         | 1,530         | 1,520   | 1,110      | 1,070  | 1,240     | 923    | 1,500     | 2,290   | 3,250           | 2,170   | 1,480   | 1,340   |
| AC-FT       | 130,000       | 132,800 | 101,300    | 99,770 | 88,720    | 80,640 | 151,600   | 205,800 | 307,800         | 188,500 | 143,800 | 123,700 |
| CAL YR 1970 | TOTAL 788,890 |         | MEAN 2,161 |        | MAX 9,210 |        | MIN 1,110 |         | AC-FT 1,565,000 |         |         |         |
| WTR YR 1971 | TOTAL 884,473 |         | MEAN 2,423 |        | MAX 8,320 |        | MIN 923   |         | AC-FT 1,754,000 |         |         |         |

## GALLATIN RIVER BASIN

39 -

06048500 Bridger Creek near Bozeman, Mont.

LOCATION.--Lat 45°42'20", long 110°57'40", in NE¼SE¼ sec.34, T.1 S., R.6 E., Gallatin County, on right bank 3.6 miles upstream from mouth and 3.5 miles northeast of Bozeman.

DRAINAGE AREA.--62.5 sq mi.

PERIOD OF RECORD.--October 1945 to September 1969, April to September 1971. Monthly discharge only for some periods, published in WSP 1309.

GAGE.--Water-stage recorder. Altitude of gage is 4,960 ft (from topographic map). Prior to June 28, 1946, nonrecording gage.

AVERAGE DISCHARGE.--24 years, 36.6 cfs (7.95 inches per year, 26,520 acre-ft per year).

EXTREMES.--Current year: Maximum discharge during period April to September 1971, 615 cfs May 14 (gage height 3.23 ft); minimum, 7.7 cfs Aug. 27, 28.

Period of record: Maximum discharge, 902 cfs June 3, 1953 (gage height, 4.90 ft, from reconstructed gage-height graph), from rating curve extended above 380 cfs; minimum, 0.9 cfs Mar. 23, 1953, Aug. 30, 1954.

REMARKS.--Records good. Diversions for irrigation of about 1,200 acres above station.

REVISIONS (WATER YEARS).--WSP 1309: 1948. WSP 1559: Drainage area.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY   | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY    | JUN   | JUL   | AUG   | SEP   |
|-------|-----|-----|-----|-----|-----|-----|-----|--------|-------|-------|-------|-------|
| 1     |     |     |     |     |     |     |     | 196    | 280   | 63    | 20    | 9.4   |
| 2     |     |     |     |     |     |     |     | 270    | 253   | 61    | 19    | 9.2   |
| 3     |     |     |     |     |     |     |     | 336    | 233   | 61    | 18    | 11    |
| 4     |     |     |     |     |     |     |     | 406    | 223   | 55    | 17    | 13    |
| 5     |     |     |     |     |     |     |     | 455    | 213   | 52    | 16    | 11    |
| 6     |     |     |     |     |     |     |     | 418    | 203   | 51    | 17    | 10    |
| 7     |     |     |     |     |     |     |     | 387    | 193   | 48    | 15    | 13    |
| 8     |     |     |     |     |     |     |     | 406    | 184   | 42    | 15    | 11    |
| 9     |     |     |     |     |     |     |     | 406    | 191   | 43    | 15    | 10    |
| 10    |     |     |     |     |     |     |     | 395    | 187   | 41    | 14    | 9.7   |
| 11    |     |     |     |     |     |     |     | 383    | 189   | 39    | 14    | 9.2   |
| 12    |     |     |     |     |     |     |     | 383    | 178   | 37    | 13    | 8.9   |
| 13    |     |     |     |     |     |     |     | 430    | 165   | 35    | 12    | 8.6   |
| 14    |     |     |     |     |     |     |     | 530    | 154   | 34    | 11    | 8.8   |
| 15    |     |     |     |     |     |     |     | 376    | 147   | 33    | 12    | 8.6   |
| 16    |     |     |     |     |     |     |     | 350    | 139   | 30    | 12    | 9.6   |
| 17    |     |     |     |     |     |     |     | 312    | 129   | 31    | 11    | 10    |
| 18    |     |     |     |     |     |     |     | 258    | 120   | 29    | 12    | 10    |
| 19    |     |     |     |     |     |     |     | 218    | 111   | 29    | 11    | 10    |
| 20    |     |     |     |     |     |     |     | 203    | 104   | 28    | 10    | 11    |
| 21    |     |     |     |     |     |     |     | 196    | 99    | 28    | 11    | 11    |
| 22    |     |     |     |     |     |     |     | 198    | 93    | 27    | 10    | 10    |
| 23    |     |     |     |     |     |     |     | 205    | 89    | 26    | 9.7   | 9.8   |
| 24    |     |     |     |     |     |     |     | 210    | 85    | 24    | 9.8   | 9.2   |
| 25    |     |     |     |     |     |     |     | 225    | 79    | 24    | 9.6   | 9.8   |
| 26    |     |     |     |     |     |     |     | 264    | 75    | 23    | 9.0   | 11    |
| 27    |     |     |     |     |     |     | 176 | 347    | 113   | 23    | 8.5   | 11    |
| 28    |     |     |     |     |     |     | 165 | 395    | 95    | 23    | 8.5   | 11    |
| 29    |     |     |     |     |     |     | 160 | 430    | 86    | 23    | 9.0   | 10    |
| 30    |     |     |     |     |     |     | 165 | 399    | 72    | 21    | 12    | 11    |
| 31    |     |     |     |     |     |     |     | 336    |       | 20    | 11    |       |
| TOTAL |     |     |     |     |     |     |     | 10,323 | 4,482 | 1,104 | 392.1 | 305.8 |
| MEAN  |     |     |     |     |     |     |     | 333    | 149   | 35.6  | 12.6  | 10.2  |
| MAX   |     |     |     |     |     |     |     | 530    | 280   | 63    | 20    | 13    |
| MIN   |     |     |     |     |     |     |     | 196    | 72    | 20    | 8.5   | 8.6   |
| AC-FT |     |     |     |     |     |     |     | 20,480 | 8,890 | 2,190 | 778   | 607   |

## PEAK DISCHARGE (BASE, 140 CFS)

| DATE | TIME | G.HT. | DISCHARGE | DATE | TIME | G.HT. | DISCHARGE |
|------|------|-------|-----------|------|------|-------|-----------|
| 5-14 | 0100 | 3.23  | 615       | 5-29 | 1400 | 2.86  | 434       |



## GALLATIN RIVER BASIN

06050000 Hyalite Creek at Hyalite ranger station, near Bozeman, Mont.

LOCATION.--Lat 45°33'42", long 111°04'12", in NW 1/4 sec. 23, T.3 S., R.5 E., Gallatin County, Gallatin National Forest, on right bank 0.8 mile south of Hyalite ranger station, 7.3 miles south of Bozeman, and 20 miles upstream from mouth.

DRAINAGE AREA.--48.2 sq mi.

PERIOD OF RECORD.--August 1895 to October 1896, calendar year 1897 (discharge measurements only), April 1898 to October 1899, June to October 1900, May to September 1902, calendar year 1903 (discharge measurements only), September to December 1904, September 1934 to current year. Monthly discharge only for some periods, published in WSP 1309. Prior to 1934, published as Middle Creek near Bozeman.

GAGE.--Water-stage recorder. Datum of gage is 5,539.6 ft above mean sea level. Prior to September 1934, non-recording gages at two sites 0.5 mile upstream at different datums. Sept. 13, 1934, to May 13, 1948, water-stage recorder at site 0.3 mile downstream at different datum.

AVERAGE DISCHARGE.--39 years (1895-96, 1898-99, 1934-71), 65.7 cfs (18.51 inches per year, 47,600 acre-ft per year), adjusted for storage in Middle Creek Reservoir.

EXTREMES.--Current year: Maximum discharge, 521 cfs June 27 (gage height, 2.62 ft); maximum gage height, 2.84 ft Feb. 6 (backwater from ice); minimum daily discharge, 10 cfs Jan. 6.

Period of record: Maximum discharge observed, 956 cfs June 14, 1898 (gage height, 2.10 ft, site and datum then in use); minimum daily, 5 cfs Jan. 27, 1961.

REMARKS.--Records fair. Flow regulated by Middle Creek Reservoir since March 1951 (see p. 181).

REVISIONS (WATER YEARS).--WSP 84: 1898-99. WSP 1509: 1902, 1939(M). WSP 1559: Drainage area. WSP 1709: 1953, 1956-57.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY    | OCT   | NOV   | DEC   | JAN   | FEB   | MAR   | APR   | MAY    | JUN    | JUL    | AUG   | SEP   |
|--------|-------|-------|-------|-------|-------|-------|-------|--------|--------|--------|-------|-------|
| 1      | 62    | 45    | 28    | 12    | 21    | 17    | 23    | 131    | 261    | 234    | 159   | 73    |
| 2      | 62    | 45    | 27    | 12    | 17    | 16    | 23    | 159    | 251    | 212    | 155   | 73    |
| 3      | 62    | 45    | 26    | 12    | 17    | 15    | 22    | 167    | 252    | 237    | 155   | 87    |
| 4      | 62    | 47    | 24    | 12    | 17    | 15    | 21    | 179    | 263    | 250    | 151   | 81    |
| 5      | 65    | 44    | 25    | 11    | 16    | 15    | 21    | 179    | 258    | 283    | 151   | 78    |
| 6      | 65    | 45    | 21    | 10    | 15    | 16    | 23    | 175    | 256    | 261    | 151   | 78    |
| 7      | 63    | 45    | 21    | 11    | 14    | 17    | 26    | 196    | 253    | 268    | 151   | 84    |
| 8      | 63    | 47    | 21    | 11    | 15    | 18    | 26    | 192    | 249    | 250    | 155   | 78    |
| 9      | 65    | 47    | 21    | 11    | 16    | 18    | 28    | 188    | 224    | 231    | 155   | 78    |
| 10     | 67    | 50    | 21    | 11    | 20    | 18    | 31    | 192    | 231    | 199    | 151   | 78    |
| 11     | 65    | 48    | 20    | 12    | 21    | 18    | 28    | 196    | 245    | 247    | 155   | 78    |
| 12     | 67    | 48    | 19    | 12    | 21    | 18    | 25    | 192    | 254    | 280    | 155   | 76    |
| 13     | 59    | 48    | 19    | 13    | 22    | 18    | 23    | 209    | 251    | 271    | 151   | 78    |
| 14     | 58    | 45    | 18    | 14    | 21    | 18    | 26    | 209    | 268    | 230    | 151   | 81    |
| 15     | 57    | 40    | 18    | 15    | 21    | 21    | 32    | 235    | 263    | 192    | 151   | 81    |
| 16     | 57    | 39    | 18    | 15    | 21    | 23    | 28    | 192    | 257    | 179    | 143   | 73    |
| 17     | 57    | 39    | 17    | 16    | 22    | 23    | 44    | 163    | 252    | 196    | 139   | 70    |
| 18     | 56    | 39    | 17    | 17    | 20    | 23    | 66    | 131    | 237    | 209    | 147   | 70    |
| 19     | 57    | 39    | 16    | 17    | 20    | 23    | 62    | 147    | 236    | 217    | 147   | 73    |
| 20     | 57    | 37    | 16    | 16    | 20    | 23    | 60    | 147    | 230    | 196    | 143   | 76    |
| 21     | 58    | 39    | 15    | 15    | 19    | 23    | 58    | 139    | 200    | 163    | 139   | 56    |
| 22     | 57    | 33    | 15    | 14    | 19    | 25    | 58    | 139    | 173    | 159    | 128   | 54    |
| 23     | 57    | 32    | 15    | 15    | 19    | 23    | 60    | 175    | 171    | 167    | 120   | 54    |
| 24     | 59    | 35    | 14    | 12    | 20    | 23    | 95    | 204    | 209    | 175    | 120   | 56    |
| 25     | 56    | 38    | 14    | 12    | 21    | 22    | 131   | 213    | 330    | 175    | 105   | 56    |
| 26     | 56    | 39    | 14    | 12    | 22    | 23    | 113   | 235    | 397    | 175    | 109   | 56    |
| 27     | 56    | 37    | 13    | 12    | 20    | 23    | 102   | 248    | 467    | 151    | 81    | 53    |
| 28     | 54    | 37    | 13    | 12    | 18    | 23    | 98    | 257    | 410    | 147    | 78    | 52    |
| 29     | 56    | 34    | 13    | 12    | ----- | 23    | 105   | 257    | 368    | 147    | 81    | 52    |
| 30     | 48    | 28    | 13    | 17    | ----- | 25    | 109   | 248    | 288    | 155    | 81    | 52    |
| 31     | 48    | ----- | 13    | 23    | ----- | 26    | ----- | 261    | -----  | 159    | 70    | ----- |
| TOTAL  | 1,831 | 1,234 | 565   | 416   | 535   | 632   | 1,567 | 5,955  | 8,004  | 6,415  | 4,128 | 2,085 |
| MEAN   | 59.1  | 41.1  | 18.2  | 13.4  | 19.1  | 20.4  | 52.2  | 192    | 267    | 207    | 133   | 69.5  |
| MAX    | 67    | 50    | 28    | 23    | 22    | 26    | 131   | 261    | 467    | 283    | 159   | 87    |
| MIN    | 48    | 28    | 13    | 10    | 14    | 15    | 21    | 131    | 171    | 147    | 70    | 52    |
| AC-FT  | 3,630 | 2,450 | 1,120 | 825   | 1,060 | 1,250 | 3,110 | 11,810 | 15,880 | 12,720 | 8,190 | 4,140 |
| MEAN†  | 50.1  | 38.1  | 25.4  | 22.8  | 28.5  | 25.4  | 35.8  | 211    | 312    | 194    | 75.1  | 56.1  |
| CFSM†  | 1.04  | .79   | .53   | .47   | .69   | .53   | .74   | 4.38   | 6.47   | 4.02   | 1.56  | 1.16  |
| IN.†   | 1.20  | .88   | .61   | .55   | .61   | .61   | .83   | 5.05   | 7.23   | 4.64   | 1.80  | 1.30  |
| AC-FT† | 3,080 | 2,270 | 1,560 | 1,410 | 1,580 | 1,560 | 2,130 | 12,980 | 18,590 | 11,940 | 4,620 | 3,340 |

## OBSERVED

|             |       |        |      |      |     |     |     |    |       |        |
|-------------|-------|--------|------|------|-----|-----|-----|----|-------|--------|
| CAL YR 1970 | TOTAL | 37,995 | MEAN | 104  | MAX | 651 | MIN | 10 | AC-FT | 75,360 |
| WTR YR 1971 | TOTAL | 33,367 | MEAN | 91.4 | MAX | 467 | MIN | 10 | AC-FT | 66,180 |

## ADJUSTED

|             |       |        |      |      |      |      |     |       |       |        |
|-------------|-------|--------|------|------|------|------|-----|-------|-------|--------|
| CAL YR 1970 | TOTAL | 38,014 | MEAN | 104  | CFSM | 2.16 | IN. | 29.35 | AC-FT | 75,400 |
| WTR YR 1971 | TOTAL | 32,797 | MEAN | 89.6 | CFSM | 1.86 | IN. | 25.31 | AC-FT | 65,050 |

† Adjusted for change in contents in Middle Creek Reservoir.

## GALLATIN RIVER BASIN

41

06052500 Gallatin River at Logan, Mont.

LOCATION.--Lat 45°53'07", long 111°26'15", in NE¼ sec.35, T.2 N., R.2 E., Gallatin County, on right bank at former county road bridge site, 0.5 mile west of Logan and 6 miles upstream from mouth.

DRAINAGE AREA.--1,795 sq mi.

PERIOD OF RECORD.--September 1893 to December 1905, August 1928 to current year. Monthly discharge only for some periods, published in WSP 1309.

GAGE.--Water-stage recorder. Datum of gage is 4,086.42 ft above mean sea level. Prior to Aug. 10, 1928, non-recording gages at several sites within 0.5 mile of present site at various datums. Aug. 10, 1928, to Oct. 7, 1941, nonrecording gage at present site and datum.

AVERAGE DISCHARGE.--55 years, 1,022 cfs (740,400 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 8,480 cfs June 28 (gage height, 8.74 ft); maximum gage height, 9.30 ft Jan. 7 (backwater from ice); minimum discharge, 491 cfs Aug. 13 (gage height, 3.43 ft).

Period of record: Maximum discharge observed, 9,840 cfs June 21, 1899 (gage height, 6.25 ft, site and datum then in use); maximum gage height, 11.88 ft Feb. 5, 1963, from floodmark (backwater from ice); minimum discharge observed, 130 cfs July 19, 1939 (gage height, 2.04 ft).

REMARKS.--Records good. Some regulation by Middle Creek Reservoir (see p. 181). Diversions for irrigation of about 110,000 acres above station.

REVISIONS (WATER YEARS).--WSP 1389: 1898-99, 1903, 1905, 1929(M), 1935-36(M), 1938-39(M), 1941(M). WSP 1559: Drainage area.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT           | NOV        | DEC       | JAN     | FEB             | MAR    | APR    | MAY     | JUN     | JUL     | AUG    | SEP    |
|-------------|---------------|------------|-----------|---------|-----------------|--------|--------|---------|---------|---------|--------|--------|
| 1           | 1,110         | 1,170      | 1,160     | 891     | 1,200           | 825    | 864    | 1,580   | 4,820   | 4,490   | 540    | 968    |
| 2           | 1,090         | 1,150      | 1,050     | 860     | 1,100           | 818    | 833    | 1,780   | 4,210   | 4,080   | 533    | 944    |
| 3           | 1,080         | 1,120      | 1,060     | 840     | 1,000           | 810    | 833    | 2,110   | 3,790   | 4,240   | 512    | 920    |
| 4           | 1,070         | 1,130      | 1,030     | 803     | 900             | 840    | 803    | 2,390   | 3,720   | 4,120   | 505    | 968    |
| 5           | 1,070         | 1,130      | 986       | 760     | 840             | 803    | 788    | 2,610   | 3,720   | 3,820   | 517    | 1,060  |
| 6           | 1,130         | 1,160      | 1,020     | 740     | 840             | 795    | 810    | 2,670   | 3,900   | 3,660   | 537    | 1,060  |
| 7           | 1,140         | 1,150      | 1,050     | 720     | 820             | 803    | 872    | 2,730   | 3,940   | 3,500   | 541    | 1,030  |
| 8           | 1,110         | 1,130      | 1,070     | 740     | 820             | 803    | 976    | 2,980   | 4,120   | 3,190   | 544    | 1,060  |
| 9           | 1,110         | 1,130      | 1,090     | 800     | 880             | 810    | 984    | 3,050   | 4,620   | 2,990   | 558    | 1,230  |
| 10          | 1,160         | 1,220      | 1,070     | 700     | 900             | 840    | 1,030  | 3,050   | 5,000   | 2,920   | 523    | 1,180  |
| 11          | 1,150         | 1,180      | 1,020     | 660     | 1,040           | 848    | 1,030  | 3,250   | 5,740   | 2,870   | 512    | 1,120  |
| 12          | 1,220         | 1,180      | 992       | 620     | 1,040           | 848    | 1,030  | 3,190   | 5,920   | 2,700   | 505    | 1,070  |
| 13          | 1,430         | 1,180      | 936       | 600     | 1,030           | 872    | 976    | 3,550   | 5,720   | 2,390   | 504    | 1,030  |
| 14          | 1,260         | 1,150      | 952       | 640     | 1,060           | 864    | 976    | 3,970   | 5,900   | 2,130   | 536    | 1,010  |
| 15          | 1,190         | 1,100      | 1,020     | 700     | 1,040           | 833    | 1,050  | 3,710   | 5,720   | 1,960   | 544    | 1,000  |
| 16          | 1,160         | 1,120      | 984       | 800     | 1,000           | 788    | 1,220  | 3,530   | 5,380   | 1,730   | 593    | 1,020  |
| 17          | 1,160         | 1,130      | 984       | 850     | 928             | 780    | 1,170  | 3,400   | 5,180   | 1,570   | 600    | 1,060  |
| 18          | 1,150         | 1,130      | 944       | 900     | 928             | 758    | 1,230  | 2,990   | 5,030   | 1,520   | 599    | 1,080  |
| 19          | 1,150         | 1,120      | 904       | 900     | 936             | 780    | 1,170  | 2,600   | 5,000   | 1,430   | 615    | 1,080  |
| 20          | 1,140         | 1,100      | 944       | 950     | 912             | 795    | 1,130  | 2,390   | 4,980   | 1,320   | 604    | 1,090  |
| 21          | 1,130         | 1,100      | 976       | 950     | 840             | 803    | 1,120  | 2,230   | 5,030   | 1,270   | 585    | 1,170  |
| 22          | 1,130         | 1,020      | 944       | 920     | 825             | 758    | 1,170  | 2,140   | 5,300   | 1,180   | 596    | 1,130  |
| 23          | 1,160         | 1,000      | 833       | 960     | 888             | 795    | 1,260  | 2,110   | 5,880   | 1,020   | 614    | 1,090  |
| 24          | 1,180         | 1,060      | 874       | 871     | 896             | 818    | 1,340  | 2,090   | 5,840   | 936     | 601    | 1,090  |
| 25          | 1,190         | 1,230      | 962       | 868     | 896             | 840    | 1,590  | 2,160   | 5,440   | 848     | 603    | 1,090  |
| 26          | 1,130         | 1,200      | 977       | 885     | 848             | 840    | 1,910  | 2,400   | 5,020   | 833     | 615    | 1,270  |
| 27          | 1,130         | 1,130      | 953       | 922     | 803             | 944    | 1,670  | 2,980   | 6,400   | 773     | 615    | 1,230  |
| 28          | 1,110         | 1,080      | 939       | 933     | 810             | 864    | 1,530  | 3,900   | 7,940   | 705     | 600    | 1,190  |
| 29          | 1,150         | 1,100      | 917       | 925     | -----           | 818    | 1,480  | 4,980   | 6,340   | 660     | 608    | 1,180  |
| 30          | 1,180         | 1,150      | 899       | 1,000   | -----           | 848    | 1,520  | 5,220   | 5,180   | 638     | 660    | 1,220  |
| 31          | 1,170         | -----      | 899       | 1,300   | -----           | 928    | -----  | 5,110   | -----   | 593     | 818    | -----  |
| TOTAL       | 35,740        | 33,950     | 30,439    | 26,008  | 26,020          | 25,569 | 34,365 | 92,850  | 154,780 | 66,086  | 17,837 | 32,640 |
| MEAN        | 1,153         | 1,132      | 982       | 839     | 929             | 825    | 1,146  | 2,995   | 5,159   | 2,132   | 575    | 1,088  |
| MAX         | 1,430         | 1,230      | 1,160     | 1,300   | 1,200           | 944    | 1,910  | 5,220   | 7,940   | 4,490   | 818    | 1,270  |
| MIN         | 1,070         | 1,000      | 833       | 600     | 803             | 758    | 788    | 1,580   | 3,720   | 593     | 504    | 920    |
| AC-FT       | 70,890        | 67,340     | 60,380    | 51,590  | 51,610          | 50,720 | 68,160 | 184,200 | 307,000 | 131,100 | 35,380 | 64,740 |
| CAL YR 1970 | TOTAL 589,532 | MEAN 1,615 | MAX 8,890 | MIN 491 | AC-FT 1,169,000 |        |        |         |         |         |        |        |
| WTR YR 1971 | TOTAL 576,284 | MEAN 1,579 | MAX 7,940 | MIN 504 | AC-FT 1,143,000 |        |        |         |         |         |        |        |

## PEAK DISCHARGE (BASE, 2,700 CFS)

| DATE | TIME | G.HT. | DISCHARGE | DATE | TIME | G.HT. | DISCHARGE |
|------|------|-------|-----------|------|------|-------|-----------|
| 5-14 | 1245 | 6.67  | 4,390     | 6-28 | 0145 | 8.74  | 8,480     |
| 5-29 | 2015 | 7.39  | 5,740     |      |      |       |           |

## MISSOURI RIVER MAIN STEM

06054500 Missouri River at Toston, Mont.

LOCATION.--Lat 46°08'46", long 111°25'18", in SE¼NW¼ sec.36, T.5 N., R.2 E., Broadwater County, on left bank 2 miles southeast of Toston, 4.8 miles upstream from Crow Creek, 7.8 miles downstream from Sixteenmile Creek, and at mile 2,292.0.

DRAINAGE AREA.--14,669 sq mi.

PERIOD OF RECORD.--April 1890 to February 1891, April 1910 to December 1916, April 1941 to current year. Monthly discharge only for some periods, published in WSP 1309.

GAGE.--Water-stage recorder. Altitude of gage is 3,920 ft (from topographic map). Prior to Dec. 20, 1916, nonrecording gages at site 2.5 miles downstream at different datums.

AVERAGE DISCHARGE.--36 years, 5,288 cfs (3,831,000 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 23,800 cfs June 28 (gage height, 10.36 ft); minimum daily, 2,400 cfs Jan. 6 (gage height, 3.66 ft).

Period of record: Maximum discharge, 32,000 cfs June 6, 1948 (gage height, 11.77 ft); minimum, 562 cfs Apr. 30, 1941 (gage height, 1.68 ft).

REMARKS.--Records excellent. Some regulation by six reservoirs on tributaries (see p. 180) and Clark Canyon Reservoir (see p. 23). Diversions for irrigation of about 555,400 acres of which 12,000 acres lies below station.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT             | NOV     | DEC        | JAN     | FEB        | MAR     | APR       | MAY     | JUN             | JUL     | AUG     | SEP     |
|-------------|-----------------|---------|------------|---------|------------|---------|-----------|---------|-----------------|---------|---------|---------|
| 1           | 5,430           | 5,800   | 5,270      | 4,200   | 7,040      | 3,680   | 4,480     | 8,630   | 18,600          | 19,100  | 3,790   | 5,130   |
| 2           | 5,910           | 5,830   | 5,000      | 4,120   | 6,380      | 3,540   | 4,770     | 9,210   | 18,300          | 16,300  | 3,700   | 5,010   |
| 3           | 5,770           | 5,570   | 4,840      | 3,920   | 6,240      | 3,530   | 4,910     | 9,950   | 17,300          | 14,500  | 3,610   | 4,290   |
| 4           | 5,610           | 5,500   | 4,440      | 3,440   | 5,540      | 3,800   | 4,850     | 10,800  | 17,200          | 14,000  | 3,570   | 4,940   |
| 5           | 5,450           | 5,700   | 4,690      | 2,750   | 4,690      | 3,960   | 4,820     | 11,800  | 16,600          | 13,400  | 3,520   | 5,090   |
| 6           | 4,730           | 5,760   | 5,130      | 2,490   | 4,010      | 3,890   | 4,920     | 12,500  | 16,000          | 12,800  | 3,620   | 5,080   |
| 7           | 4,770           | 5,790   | 5,040      | 2,950   | 3,920      | 3,780   | 5,200     | 13,100  | 15,600          | 12,000  | 3,700   | 5,340   |
| 8           | 4,630           | 5,850   | 5,050      | 3,120   | 4,460      | 3,780   | 5,930     | 13,500  | 15,300          | 11,400  | 3,900   | 5,550   |
| 9           | 4,670           | 5,880   | 5,110      | 3,670   | 4,710      | 3,800   | 6,230     | 14,100  | 15,900          | 10,700  | 3,940   | 5,480   |
| 10          | 4,760           | 6,000   | 5,130      | 3,970   | 4,910      | 4,030   | 6,390     | 14,300  | 16,800          | 10,400  | 3,880   | 5,590   |
| 11          | 4,850           | 5,950   | 4,960      | 3,890   | 5,030      | 4,070   | 6,400     | 14,300  | 18,400          | 9,980   | 3,630   | 5,530   |
| 12          | 5,000           | 5,880   | 4,780      | 3,830   | 5,210      | 3,970   | 6,400     | 14,100  | 19,700          | 9,650   | 3,530   | 5,420   |
| 13          | 5,310           | 5,850   | 4,320      | 3,650   | 5,170      | 4,020   | 5,860     | 14,000  | 19,900          | 8,850   | 3,480   | 5,330   |
| 14          | 5,320           | 5,810   | 3,440      | 3,580   | 5,150      | 4,090   | 5,650     | 15,100  | 19,900          | 7,960   | 3,450   | 4,220   |
| 15          | 5,180           | 5,760   | 3,720      | 3,740   | 5,100      | 4,060   | 5,830     | 16,000  | 20,000          | 6,780   | 3,420   | 4,380   |
| 16          | 5,470           | 5,680   | 4,530      | 4,020   | 5,000      | 4,030   | 6,460     | 16,000  | 19,500          | 5,990   | 3,450   | 4,440   |
| 17          | 5,470           | 5,690   | 4,740      | 4,240   | 4,820      | 3,850   | 7,450     | 16,100  | 18,600          | 5,760   | 3,410   | 4,510   |
| 18          | 5,520           | 5,690   | 4,600      | 4,420   | 4,610      | 3,660   | 7,440     | 14,500  | 18,200          | 5,790   | 3,340   | 4,570   |
| 19          | 5,550           | 5,780   | 3,820      | 4,590   | 4,530      | 3,780   | 7,110     | 13,300  | 17,600          | 5,800   | 3,370   | 4,580   |
| 20          | 5,450           | 5,800   | 3,250      | 5,650   | 4,460      | 3,680   | 6,740     | 13,300  | 17,200          | 5,840   | 3,380   | 4,660   |
| 21          | 5,470           | 5,770   | 3,420      | 5,640   | 4,290      | 3,560   | 6,650     | 11,500  | 16,900          | 5,670   | 3,230   | 4,740   |
| 22          | 5,550           | 5,360   | 3,820      | 5,310   | 4,190      | 3,650   | 7,130     | 10,800  | 17,100          | 5,580   | 3,160   | 4,370   |
| 23          | 5,760           | 5,320   | 3,360      | 4,320   | 4,120      | 3,720   | 7,520     | 10,200  | 17,600          | 5,330   | 3,190   | 4,320   |
| 24          | 5,730           | 5,380   | 2,840      | 3,990   | 4,160      | 3,800   | 8,050     | 9,620   | 17,800          | 4,820   | 3,130   | 4,320   |
| 25          | 6,040           | 5,700   | 3,190      | 3,950   | 4,310      | 3,870   | 9,150     | 9,390   | 17,600          | 4,620   | 2,940   | 4,430   |
| 26          | 5,960           | 5,970   | 3,320      | 4,110   | 4,200      | 3,880   | 9,990     | 9,410   | 17,000          | 4,430   | 2,820   | 4,760   |
| 27          | 5,660           | 5,970   | 3,440      | 4,470   | 3,890      | 4,390   | 10,200    | 9,920   | 18,400          | 4,190   | 2,770   | 4,990   |
| 28          | 5,630           | 5,390   | 3,660      | 4,830   | 4,000      | 4,280   | 9,310     | 11,200  | 22,400          | 4,020   | 2,910   | 4,950   |
| 29          | 5,490           | 5,250   | 3,730      | 4,860   | -----      | 4,190   | 8,650     | 13,700  | 22,500          | 3,920   | 3,210   | 4,930   |
| 30          | 5,550           | 5,160   | 3,910      | 5,750   | -----      | 4,370   | 8,370     | 16,800  | 20,700          | 3,920   | 3,940   | 5,150   |
| 31          | 5,530           | -----   | 4,230      | 7,320   | -----      | 4,580   | -----     | 18,100  | -----           | 3,900   | 4,940   | -----   |
| TOTAL       | 167,220         | 170,840 | 130,780    | 130,790 | 134,140    | 121,290 | 202,860   | 395,230 | 544,600         | 257,400 | 107,930 | 146,100 |
| MEAN        | 5,394           | 5,695   | 4,219      | 4,219   | 4,791      | 3,913   | 6,762     | 12,750  | 18,150          | 8,303   | 3,482   | 4,870   |
| MAX         | 6,040           | 6,000   | 5,270      | 7,320   | 7,040      | 4,580   | 10,200    | 18,100  | 22,500          | 19,100  | 4,940   | 5,590   |
| MIN         | 4,630           | 5,160   | 2,840      | 2,490   | 3,890      | 3,530   | 4,480     | 8,630   | 15,300          | 3,900   | 2,770   | 4,220   |
| AC-FT       | 331,700         | 338,900 | 259,400    | 259,400 | 266,100    | 240,600 | 402,400   | 783,900 | 1,080,000       | 510,600 | 214,100 | 289,800 |
| CAL YR 1970 | TOTAL 2,326,200 |         | MEAN 6,373 |         | MAX 26,700 |         | MIN 2,000 |         | AC-FT 4,614,000 |         |         |         |
| WTR YR 1971 | TOTAL 2,509,180 |         | MEAN 6,874 |         | MAX 22,500 |         | MIN 2,490 |         | AC-FT 4,977,000 |         |         |         |

## CROW CREEK BASIN

43

06055500 Crow Creek near Radersburg, Mont.

LOCATION.--Lat 46°16'05", long 111°41'30", near west edge of SE¼ sec.14, T.6 N., R.1 W., Broadwater County, Helena National Forest, on left bank 1.5 miles upstream from Slim Sam Creek and 6 miles northwest of Radersburg.

DRAINAGE AREA.--76.6 sq mi. Area at site used Apr. 17, 1924, to Sept. 30, 1929, 78.0 sq mi. Area at site used prior to Apr. 17, 1924, 86.4 sq mi.

PERIOD OF RECORD.--April to June 1901, May 1919 to September 1929, June 1966 to current year. Monthly discharge only for some periods, published in WSP 1309.

GAGE.--Water-stage recorder. Altitude of gage is 4,870 ft (from topographic map). Prior to June 29, 1901, non-recording gage at site 1.5 miles downstream at different datum. May 25, 1919, to Apr. 16, 1924, nonrecording gage at about the same site as earlier record but different datum. Apr. 17, 1924, to Sept. 30, 1929, at site 0.6 mile downstream at different datum.

AVERAGE DISCHARGE.--15 years (1919-29, 1966-71), 47.7 cfs (34,560 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 498 cfs May 29 (gage height, 4.57 ft); minimum, 2.1 cfs about Nov.23 (gage height, 1.76 ft).

Period of record: Maximum discharge, about 1,000 cfs July 14, 1920 (gage height, 5 ft, site and datum then in use); minimum observed, 1.4 cfs Jan. 10, 1922 (gage height, 0.19 ft, site and datum then in use).

REMARKS.--Records good except those for winter period, which are poor. No regulation or diversions above gage.

REVISIONS (WATER YEARS).--WSP 1509: 1920, 1921, 1922(M), 1924(M). WRD Mont. 1966: Drainage area.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT                                                   | NOV   | DEC   | JAN   | FEB   | MAR   | APR   | MAY   | JUN   | JUL   | AUG   | SEP   |
|-------------|-------------------------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1           | 13                                                    | 12    | 10    | 9.0   | 26    | 9.7   | 10    | 35    | 230   | 69    | 20    | 24    |
| 2           | 12                                                    | 10    | 10    | 9.5   | 20    | 10    | 11    | 52    | 207   | 67    | 20    | 20    |
| 3           | 13                                                    | 9.4   | 9.4   | 9.0   | 14    | 10    | 11    | 69    | 189   | 66    | 20    | 19    |
| 4           | 13                                                    | 10    | 9.0   | 8.5   | 12    | 10    | 9.7   | 92    | 202   | 60    | 21    | 21    |
| 5           | 12                                                    | 12    | 10    | 8.0   | 13    | 10    | 12    | 126   | 180   | 59    | 21    | 19    |
| 6           | 14                                                    | 12    | 11    | 7.0   | 14    | 10    | 16    | 128   | 172   | 56    | 19    | 17    |
| 7           | 14                                                    | 12    | 11    | 6.5   | 20    | 10    | 19    | 124   | 166   | 53    | 19    | 16    |
| 8           | 14                                                    | 12    | 10    | 6.0   | 21    | 10    | 16    | 130   | 168   | 51    | 18    | 16    |
| 9           | 14                                                    | 11    | 9.7   | 6.0   | 18    | 10    | 16    | 131   | 170   | 49    | 17    | 16    |
| 10          | 16                                                    | 11    | 8.8   | 5.5   | 18    | 9.5   | 19    | 130   | 166   | 46    | 15    | 14    |
| 11          | 16                                                    | 10    | 10    | 5.0   | 16    | 9.4   | 14    | 131   | 172   | 50    | 15    | 13    |
| 12          | 18                                                    | 13    | 9.5   | 4.5   | 14    | 9.4   | 15    | 154   | 156   | 44    | 15    | 13    |
| 13          | 18                                                    | 12    | 9.5   | 4.0   | 12    | 9.7   | 13    | 187   | 152   | 42    | 14    | 12    |
| 14          | 14                                                    | 10    | 9.5   | 5.0   | 12    | 8.8   | 16    | 185   | 150   | 39    | 14    | 12    |
| 15          | 13                                                    | 12    | 9.0   | 7.0   | 12    | 7.6   | 21    | 170   | 138   | 37    | 14    | 12    |
| 16          | 14                                                    | 13    | 9.0   | 8.0   | 12    | 8.5   | 19    | 174   | 131   | 33    | 14    | 14    |
| 17          | 15                                                    | 12    | 9.0   | 9.0   | 9.7   | 8.5   | 18    | 160   | 121   | 32    | 14    | 15    |
| 18          | 14                                                    | 12    | 9.0   | 10    | 11    | 8.5   | 17    | 140   | 109   | 30    | 14    | 15    |
| 19          | 14                                                    | 12    | 8.5   | 10    | 10    | 9.7   | 16    | 135   | 103   | 29    | 13    | 16    |
| 20          | 14                                                    | 10    | 8.5   | 10    | 8.8   | 9.4   | 19    | 128   | 100   | 29    | 13    | 17    |
| 21          | 14                                                    | 8.5   | 8.5   | 9.7   | 8.2   | 8.8   | 19    | 124   | 96    | 30    | 13    | 18    |
| 22          | 14                                                    | 7.0   | 8.0   | 10    | 13    | 7.9   | 22    | 114   | 95    | 29    | 12    | 18    |
| 23          | 13                                                    | 5.0   | 8.0   | 10    | 16    | 9.7   | 23    | 105   | 93    | 27    | 15    | 17    |
| 24          | 14                                                    | 5.5   | 8.0   | 10    | 12    | 8.8   | 30    | 112   | 89    | 25    | 13    | 17    |
| 25          | 11                                                    | 7.0   | 8.0   | 10    | 9.4   | 8.8   | 36    | 123   | 87    | 25    | 12    | 18    |
| 26          | 12                                                    | 12    | 8.0   | 10    | 8.8   | 11    | 30    | 152   | 91    | 24    | 12    | 23    |
| 27          | 11                                                    | 15    | 8.0   | 10    | 9.7   | 10    | 25    | 209   | 95    | 23    | 11    | 21    |
| 28          | 11                                                    | 15    | 8.0   | 10    | 11    | 8.8   | 25    | 323   | 92    | 23    | 11    | 19    |
| 29          | 12                                                    | 14    | 8.0   | 10    | ----- | 9.7   | 25    | 400   | 88    | 24    | 11    | 18    |
| 30          | 12                                                    | 12    | 8.0   | 19    | ----- | 12    | 28    | 287   | 78    | 23    | 41    | 17    |
| 31          | 12                                                    | ----- | 8.5   | 31    | ----- | 12    | ----- | 270   | ----- | 21    | 31    | ----- |
| TOTAL       | 421                                                   | 328.4 | 279.4 | 287.2 | 381.6 | 296.2 | 570.7 | 4,800 | 4,086 | 1,215 | 512   | 507   |
| MEAN        | 13.6                                                  | 10.9  | 9.01  | 9.26  | 13.6  | 9.55  | 19.0  | 155   | 136   | 39.2  | 16.5  | 16.9  |
| MAX         | 18                                                    | 15    | 11    | 31    | 26    | 12    | 36    | 400   | 230   | 69    | 41    | 24    |
| MIN         | 11                                                    | 5.0   | 8.0   | 4.0   | 8.2   | 7.6   | 9.7   | 35    | 78    | 21    | 11    | 12    |
| AC-FT       | 835                                                   | 651   | 554   | 570   | 757   | 588   | 1,130 | 9,520 | 8,100 | 2,410 | 1,020 | 1,010 |
| CAL YR 1970 | TOTAL 17,894.6 MEAN 49.0 MAX 512 MIN 5.0 AC-FT 35,490 |       |       |       |       |       |       |       |       |       |       |       |
| WTR YR 1971 | TOTAL 13,684.5 MEAN 37.5 MAX 400 MIN 4.0 AC-FT 27,140 |       |       |       |       |       |       |       |       |       |       |       |

## PEAK DISCHARGE (BASE, 250 CFS)

| DATE | TIME | G.HT. | DISCHARGE | DATE | TIME | G.HT. | DISCHARGE |
|------|------|-------|-----------|------|------|-------|-----------|
| 5-29 | 0700 | 4.57  | 498       |      |      |       |           |

NOTE.--Stage-discharge relation affected by ice Dec. 12 to Jan. 19 (no gage-height record Dec. 12 to Jan. 4).



## MISSOURI RIVER MAIN STEM

06058500 Canyon Ferry Reservoir near Helena, Mont.

LOCATION.--Lat 46°38'57", long 111°43'39", in SE $\frac{1}{4}$ SE $\frac{1}{4}$  sec.4, T.10 N., R.1 W., Lewis and Clark County, in block 17 of Canyon Ferry Dam, 15 miles east of Helena, and at mile 2,242.8.

DRAINAGE AREA.--15,904 sq mi.

PERIOD OF RECORD.--April 1953 to current year (monthend contents only). Records of monthend contents in Lake Sewell, submerged by present reservoir Apr. 8, 1953, available January 1936 to March 1953. Scattered daily elevations and contents for April to July 1953, published in WSP 1320-B. Daily elevations and contents for May to June 1964, published in WSP 1840-B.

GAGE.--Water-stage recorder in powerhouse control room. Datum of gage is at mean sea level (levels by Bureau of Reclamation).

EXTREMES.--Current year: Maximum daily contents, 1,955,000 acre-ft July 2 (elevation, 3,797.47 ft); minimum, 1,317,000 acre-ft May 28 (elevation, 3,776.93 ft).

Period of record: Maximum daily contents, 2,043,000 acre-ft July 15-29, 31, 1955, July 2, 5, 6, 8, 1956, July 16, 17, 1962, June 23, 1964 (elevation, 3,800.00 ft); minimum since first filling, 1,017,000 acre-ft Apr. 11, 1967 (elevation, 3,764.70 ft).

REMARKS.--Reservoir is formed by concrete dam; construction began in 1949, completed in 1953. Storage began in March 1953. Usable capacity, 2,043,000 acre-ft at controlled spillway elevation (3,800 ft). Dead storage, 8,000 acre-ft below elevation 3,650 ft. Minimum operating level, 3,728 ft for on-site power generation (usable contents, 426,500 acre-ft). Figures given herein represent usable contents. Water is used for power production, flood control, irrigation, recreation, and supplemental water supply for city of Helena.

COOPERATION.--Elevations and capacity table furnished by Bureau of Reclamation.

REVISIONS.--WSP 1559: Drainage area.

CORRECTIONS.--In WSP 1729, the monthly contents in acre-feet for February 1955 is listed in error; it should be 1,224,000.

## MONTHEND ELEVATION AND CONTENTS, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| Date                  | Elevation<br>(feet)† | Contents<br>(acre-feet) | Change in contents<br>(acre-feet) |
|-----------------------|----------------------|-------------------------|-----------------------------------|
| Sept. 30 . . . . .    | 3,791.50             | 1,754,000               | -                                 |
| Oct. 31 . . . . .     | 3,792.51             | 1,787,000               | +33,000                           |
| Nov. 30 . . . . .     | 3,792.92             | 1,801,000               | +14,000                           |
| Dec. 31 . . . . .     | 3,790.40             | 1,719,000               | -82,000                           |
| CAL YR 1970 . . . . . |                      |                         | -60,000                           |
| Jan. 31 . . . . .     | 3,787.06             | 1,613,000               | -106,000                          |
| Feb. 28 . . . . .     | 3,785.91             | 1,577,000               | -36,000                           |
| Mar. 31 . . . . .     | 3,781.45             | 1,444,000               | -133,000                          |
| Apr. 30 . . . . .     | 3,777.60             | 1,336,000               | -108,000                          |
| May 31 . . . . .      | 3,778.18             | 1,351,000               | +15,000                           |
| June 30 . . . . .     | 3,797.09             | 1,942,000               | +591,000                          |
| July 31 . . . . .     | 3,796.03             | 1,905,000               | -37,000                           |
| Aug. 31 . . . . .     | 3,792.98             | 1,803,000               | -102,000                          |
| Sept. 30 . . . . .    | 3,793.12             | 1,808,000               | +5,000                            |
| WTR YR 1971 . . . . . |                      |                         | +54,000                           |

† Mean daily elevations based on readings made at 4-hour intervals.

## PRICKLY PEAR CREEK BASIN

45

06062500 Tenmile Creek near Rimini, Mont.

LOCATION.--Lat 46°31'27", long 112°15'22", in NW¼SW¼NE¼ sec.20, T.9 N., R.5 W., Lewis and Clark County, Helena National Forest, on left bank at Moose Creek ranger station, 500 ft upstream from Moose Creek and 2.5 miles north of Rimini.

DRAINAGE AREA.--32.7 sq mi.

PERIOD OF RECORD.--October 1914 to current year. Monthly discharge only for some periods, published in WSP 1309.

GAGE.--Water-stage recorder and sharp-crested weir since Oct. 20, 1937. Altitude of gage is 4,850 ft (from topographic map). Prior to Dec. 17, 1934, water-stage recorder at site 40 ft downstream at different datum and different control.

AVERAGE DISCHARGE.--57 years, 17.7 cfs (12,820 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 177 cfs May 31 (gage height, 2.97 ft); minimum, 0.07 cfs Mar. 2 (gage height, 0.97 ft).

Period of record: Maximum discharge, 781 cfs May 27, 1917 (gage height, 4.98 ft, site and datum then in use); no flow at times.

REMARKS.--Records good. Flow regulated by Chessman and Scott Reservoirs on tributaries above station (combined capacity, 2,340 acre-ft). Small diversion above station for water supply for city of Helena.

REVISIONS (WATER YEARS).--WSP 1309: 1917, 1921, 1924-25. WSP 1509: 1915, 1916-17(M), 1920(M), 1927(M), 1928-30, 1947(M), 1948, 1950(M). WSP 1559: Drainage area. WSP 1709: 1959.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY   | OCT   | NOV   | DEC   | JAN   | FEB   | MAR   | APR   | MAY   | JUN     | JUL   | AUG   | SEP   |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------|-------|-------|-------|
| 1     | .52   | .87   | .87   | .64   | 7.9   | .94   | 1.7   | 21    | 176     | 4.1   | .56   | 1.2   |
| 2     | .64   | .80   | .80   | .68   | 5.5   | .68   | 1.6   | 31    | 110     | 3.4   | .76   | .48   |
| 3     | .60   | 1.0   | .76   | .64   | 3.3   | .87   | 1.5   | 43    | 100     | 4.2   | .72   | .40   |
| 4     | .56   | 1.1   | .76   | .60   | 2.3   | .87   | 1.6   | 52    | 90      | 4.0   | .72   | .72   |
| 5     | .76   | 1.4   | .76   | .72   | 1.9   | .80   | 1.5   | 61    | 95      | 3.6   | .76   | 2.3   |
| 6     | 1.3   | 1.2   | .80   | .76   | 1.4   | .76   | 2.7   | 63    | 80      | 3.2   | .76   | 1.2   |
| 7     | .94   | .80   | .87   | .87   | 1.3   | .80   | 3.9   | 57    | 74      | 2.7   | .80   | .40   |
| 8     | 1.1   | .76   | .87   | .80   | 1.4   | .80   | 3.1   | 64    | 76      | 1.6   | .60   | .38   |
| 9     | 1.2   | .76   | .76   | .76   | 1.2   | .80   | 2.5   | 69    | 78      | 1.8   | .52   | .40   |
| 10    | 1.9   | .72   | .76   | .76   | 1.8   | .80   | 2.4   | 74    | 75      | 2.2   | .52   | .44   |
| 11    | 1.4   | .68   | .76   | .72   | 2.4   | .60   | 1.9   | 89    | 70      | 2.2   | .44   | .44   |
| 12    | 3.3   | .64   | .76   | .72   | 1.4   | .80   | 2.0   | 105   | 65      | 1.8   | .40   | .64   |
| 13    | 2.7   | .60   | .72   | .72   | 1.6   | .80   | 1.8   | 115   | 60      | 1.3   | .48   | .60   |
| 14    | 1.2   | .60   | .72   | .73   | 1.5   | .80   | 2.3   | 99    | 55      | 1.3   | .40   | .76   |
| 15    | 1.5   | .56   | .72   | .74   | 1.3   | .94   | 4.8   | 90    | 50      | 1.3   | .72   | .80   |
| 16    | 1.2   | .60   | .70   | .76   | 1.1   | .80   | 2.6   | 89    | 45      | 1.3   | .36   | 1.2   |
| 17    | 1.2   | .60   | .70   | .94   | 1.1   | .72   | 1.9   | 70    | 40      | 1.3   | .38   | 1.5   |
| 18    | 1.2   | .52   | .66   | .76   | 1.0   | .76   | 1.8   | 61    | 35      | 1.3   | .34   | 1.2   |
| 19    | 1.4   | .56   | .70   | .94   | .94   | .80   | 2.0   | 56    | 30      | 2.0   | .32   | 1.2   |
| 20    | 1.4   | .56   | .72   | 1.5   | .94   | .94   | 3.1   | 52    | 25      | 2.0   | .30   | 1.7   |
| 21    | 1.1   | .52   | .68   | 1.0   | 1.0   | .87   | 4.1   | 45    | 19      | 2.0   | 1.0   | 1.3   |
| 22    | .94   | .56   | .64   | .94   | 1.0   | .87   | 10    | 41    | 17      | 2.0   | 1.0   | 1.4   |
| 23    | 1.3   | .55   | .68   | .87   | .94   | 1.0   | 8.9   | 42    | 19      | 2.0   | .80   | .60   |
| 24    | 1.4   | .55   | .68   | .76   | .94   | 1.0   | 18    | 49    | 17      | 2.0   | .44   | .68   |
| 25    | .94   | .62   | .68   | .76   | 1.0   | .94   | 24    | 58    | 15      | 1.5   | .44   | .60   |
| 26    | .80   | .61   | .72   | .76   | 1.1   | 1.2   | 18    | 77    | 15      | 1.0   | .40   | .64   |
| 27    | .76   | .61   | .68   | .72   | 1.0   | 1.2   | 13    | 98    | 16      | .94   | .32   | .56   |
| 28    | 1.2   | .60   | .68   | .68   | 1.3   | 1.0   | 12    | 119   | 15      | 1.9   | .32   | .52   |
| 29    | .94   | .62   | .68   | .72   | ----- | 1.4   | 14    | 137   | 13      | 1.2   | .34   | .52   |
| 30    | .87   | .80   | .68   | 1.6   | ----- | 2.1   | 15    | 114   | 6.6     | .68   | 2.8   | .48   |
| 31    | .94   | ----- | .68   | 6.1   | ----- | 2.3   | ----- | 139   | -----   | .60   | 1.2   | ----- |
| TOTAL | 37.21 | 21.37 | 22.65 | 30.67 | 49.56 | 30.16 | 183.7 | 2,280 | 1,531.6 | 62.42 | 19.92 | 25.26 |
| MEAN  | 1.20  | .71   | .73   | .99   | 1.77  | .97   | 6.12  | 73.5  | 51.1    | 2.01  | .64   | .84   |
| MAX   | 3.3   | 1.4   | .87   | 6.1   | 7.9   | 2.3   | 24    | 139   | 126     | 4.2   | 2.8   | 2.3   |
| MIN   | .52   | .52   | .64   | .60   | .94   | .68   | 1.5   | 21    | 6.6     | .60   | .30   | .38   |
| AC-FT | 74    | 42    | 45    | 61    | 98    | 60    | 364   | 4,520 | 3,040   | 124   | 40    | 50    |

CAL YR 1970 TOTAL 5,675.18 MEAN 15.5 MAX 188 MIN .46 AC-FT 11,260  
WTR YR 1971 TOTAL 4,294.52 MEAN 11.8 MAX 139 MIN .30 AC-FT 8,520

## PEAK DISCHARGE (BASE, 80 CFS)

| DATE | TIME | G.HT. | DISCHARGE | DATE | TIME | G.HT. | DISCHARGE |
|------|------|-------|-----------|------|------|-------|-----------|
| 5-12 | 2045 | 2.81  | 134       | 5-31 | 0130 | 2.97  | 177       |



## SMITH RIVER BASIN

47

06077000 Sheep Creek near White Sulphur Springs, Mont.

LOCATION.--Lat 46°46'05", long 110°48'33", in SW 1/4 sec. 26, T.12 N., R.7 E., Meagher County, Lewis and Clark National Forest, on right bank 7 miles upstream from Moose Creek and 16 miles north of White Sulphur Springs.

DRAINAGE AREA.--54.4 sq mi.

PERIOD OF RECORD.--July 1941 to current year.

GAGE.--Water-stage recorder. Altitude of gage is 5,820 ft (by barometer). Prior to Oct. 1, 1942, nonrecording gages at site 1,000 ft upstream at datum 7.03 ft higher, and Oct. 1, 1942, to May 3, 1955, at site 700 ft upstream at datum 5.33 ft higher.

AVERAGE DISCHARGE.--30 years, 31.8 cfs (23,040 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 203 cfs May 30 (gage height, 3.95 ft); minimum daily, 6.5 cfs Jan. 11.

Period of record: Maximum discharge, 460 cfs June 4, 1953 (gage height, 5.80 ft, from graph based on gage readings, site and datum then in use); minimum daily, 3.5 cfs Jan. 18-20, 1943.

REMARKS.--Records good except those for winter period, which are poor. Diversions for irrigation of about 200 acres above station.

REVISIONS (WATER YEARS).--WSP 1309: 1942(M). WSP 1559: Drainage area.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT            | NOV       | DEC     | JAN     | FEB          | MAR   | APR   | MAY   | JUN   | JUL   | AUG   | SEP   |
|-------------|----------------|-----------|---------|---------|--------------|-------|-------|-------|-------|-------|-------|-------|
| 1           | 18             | 16        | 14      | 10      | 10           | 8.0   | 8.0   | 42    | 173   | 55    | 26    | 22    |
| 2           | 17             | 14        | 13      | 9.0     | 11           | 8.2   | 8.4   | 61    | 160   | 54    | 26    | 21    |
| 3           | 17             | 15        | 12      | 9.4     | 10           | 8.4   | 9.0   | 85    | 156   | 52    | 26    | 21    |
| 4           | 17             | 15        | 13      | 9.0     | 9.4          | 8.2   | 8.6   | 103   | 153   | 49    | 27    | 21    |
| 5           | 17             | 16        | 14      | 10      | 8.8          | 7.8   | 9.0   | 118   | 147   | 48    | 26    | 20    |
| 6           | 17             | 16        | 14      | 11      | 8.0          | 8.0   | 10    | 115   | 144   | 47    | 25    | 19    |
| 7           | 17             | 15        | 13      | 12      | 8.4          | 8.4   | 11    | 122   | 139   | 45    | 25    | 20    |
| 8           | 17             | 15        | 14      | 12      | 9.0          | 8.6   | 10    | 136   | 134   | 44    | 24    | 19    |
| 9           | 17             | 16        | 14      | 11      | 9.4          | 8.6   | 11    | 139   | 130   | 43    | 23    | 18    |
| 10          | 17             | 15        | 14      | 9.0     | 10           | 9.0   | 12    | 140   | 128   | 42    | 22    | 18    |
| 11          | 17             | 14        | 15      | 6.5     | 11           | 8.6   | 11    | 142   | 124   | 41    | 22    | 18    |
| 12          | 18             | 16        | 15      | 7.4     | 11           | 8.6   | 10    | 160   | 118   | 40    | 21    | 17    |
| 13          | 17             | 15        | 15      | 7.6     | 11           | 8.6   | 10    | 185   | 112   | 38    | 21    | 17    |
| 14          | 17             | 15        | 12      | 7.8     | 11           | 8.4   | 11    | 182   | 105   | 37    | 20    | 18    |
| 15          | 17             | 15        | 13      | 8.2     | 10           | 8.0   | 12    | 166   | 101   | 35    | 21    | 18    |
| 16          | 17             | 15        | 13      | 8.4     | 10           | 8.2   | 13    | 169   | 95    | 35    | 21    | 19    |
| 17          | 17             | 15        | 13      | 9.0     | 9.6          | 7.6   | 14    | 158   | 89    | 34    | 20    | 19    |
| 18          | 17             | 15        | 12      | 10      | 10           | 7.2   | 14    | 144   | 85    | 33    | 20    | 19    |
| 19          | 17             | 14        | 11      | 10      | 10           | 7.4   | 19    | 135   | 83    | 33    | 20    | 19    |
| 20          | 17             | 14        | 10      | 9.4     | 9.0          | 8.0   | 16    | 132   | 76    | 33    | 20    | 19    |
| 21          | 17             | 14        | 9.6     | 8.8     | 8.0          | 7.6   | 19    | 117   | 70    | 32    | 19    | 18    |
| 22          | 17             | 13        | 9.0     | 8.4     | 8.4          | 7.0   | 21    | 107   | 67    | 33    | 19    | 17    |
| 23          | 17             | 13        | 9.6     | 8.6     | 8.6          | 8.0   | 24    | 99    | 65    | 32    | 19    | 17    |
| 24          | 17             | 14        | 12      | 9.0     | 9.0          | 8.2   | 37    | 92    | 62    | 30    | 18    | 17    |
| 25          | 16             | 14        | 13      | 9.4     | 9.4          | 8.4   | 46    | 97    | 61    | 29    | 18    | 17    |
| 26          | 16             | 14        | 12      | 9.8     | 9.2          | 9.0   | 32    | 111   | 61    | 29    | 19    | 17    |
| 27          | 15             | 14        | 12      | 10      | 8.4          | 8.6   | 28    | 136   | 65    | 28    | 19    | 17    |
| 28          | 15             | 14        | 13      | 10      | 8.6          | 9.0   | 25    | 167   | 71    | 32    | 19    | 17    |
| 29          | 17             | 14        | 13      | 10      | -----        | 9.2   | 26    | 185   | 73    | 29    | 20    | 17    |
| 30          | 17             | 14        | 12      | 11      | -----        | 9.4   | 30    | 196   | 62    | 28    | 29    | 17    |
| 31          | 16             | -----     | 11      | 11      | -----        | 8.8   | ----- | 190   | ----- | 27    | 24    | ----- |
| TOTAL       | 522            | 439       | 390.2   | 292.7   | 266.2        | 257.0 | 515.0 | 4,131 | 3,109 | 1,167 | 679   | 553   |
| MEAN        | 16.8           | 14.6      | 12.6    | 9.44    | 9.51         | 8.29  | 17.2  | 133   | 104   | 37.6  | 21.9  | 18.4  |
| MAX         | 18             | 16        | 15      | 12      | 11           | 9.4   | 46    | 196   | 173   | 55    | 29    | 22    |
| MIN         | 15             | 13        | 9.0     | 6.5     | 8.0          | 7.0   | 8.0   | 42    | 61    | 27    | 18    | 17    |
| AC-FT       | 1,040          | 871       | 774     | 581     | 528          | 510   | 1,020 | 8,190 | 6,170 | 2,310 | 1,350 | 1,100 |
| CAL YR 1970 | TOTAL 17,328.9 | MEAN 47.5 | MAX 396 | MIN 8.2 | AC-FT 34,370 |       |       |       |       |       |       |       |
| WTR YR 1971 | TOTAL 12,321.1 | MEAN 33.8 | MAX 196 | MIN 6.5 | AC-FT 24,440 |       |       |       |       |       |       |       |

PEAK DISCHARGE (BASE, 120 CFS)

NOTE.--Stage-discharge relation affected by ice Dec. 17 to Apr. 17.

| DATE | TIME | G.HT. | DISCHARGE | DATE | TIME | G.HT. | DISCHARGE |
|------|------|-------|-----------|------|------|-------|-----------|
| 5-14 | 0015 | 3.89  | 199       | 5-30 | 2230 | 3.95  | 203       |



## MISSOURI RIVER MAIN STEM

06078200 Missouri River near Ulm, Mont.

LOCATION.--Lat 47°26'09", long 111°23'07", in NE1/4NW1/4 sec.5, T.19 N., R.3 E., Cascade County, on left bank 5.6 miles east of Ulm and 9.1 miles downstream from Smith River.

DRAINAGE AREA.--20,941 sq mi.

PERIOD OF RECORD.--August 1957 to current year.

GAGE.--Water-stage recorder. Altitude of gage is 3,310 ft (from topographic map).

AVERAGE DISCHARGE.--14 years, 6,584 cfs (4,770,000 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 18,500 cfs May 12 (gage height, 10.99 ft); minimum daily, 3,100 cfs Dec. 20.

Period of record: Maximum discharge, 27,500 cfs June 22, 1964 (gage height, 14.44 ft); minimum daily, 1,700 cfs June 17, 1961.

Flood in June 1953 reached a stage of about 17 ft (discharge, 35,000 cfs); flood in June 1948 reached a stage of about 16 ft (discharge, 32,000 cfs); from information by local residents.

REMARKS.--Records good except those for winter period, which are fair. Flow regulated by 10 smaller irrigation reservoirs and powerplants (see p. 180), Clark Canyon Reservoir (see p. 22), and Canyon Ferry Reservoir (see p. 44). Diversions for irrigation of about 630,400 acres above station.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT             | NOV     | DEC        | JAN     | FEB        | MAR     | APR       | MAY     | JUN             | JUL     | AUG     | SEP     |
|-------------|-----------------|---------|------------|---------|------------|---------|-----------|---------|-----------------|---------|---------|---------|
| 1           | 5,080           | 6,650   | 6,280      | 6,600   | 6,600      | 7,100   | 7,910     | 13,000  | 14,700          | 15,300  | 6,240   | 4,910   |
| 2           | 4,900           | 6,380   | 6,330      | 6,600   | 6,800      | 7,880   | 8,020     | 13,000  | 14,600          | 15,800  | 6,290   | 5,130   |
| 3           | 4,650           | 6,570   | 6,200      | 6,400   | 7,200      | 7,500   | 7,900     | 13,200  | 14,400          | 16,700  | 6,570   | 5,460   |
| 4           | 4,960           | 6,740   | 6,380      | 6,000   | 7,200      | 7,430   | 7,900     | 13,500  | 14,500          | 16,700  | 6,550   | 4,630   |
| 5           | 4,950           | 6,590   | 6,500      | 5,800   | 7,200      | 7,410   | 7,840     | 13,900  | 14,400          | 16,600  | 6,390   | 4,430   |
| 6           | 5,160           | 6,000   | 6,600      | 6,000   | 7,200      | 7,400   | 7,030     | 14,600  | 14,400          | 16,400  | 6,420   | 5,020   |
| 7           | 5,140           | 6,180   | 6,600      | 6,200   | 7,000      | 7,450   | 7,780     | 15,900  | 14,300          | 15,800  | 6,540   | 5,210   |
| 8           | 5,260           | 6,420   | 6,460      | 6,500   | 7,200      | 7,420   | 9,780     | 17,500  | 14,000          | 14,600  | 6,730   | 5,110   |
| 9           | 5,130           | 6,360   | 6,020      | 6,500   | 7,400      | 7,360   | 10,500    | 18,100  | 11,700          | 13,500  | 7,000   | 4,940   |
| 10          | 5,200           | 6,280   | 5,990      | 6,400   | 7,400      | 7,270   | 10,500    | 18,000  | 8,880           | 12,700  | 6,310   | 4,840   |
| 11          | 5,290           | 6,360   | 6,060      | 5,800   | 7,400      | 7,190   | 10,500    | 18,100  | 9,500           | 12,000  | 6,090   | 4,620   |
| 12          | 5,320           | 6,650   | 5,890      | 5,400   | 7,600      | 7,140   | 10,300    | 18,500  | 9,580           | 11,800  | 6,210   | 4,600   |
| 13          | 5,610           | 6,710   | 5,930      | 5,800   | 7,800      | 7,140   | 10,200    | 18,300  | 9,510           | 10,600  | 6,460   | 4,450   |
| 14          | 5,310           | 6,580   | 6,260      | 6,600   | 8,000      | 7,200   | 10,000    | 18,000  | 9,400           | 9,640   | 6,020   | 4,600   |
| 15          | 5,250           | 6,260   | 6,430      | 6,800   | 8,200      | 7,160   | 9,980     | 17,700  | 9,340           | 9,100   | 6,300   | 5,210   |
| 16          | 5,160           | 6,360   | 6,140      | 7,000   | 8,220      | 7,120   | 9,920     | 17,300  | 9,240           | 8,440   | 6,280   | 5,340   |
| 17          | 5,190           | 6,150   | 6,320      | 7,400   | 7,750      | 7,120   | 9,740     | 17,000  | 9,080           | 7,850   | 5,560   | 6,040   |
| 18          | 5,200           | 6,320   | 5,000      | 7,300   | 7,650      | 7,140   | 9,880     | 17,200  | 8,850           | 6,890   | 5,240   | 6,700   |
| 19          | 5,230           | 6,390   | 3,500      | 7,300   | 7,530      | 7,220   | 9,900     | 17,100  | 8,450           | 6,530   | 5,040   | 6,800   |
| 20          | 5,260           | 5,750   | 3,100      | 7,400   | 7,390      | 7,490   | 10,000    | 17,000  | 8,270           | 6,490   | 4,920   | 6,890   |
| 21          | 5,490           | 5,950   | 3,900      | 7,300   | 7,270      | 7,660   | 10,400    | 17,000  | 8,230           | 6,390   | 4,360   | 6,680   |
| 22          | 5,350           | 5,930   | 5,200      | 7,200   | 7,170      | 7,580   | 10,500    | 16,900  | 8,230           | 6,380   | 4,740   | 6,230   |
| 23          | 5,560           | 6,360   | 5,500      | 7,200   | 7,170      | 7,420   | 10,600    | 16,800  | 8,230           | 6,280   | 4,840   | 6,140   |
| 24          | 5,320           | 6,390   | 6,000      | 7,000   | 7,230      | 7,630   | 11,200    | 16,700  | 8,130           | 6,140   | 4,710   | 6,020   |
| 25          | 5,460           | 6,350   | 6,300      | 7,400   | 7,110      | 7,700   | 12,300    | 16,000  | 8,080           | 6,140   | 4,730   | 6,310   |
| 26          | 5,490           | 6,460   | 6,000      | 7,400   | 7,110      | 7,710   | 12,800    | 13,800  | 8,290           | 6,090   | 5,040   | 6,500   |
| 27          | 5,610           | 6,420   | 6,300      | 7,400   | 7,110      | 7,540   | 12,200    | 13,500  | 8,670           | 6,080   | 4,730   | 6,590   |
| 28          | 5,690           | 6,410   | 6,500      | 7,400   | 7,120      | 7,580   | 12,000    | 13,700  | 9,230           | 6,160   | 4,270   | 6,560   |
| 29          | 6,540           | 6,520   | 6,800      | 7,400   | -----      | 7,690   | 12,300    | 14,000  | 11,300          | 6,710   | 4,630   | 6,530   |
| 30          | 6,710           | 6,280   | 7,000      | 7,500   | -----      | 7,710   | 12,900    | 14,100  | 14,000          | 6,600   | 4,840   | 6,440   |
| 31          | 6,520           | -----   | 6,800      | 7,400   | -----      | 7,720   | -----     | 14,400  | -----           | 6,440   | 4,870   | -----   |
| TOTAL       | 166,990         | 190,770 | 184,290    | 210,400 | 206,030    | 230,080 | 302,780   | 493,800 | 319,490         | 312,850 | 174,920 | 168,930 |
| MEAN        | 5,387           | 6,359   | 5,945      | 6,787   | 7,358      | 7,422   | 10,090    | 15,930  | 10,650          | 10,090  | 5,643   | 5,631   |
| MAX         | 6,710           | 6,740   | 7,000      | 7,500   | 8,220      | 7,880   | 12,900    | 18,500  | 14,700          | 16,700  | 7,000   | 6,890   |
| MIN         | 4,650           | 5,750   | 3,100      | 5,400   | 6,600      | 7,100   | 7,030     | 13,000  | 8,080           | 6,080   | 4,270   | 4,430   |
| AC-FT       | 331,200         | 378,400 | 365,500    | 417,300 | 408,700    | 456,400 | 600,600   | 979,500 | 633,700         | 620,500 | 347,000 | 335,100 |
| CAL YR 1970 | TOTAL 2,930,860 |         | MEAN 8,030 |         | MAX 19,900 |         | MIN 3,100 |         | AC-FT 5,813,000 |         |         |         |
| WTR YR 1971 | TOTAL 2,961,330 |         | MEAN 8,113 |         | MAX 18,500 |         | MIN 3,100 |         | AC-FT 5,874,000 |         |         |         |

NOTE.--Stage-discharge relation affected by ice Dec. 18 to Feb. 15.

## 49

LOCATION.--Lat 47°37'10", long 112°41'28", near center of east line of sec.36, T.22 N., R.9 W., Lewis and Clark County, Lewis and Clark National Forest, on road bridge 1 mile downstream from diversion dam, 16.5 miles northwest of Augusta, and at mile 95.6.

REMARKS.--Records good. Flow regulated by Gibson Dam (see p. 182 ). Diversions above station into Pishkun Canal and Willow Creek feeder canal for irrigation of about 91,000 acres below station. Records of chemical analyses and water temperatures for the current year are published in Part 2 of this report.

| DAY         | OCT           | NOV   | DEC   | JAN   | FEB   | MAR    | APR    | MAY     | JUN     | JUL    | AUG   | SEP   |
|-------------|---------------|-------|-------|-------|-------|--------|--------|---------|---------|--------|-------|-------|
| 1           | 45            | 151   | 158   | 151   | 170   | 172    | 183    | 1,700   | 3,880   | 819    | 64    | 148   |
| 2           | 43            | 151   | 156   | 151   | 165   | 177    | 180    | 1,550   | 3,420   | 404    | 61    | 128   |
| 3           | 41            | 148   | 158   | 151   | 165   | 172    | 183    | 1,460   | 3,310   | 258    | 64    | 124   |
| 4           | 45            | 148   | 158   | 151   | 160   | 172    | 180    | 1,480   | 3,370   | 251    | 62    | 122   |
| 5           | 48            | 151   | 163   | 152   | 160   | 183    | 183    | 1,500   | 3,490   | 251    | 65    | 120   |
| 6           | 49            | 151   | 158   | 152   | 165   | 172    | 183    | 1,510   | 3,240   | 251    | 83    | 120   |
| 7           | 54            | 151   | 160   | 152   | 165   | 172    | 188    | 1,530   | 3,360   | 248    | 86    | 118   |
| 8           | 57            | 151   | 156   | 152   | 170   | 172    | 188    | 1,560   | 4,000   | 248    | 83    | 116   |
| 9           | 58            | 151   | 153   | 152   | 172   | 175    | 165    | 1,550   | 4,600   | 248    | 75    | 114   |
| 10          | 59            | 148   | 156   | 153   | 175   | 172    | 137    | 1,550   | 3,970   | 248    | 68    | 112   |
| 11          | 58            | 148   | 158   | 153   | 175   | 175    | 122    | 2,150   | 3,230   | 241    | 71    | 106   |
| 12          | 62            | 151   | 156   | 153   | 180   | 175    | 95     | 4,170   | 2,610   | 241    | 68    | 108   |
| 13          | 105           | 151   | 155   | 153   | 194   | 172    | 71     | 5,370   | 2,190   | 191    | 68    | 106   |
| 14          | 142           | 146   | 155   | 154   | 188   | 175    | 65     | 4,920   | 2,780   | 110    | 64    | 106   |
| 15          | 142           | 151   | 153   | 155   | 183   | 172    | 349    | 3,720   | 2,710   | 146    | 68    | 106   |
| 16          | 142           | 151   | 153   | 160   | 175   | 170    | 722    | 3,140   | 2,340   | 144    | 65    | 108   |
| 17          | 142           | 151   | 151   | 165   | 172   | 172    | 746    | 2,790   | 1,740   | 141    | 68    | 106   |
| 18          | 140           | 156   | 150   | 170   | 175   | 175    | 861    | 2,400   | 1,560   | 139    | 82    | 104   |
| 19          | 142           | 151   | 150   | 175   | 175   | 177    | 680    | 2,110   | 1,220   | 126    | 78    | 104   |
| 20          | 144           | 153   | 150   | 175   | 172   | 172    | 363    | 1,920   | 903     | 116    | 82    | 102   |
| 21          | 142           | 153   | 151   | 170   | 175   | 175    | 218    | 1,720   | 896     | 114    | 92    | 101   |
| 22          | 144           | 152   | 150   | 165   | 172   | 170    | 128    | 1,550   | 1,370   | 114    | 93    | 99    |
| 23          | 144           | 150   | 150   | 165   | 172   | 175    | 101    | 1,510   | 2,930   | 110    | 92    | 99    |
| 24          | 148           | 160   | 150   | 167   | 172   | 177    | 153    | 1,580   | 3,160   | 102    | 95    | 108   |
| 25          | 144           | 163   | 152   | 162   | 172   | 175    | 202    | 2,030   | 3,070   | 99     | 128   | 175   |
| 26          | 146           | 160   | 152   | 167   | 172   | 177    | 337    | 3,110   | 2,350   | 97     | 120   | 175   |
| 27          | 148           | 158   | 153   | 162   | 172   | 172    | 805    | 4,840   | 1,890   | 92     | 99    | 172   |
| 28          | 148           | 160   | 153   | 167   | 172   | 183    | 1,370  | 6,690   | 918     | 90     | 93    | 170   |
| 29          | 148           | 163   | 153   | 165   | ----- | 180    | 1,620  | 7,010   | 868     | 85     | 90    | 170   |
| 30          | 148           | 163   | 153   | 167   | ----- | 180    | 1,690  | 5,790   | 847     | 77     | 175   | 211   |
| 31          | 148           | ----- | 153   | 165   | ----- | 180    | -----  | 4,840   | -----   | 68     | 170   | ----- |
| TOTAL       | 3,326         | 4,592 | 4,777 | 4,952 | 4,835 | 5,418  | 12,468 | 88,750  | 76,222  | 5,869  | 2,672 | 3,758 |
| MEAN        | 107           | 153   | 154   | 160   | 173   | 175    | 416    | 2,863   | 2,541   | 189    | 86.2  | 125   |
| MAX         | 148           | 163   | 163   | 175   | 194   | 183    | 1,690  | 7,010   | 4,600   | 819    | 175   | 211   |
| MIN         | 41            | 146   | 150   | 151   | 160   | 170    | 65     | 1,460   | 847     | 68     | 61    | 99    |
| AC-FT       | 6,600         | 9,110 | 9,480 | 9,820 | 9,590 | 10,750 | 24,730 | 176,000 | 151,200 | 11,640 | 5,300 | 7,450 |
| CAL YR 1970 | TOTAL 416,455 |       |       |       |       |        |        |         |         |        |       |       |

## SUN RIVER BASIN

06082200 Sun River below Willow Creek, near Augusta, Mont.

LOCATION.--Lat 47°32'51", long 112°22'00", in NE1/4SW1/4 sec.27, T.21 N., R.6 W., Teton County, on left bank at old bridge abutment 360 ft upstream from bridge on U.S. Highway 287, 1.6 miles downstream from Willow Creek, 4 miles northeast of Augusta, and at mile 71.3.

DRAINAGE AREA.--827 sq mi.

PERIOD OF RECORD.--September 1967 to current year.

GAGE.--Water-stage recorder. Datum of gage is 3,956.78 ft above mean sea level.

EXTREMES.--Current year: Maximum discharge, 7,650 cfs May 28 (gage height, 6.69 ft); minimum daily, 34 cfs Oct. 2-4.

Period of record: Maximum discharge, 7,650 cfs May 28, 1971 (gage height, 6.69 ft); minimum daily, 34 cfs Oct. 2-4, 1970.

Flood of June 9, 1964, reached a stage of 16.16 ft, from floodmark (discharge, 46,700 cfs, from contracted-opening measurement of peak flow at bridge 360 ft downstream from present gage site).

REMARKS.--Records good except those for winter period, which are fair. Flow regulated by Gibson Dam (see p.182 ). Diversions above station for irrigation of about 103,000 acres of which 100,000 acres lies below station.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT           | NOV      | DEC       | JAN    | FEB           | MAR    | APR    | MAY     | JUN     | JUL    | AUG   | SEP   |
|-------------|---------------|----------|-----------|--------|---------------|--------|--------|---------|---------|--------|-------|-------|
| 1           | 35            | 162      | 150       | 150    | 190           | 170    | 195    | 1,640   | 4,280   | 890    | 175   | 175   |
| 2           | 34            | 162      | 160       | 150    | 185           | 175    | 195    | 1,540   | 3,630   | 667    | 170   | 146   |
| 3           | 34            | 162      | 165       | 145    | 180           | 180    | 195    | 1,390   | 3,370   | 340    | 175   | 118   |
| 4           | 34            | 162      | 165       | 140    | 180           | 180    | 195    | 1,440   | 3,420   | 304    | 170   | 115   |
| 5           | 35            | 162      | 170       | 140    | 180           | 185    | 195    | 1,480   | 3,540   | 286    | 154   | 103   |
| 6           | 37            | 162      | 175       | 140    | 185           | 190    | 195    | 1,540   | 3,260   | 262    | 146   | 100   |
| 7           | 39            | 162      | 170       | 145    | 190           | 200    | 190    | 1,520   | 3,350   | 262    | 162   | 98    |
| 8           | 40            | 162      | 170       | 150    | 195           | 200    | 190    | 1,530   | 3,860   | 250    | 162   | 98    |
| 9           | 45            | 162      | 165       | 145    | 200           | 200    | 190    | 1,540   | 4,540   | 232    | 162   | 95    |
| 10          | 46            | 162      | 165       | 140    | 210           | 210    | 154    | 1,540   | 4,200   | 232    | 158   | 90    |
| 11          | 48            | 162      | 165       | 130    | 220           | 220    | 138    | 1,800   | 3,520   | 226    | 150   | 67    |
| 12          | 49            | 170      | 165       | 125    | 230           | 210    | 127    | 3,960   | 2,880   | 220    | 142   | 40    |
| 13          | 54            | 162      | 165       | 120    | 400           | 210    | 103    | 5,260   | 2,240   | 250    | 150   | 40    |
| 14          | 80            | 162      | 165       | 120    | 240           | 232    | 90     | 5,060   | 2,770   | 250    | 162   | 42    |
| 15          | 93            | 162      | 165       | 125    | 230           | 220    | 80     | 4,100   | 2,930   | 226    | 158   | 43    |
| 16          | 95            | 162      | 165       | 140    | 200           | 220    | 542    | 3,420   | 2,510   | 256    | 154   | 48    |
| 17          | 98            | 162      | 160       | 160    | 200           | 215    | 624    | 3,080   | 1,980   | 256    | 158   | 51    |
| 18          | 98            | 158      | 160       | 180    | 200           | 220    | 750    | 2,690   | 1,560   | 256    | 134   | 52    |
| 19          | 100           | 162      | 150       | 200    | 200           | 215    | 721    | 2,300   | 1,390   | 256    | 124   | 55    |
| 20          | 103           | 150      | 145       | 260    | 195           | 190    | 438    | 2,100   | 985     | 244    | 118   | 95    |
| 21          | 106           | 140      | 140       | 240    | 190           | 190    | 268    | 1,950   | 920     | 232    | 98    | 93    |
| 22          | 106           | 130      | 140       | 220    | 185           | 232    | 195    | 1,770   | 1,030   | 250    | 88    | 85    |
| 23          | 109           | 130      | 145       | 200    | 180           | 220    | 115    | 1,700   | 2,440   | 256    | 88    | 61    |
| 24          | 112           | 130      | 145       | 220    | 175           | 195    | 118    | 1,710   | 2,930   | 238    | 88    | 40    |
| 25          | 115           | 130      | 150       | 220    | 170           | 195    | 166    | 1,950   | 2,860   | 244    | 106   | 90    |
| 26          | 115           | 130      | 165       | 220    | 165           | 195    | 185    | 2,890   | 2,390   | 244    | 112   | 103   |
| 27          | 118           | 135      | 175       | 240    | 170           | 195    | 544    | 4,580   | 1,850   | 238    | 106   | 103   |
| 28          | 118           | 135      | 180       | 220    | 170           | 190    | 1,160  | 6,360   | 1,210   | 244    | 69    | 103   |
| 29          | 146           | 140      | 175       | 210    | -----         | 195    | 1,440  | 6,910   | 974     | 226    | 51    | 103   |
| 30          | 162           | 145      | 165       | 200    | -----         | 195    | 1,610  | 6,130   | 920     | 195    | 115   | 103   |
| 31          | 162           | -----    | 160       | 195    | -----         | 195    | -----  | 5,260   | -----   | 185    | 232   | ----- |
| TOTAL       | 2,566         | 4,577    | 5,000     | 5,390  | 5,615         | 6,239  | 11,308 | 90,140  | 77,739  | 8,717  | 4,237 | 2,555 |
| MEAN        | 82.8          | 153      | 161       | 174    | 201           | 201    | 377    | 2,908   | 2,591   | 281    | 137   | 85.2  |
| MAX         | 162           | 170      | 180       | 260    | 400           | 232    | 1,610  | 6,910   | 4,540   | 890    | 232   | 175   |
| MIN         | 34            | 130      | 140       | 120    | 165           | 170    | 80     | 1,390   | 920     | 185    | 51    | 40    |
| AC-FT       | 5,090         | 9,080    | 9,920     | 10,690 | 11,140        | 12,380 | 22,430 | 178,800 | 154,200 | 17,290 | 8,400 | 5,070 |
| CAL YR 1970 | TOTAL 153,230 | MEAN 420 | MAX 6,300 | MIN 34 | AC-FT 303,900 |        |        |         |         |        |       |       |
| WTR YR 1971 | TOTAL 224,083 | MEAN 614 | MAX 6,910 | MIN 34 | AC-FT 444,500 |        |        |         |         |        |       |       |

NOTE.--Stage-discharge relation affected by ice Nov. 20 to Mar. 12 (no gage height record Nov. 22-30, Dec. 2-6, 11-26, Jan. 7-28, 30, 31, Feb. 18-28).

## SUN RIVER BASIN

51

06085800 Sun River at Simms, Mont.

LOCATION.--Lat 47°30'06", long 111°55'56", in NW1/4NW1/4SE1/4 sec.12, T.20 N., R.3 W., Cascade County, on left bank 500 ft downstream from county bridge, 0.7 mile north of Simms, and 0.7 mile downstream from Simms Creek.

DRAINAGE AREA.--1,320 sq mi.

PERIOD OF RECORD.--May to June 1953 (in WSP 1320-B), May to June 1964 (in WSP 1840-B), March 1966 to current year.

GAGE.--Water-stage recorder. Datum of gage is 3,546.58 ft above mean sea level.

AVERAGE DISCHARGE.--5 years, 551 cfs (399,200 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 7,630 cfs May 29 (gage height, 7.15 ft); minimum daily, 37 cfs Oct. 5.

Period of record: Maximum discharge, 9,610 cfs June 1, 1967 (gage height, 7.79 ft); minimum daily, 37 cfs Oct. 5, 1970.

Flood of June 9, 1964 reached a stage of about 13.7 ft, from floodmark (discharge, 69,800 cfs from slope-area measurement of peak flow at site 4 miles upstream).

REMARKS.--Records good except those for winter period, which are poor. Flow regulated by Gibson, Pishkun, Willow Creek, and Nilan Reservoirs (see p. 182). Diversions for irrigation of about 105,000 acres above station.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT           | NOV    | DEC      | JAN    | FEB       | MAR    | APR    | MAY     | JUN           | JUL    | AUG   | SEP    |
|-------------|---------------|--------|----------|--------|-----------|--------|--------|---------|---------------|--------|-------|--------|
| 1           | 50            | 211    | 190      | 200    | 315       | 210    | 263    | 1,880   | 4,850         | 744    | 108   | 301    |
| 2           | 56            | 217    | 190      | 200    | 305       | 210    | 256    | 1,900   | 4,010         | 672    | 91    | 296    |
| 3           | 56            | 221    | 190      | 200    | 285       | 210    | 256    | 1,640   | 3,690         | 388    | 86    | 252    |
| 4           | 45            | 217    | 185      | 195    | 270       | 220    | 252    | 1,660   | 3,680         | 264    | 78    | 211    |
| 5           | 37            | 217    | 180      | 190    | 255       | 225    | 252    | 1,790   | 3,800         | 237    | 71    | 174    |
| 6           | 83            | 221    | 180      | 185    | 250       | 235    | 252    | 1,970   | 3,650         | 187    | 69    | 171    |
| 7           | 95            | 217    | 180      | 170    | 240       | 245    | 256    | 2,170   | 3,510         | 165    | 67    | 165    |
| 8           | 120           | 217    | 180      | 165    | 240       | 255    | 256    | 2,220   | 3,860         | 168    | 65    | 155    |
| 9           | 115           | 217    | 185      | 160    | 240       | 270    | 252    | 2,150   | 4,580         | 146    | 65    | 143    |
| 10          | 122           | 217    | 190      | 150    | 250       | 285    | 249    | 2,090   | 4,510         | 132    | 63    | 149    |
| 11          | 119           | 214    | 195      | 145    | 300       | 300    | 228    | 2,100   | 3,740         | 116    | 63    | 138    |
| 12          | 118           | 214    | 200      | 135    | 400       | 280    | 217    | 3,850   | 3,120         | 113    | 63    | 89     |
| 13          | 124           | 214    | 200      | 130    | 430       | 256    | 201    | 5,400   | 2,180         | 103    | 71    | 98     |
| 14          | 125           | 214    | 200      | 125    | 450       | 235    | 173    | 6,140   | 2,410         | 129    | 96    | 101    |
| 15          | 174           | 214    | 200      | 130    | 390       | 242    | 155    | 4,950   | 2,720         | 78     | 116   | 101    |
| 16          | 199           | 214    | 195      | 140    | 355       | 231    | 357    | 4,020   | 2,270         | 84     | 126   | 118    |
| 17          | 186           | 214    | 185      | 150    | 330       | 249    | 723    | 3,620   | 1,800         | 78     | 129   | 149    |
| 18          | 182           | 214    | 180      | 210    | 310       | 228    | 812    | 3,170   | 1,180         | 71     | 129   | 168    |
| 19          | 181           | 211    | 170      | 300    | 295       | 225    | 877    | 2,690   | 1,340         | 69     | 116   | 162    |
| 20          | 175           | 204    | 165      | 370    | 280       | 230    | 692    | 2,380   | 890           | 71     | 106   | 194    |
| 21          | 187           | 173    | 160      | 335    | 265       | 230    | 518    | 2,150   | 869           | 80     | 98    | 222    |
| 22          | 180           | 160    | 160      | 325    | 255       | 230    | 412    | 1,970   | 883           | 108    | 96    | 208    |
| 23          | 177           | 145    | 160      | 320    | 250       | 235    | 344    | 1,840   | 2,010         | 116    | 96    | 194    |
| 24          | 174           | 145    | 160      | 320    | 240       | 235    | 302    | 1,870   | 3,000         | 98     | 93    | 143    |
| 25          | 166           | 145    | 160      | 320    | 230       | 240    | 403    | 2,020   | 3,020         | 111    | 96    | 135    |
| 26          | 165           | 145    | 160      | 320    | 225       | 245    | 523    | 2,880   | 2,600         | 129    | 98    | 208    |
| 27          | 158           | 150    | 160      | 330    | 220       | 252    | 607    | 4,490   | 1,760         | 124    | 98    | 230    |
| 28          | 161           | 165    | 170      | 350    | 215       | 249    | 1,320  | 6,480   | 1,300         | 124    | 98    | 215    |
| 29          | 171           | 180    | 185      | 355    | -----     | 252    | 1,660  | 7,280   | 834           | 140    | 106   | 187    |
| 30          | 217           | 190    | 195      | 350    | -----     | 252    | 1,860  | 6,640   | 771           | 121    | 106   | 197    |
| 31          | 207           | -----  | 200      | 330    | -----     | 263    | -----  | 5,860   | -----         | 116    | 226   | -----  |
| TOTAL       | 4,325         | 5,897  | 5,610    | 7,305  | 8,090     | 7,524  | 14,928 | 101,270 | 78,837        | 5,282  | 2,989 | 5,274  |
| MEAN        | 140           | 197    | 181      | 236    | 289       | 243    | 498    | 3,267   | 2,628         | 170    | 96.4  | 176    |
| MAX         | 217           | 221    | 200      | 370    | 450       | 300    | 1,860  | 7,280   | 4,850         | 744    | 226   | 301    |
| MIN         | 37            | 145    | 160      | 125    | 215       | 210    | 155    | 1,640   | 771           | 69     | 63    | 89     |
| AC-FT       | 8,580         | 11,700 | 11,130   | 14,490 | 16,050    | 14,920 | 29,610 | 200,900 | 156,400       | 10,480 | 5,930 | 10,460 |
| CAL YR 1970 | TOTAL 167,719 |        | MEAN 460 |        | MAX 6,140 |        | MIN 37 |         | AC-FT 332,700 |        |       |        |
| WTR YR 1971 | TOTAL 247,331 |        | MEAN 678 |        | MAX 7,280 |        | MIN 37 |         | AC-FT 490,600 |        |       |        |

NOTE.--Stage-discharge relation affected by ice Nov. 22 to Mar. 12 (no gage-height record Oct. 3-5, Nov. 22 to Dec. 4, Jan. 4-6, 10-29).



## SUN RIVER BASIN

06088300 Muddy Creek near Vaughn, Mont.

LOCATION.--Lat 47°37'30", long 111°38'05", in NW 1/4 sec. 32, T.22 N., R.1 E., Cascade County, on left bank 50 ft downstream from bridge on county road and 6.2 miles northwest of Vaughn.

DRAINAGE AREA.--282 sq mi.

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

GAGE.--Water-stage recorder. Altitude of gage is 3,450 ft (from topographic map).

EXTREMES.--Current year: Maximum discharge, 472 cfs July 31 (gage height, 5.22 ft); maximum gage height, 5.78 ft, Jan. 19 (backwater from ice); minimum discharge, 15 cfs Mar. 21 (gage height, 2.26 ft).

Period of record: Maximum discharge, about 1,400 cfs Mar. 18, 1969; maximum gage height, 9.20 ft Mar. 17, 1969 (backwater from ice); minimum discharge, 15 cfs Mar. 21, 1971 (gage height, 2.26 ft).

REMARKS.--Records good except those for winter period, which are poor. Natural flow increased by wastage from Greenfields Irrigation Project. Diversions for irrigation of about 400 acres above station. Pumped diversions from Muddy Creek above station in SW 1/4 sec. 2, T.22 N., R.1 W., to supplement water supply for Benton Lake Wildlife Refuge are listed below. Records of chemical analysis, water temperatures, and suspended sediment loads for the current year are published in Part 2 of this report.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY   | OCT   | NOV   | DEC   | JAN   | FEB   | MAR   | APR   | MAY   | JUN    | JUL    | AUG    | SEP    |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|--------|--------|--------|
| 1     | 137   | 72    | 55    | 40    | 30    | 30    | 32    | 29    | 311    | 251    | 425    | 373    |
| 2     | 187   | 70    | 50    | 30    | 35    | 32    | 35    | 29    | 230    | 239    | 408    | 368    |
| 3     | 185   | 69    | 50    | 30    | 35    | 35    | 33    | 29    | 199    | 277    | 398    | 340    |
| 4     | 182   | 68    | 50    | 30    | 30    | 37    | 32    | 26    | 194    | 283    | 395    | 331    |
| 5     | 184   | 69    | 55    | 30    | 30    | 40    | 32    | 30    | 168    | 303    | 353    | 309    |
| 6     | 203   | 69    | 60    | 35    | 25    | 40    | 32    | 32    | 206    | 315    | 355    | 267    |
| 7     | 160   | 66    | 65    | 40    | 25    | 38    | 33    | 68    | 279    | 350    | 365    | 224    |
| 8     | 117   | 65    | 60    | 40    | 30    | 40    | 31    | 143   | 213    | 321    | 360    | 194    |
| 9     | 103   | 65    | 55    | 35    | 35    | 43    | 31    | 96    | 171    | 305    | 418    | 177    |
| 10    | 101   | 63    | 50    | 35    | 40    | 40    | 31    | 77    | 180    | 253    | 378    | 168    |
| 11    | 92    | 62    | 55    | 30    | 50    | 39    | 28    | 118   | 208    | 257    | 380    | 149    |
| 12    | 100   | 61    | 55    | 25    | 70    | 37    | 31    | 129   | 177    | 283    | 311    | 138    |
| 13    | 106   | 59    | 50    | 20    | 110   | 37    | 29    | 104   | 156    | 239    | 301    | 137    |
| 14    | 101   | 59    | 55    | 20    | 100   | 35    | 29    | 107   | 171    | 226    | 403    | 120    |
| 15    | 101   | 59    | 60    | 25    | 90    | 33    | 29    | 125   | 129    | 203    | 365    | 121    |
| 16    | 97    | 57    | 60    | 30    | 80    | 30    | 29    | 135   | 117    | 179    | 331    | 135    |
| 17    | 92    | 56    | 50    | 35    | 70    | 28    | 32    | 194   | 111    | 171    | 315    | 187    |
| 18    | 79    | 56    | 40    | 40    | 60    | 31    | 35    | 192   | 115    | 172    | 325    | 184    |
| 19    | 76    | 55    | 35    | 60    | 50    | 32    | 35    | 168   | 135    | 166    | 295    | 179    |
| 20    | 74    | 50    | 30    | 75    | 45    | 30    | 35    | 212   | 120    | 169    | 289    | 212    |
| 21    | 73    | 45    | 30    | 70    | 50    | 25    | 34    | 199   | 113    | 180    | 307    | 199    |
| 22    | 70    | 50    | 35    | 65    | 45    | 25    | 32    | 196   | 112    | 179    | 345    | 182    |
| 23    | 69    | 50    | 35    | 60    | 42    | 30    | 32    | 180   | 122    | 185    | 338    | 182    |
| 24    | 68    | 55    | 40    | 55    | 40    | 40    | 31    | 168   | 113    | 182    | 307    | 192    |
| 25    | 64    | 55    | 40    | 50    | 37    | 35    | 31    | 160   | 118    | 219    | 335    | 194    |
| 26    | 63    | 50    | 45    | 50    | 35    | 37    | 31    | 163   | 143    | 243    | 321    | 192    |
| 27    | 61    | 50    | 45    | 55    | 32    | 39    | 31    | 147   | 166    | 210    | 281    | 187    |
| 28    | 59    | 50    | 45    | 60    | 30    | 34    | 31    | 125   | 182    | 259    | 271    | 169    |
| 29    | 61    | 55    | 50    | 50    | ----- | 37    | 30    | 127   | 212    | 343    | 243    | 161    |
| 30    | 77    | 60    | 50    | 35    | ----- | 39    | 29    | 132   | 235    | 423    | 287    | 169    |
| 31    | 75    | ----- | 50    | 30    | ----- | 37    | ----- | 251   | -----  | 450    | 353    | -----  |
| TOTAL | 3,217 | 1,770 | 1,505 | 1,285 | 1,351 | 1,085 | 946   | 3,893 | 5,106  | 7,835  | 10,558 | 6,140  |
| MEAN  | 104   | 59.0  | 48.5  | 41.5  | 48.3  | 35.0  | 31.5  | 126   | 170    | 253    | 341    | 205    |
| MAX   | 203   | 72    | 65    | 75    | 110   | 43    | 35    | 251   | 311    | 450    | 425    | 373    |
| MIN   | 59    | 45    | 30    | 20    | 25    | 25    | 28    | 28    | 111    | 166    | 243    | 120    |
| AC-FT | 6,380 | 3,510 | 2,990 | 2,550 | 2,680 | 2,150 | 1,880 | 7,720 | 10,130 | 15,540 | 20,940 | 12,180 |
| (+)   | 814   | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 1,680  | 1,790  | 827    | 1,260  |

CAL YR 1970 TOTAL 45,968 MEAN 126 MAX 510 MIN 25 AC-FT 91,180 (+) 3,470  
 WTR YR 1971 TOTAL 44,691 MEAN 122 MAX 450 MIN 20 AC-FT 88,640 (+) 6,370

+ Diversions, in acre-feet, to Benton Lake, furnished by Fish and Wildlife Service.  
 NOTE.--Stage-discharge relation affected by ice Nov. 20 to Mar. 25.

## SUN RIVER BASIN

53

06088500 Muddy Creek at Vaughn, Mont.

LOCATION.--Lat 47°33'42", long 111°32'33", near center of ~~SW~~<sup>NE</sup> 1/4 sec. 24, T.21 N., R.1 E., Cascade County, on right bank about 30 ft upstream from old highway bridge at Vaughn, 1.5 miles upstream from mouth.

DRAINAGE AREA.--314 sq mi.

PERIOD OF RECORD.--May 1925 to February 1926, April 1934 to September 1968, July to September 1971.

GAGE.--Water-stage recorder. Altitude of gage is 3,350 ft (from topographic map). May 21, 1925, to Feb. 8, 1926, nonrecording gage at site 500 ft downstream at different datum. Apr. 19, 1934, to Sept. 30, 1955, at present site at datum 1.00 ft higher. May 18, 1955, to Apr. 25, 1960, and since Sept. 24, 1962, auxiliary crest-stage gage. Oct. 1, 1955 to Sept. 30, 1968, nonrecording gage at bridge 30 ft downstream at present datum.

AVERAGE DISCHARGE.--34 years (1934-68), 122 cfs (88,320 acre-ft per year).

EXTREMES.--Maximum discharge during period July to September, 498 cfs July 30 (gage height, 4.64 ft, from graph based on gage readings); minimum daily 196 cfs Sept. 15.

Period of record: Maximum discharge, 7,600 cfs June 4, 1953 (gage height, 17.7 ft, present datum, from floodmarks), from rating curve extended above 3,000 cfs on basis of slope-area measurement of peak flow; minimum observed, 4.9 cfs Jan. 24, 1936.

Flood in June 1908 reached a stage of about 24 ft, present datum (discharge not determined); flood in June 1932 reached a stage of about 19 ft, present datum (discharge not determined); from information by local residents.

REMARKS.--Records good. Natural flow increased by wastage from Sun River Canal and by return flow from irrigation. Diversions for irrigation of about 700 acres above station. Pumped diversions from Muddy Creek above station in SW 1/4 sec. 2, T.22 N., R.1 W., to supplement water supply for Benton Lake Wildlife Refuge are listed below.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY   | OCT | NOV   | DEC | JAN | FEB   | MAR | APR   | MAY | JUN   | JUL    | AUG    | SEP    |
|-------|-----|-------|-----|-----|-------|-----|-------|-----|-------|--------|--------|--------|
| 1     |     |       |     |     |       |     |       |     |       | 336    | 468    | 399    |
| 2     |     |       |     |     |       |     |       |     |       | 318    | 450    | 409    |
| 3     |     |       |     |     |       |     |       |     |       | 349    | 445    | 391    |
| 4     |     |       |     |     |       |     |       |     |       | 360    | 446    | 377    |
| 5     |     |       |     |     |       |     |       |     |       | 362    | 418    | 363    |
| 6     |     |       |     |     |       |     |       |     |       | 355    | 414    | 327    |
| 7     |     |       |     |     |       |     |       |     |       | 423    | 423    | 289    |
| 8     |     |       |     |     |       |     |       |     |       | 391    | 414    | 260    |
| 9     |     |       |     |     |       |     |       |     |       | 392    | 452    | 236    |
| 10    |     |       |     |     |       |     |       |     |       | 341    | 428    | 228    |
| 11    |     |       |     |     |       |     |       |     |       | 333    | 436    | 220    |
| 12    |     |       |     |     |       |     |       |     |       | 352    | 388    | 211    |
| 13    |     |       |     |     |       |     |       |     |       | 310    | 354    | 211    |
| 14    |     |       |     |     |       |     |       |     |       | 294    | 426    | 199    |
| 15    |     |       |     |     |       |     |       |     |       | 277    | 430    | 196    |
| 16    |     |       |     |     |       |     |       |     |       | 254    | 398    | 204    |
| 17    |     |       |     |     |       |     |       |     |       | 248    | 375    | 245    |
| 18    |     |       |     |     |       |     |       |     |       | 243    | 281    | 258    |
| 19    |     |       |     |     |       |     |       |     |       | 235    | 357    | 250    |
| 20    |     |       |     |     |       |     |       |     |       | 235    | 340    | 261    |
| 21    |     |       |     |     |       |     |       |     |       | 242    | 347    | 269    |
| 22    |     |       |     |     |       |     |       |     |       | 256    | 369    | 243    |
| 23    |     |       |     |     |       |     |       |     |       | 259    | 384    | 240    |
| 24    |     |       |     |     |       |     |       |     |       | 258    | 347    | 248    |
| 25    |     |       |     |     |       |     |       |     |       | 291    | 370    | 251    |
| 26    |     |       |     |     |       |     |       |     |       | 317    | 363    | 248    |
| 27    |     |       |     |     |       |     |       |     |       | 291    | 327    | 241    |
| 28    |     |       |     |     |       |     |       |     |       | 314    | 310    | 222    |
| 29    |     |       |     |     | ----- |     |       |     |       | 384    | 296    | 222    |
| 30    |     |       |     |     | ----- |     |       |     |       | 456    | 323    | 225    |
| 31    |     | ----- |     |     | ----- |     | ----- |     | ----- | 480    | 382    | -----  |
| TOTAL |     |       |     |     |       |     |       |     |       | 9,956  | 12,061 | 7,943  |
| MEAN  |     |       |     |     |       |     |       |     |       | 321    | 389    | 265    |
| MAX   |     |       |     |     |       |     |       |     |       | 480    | 468    | 409    |
| MIN   |     |       |     |     |       |     |       |     |       | 235    | 296    | 196    |
| AC-FT |     |       |     |     |       |     |       |     |       | 19,750 | 23,920 | 15,750 |
| (+)   |     |       |     |     |       |     |       |     |       | 1,790  | 827    | 1,260  |

CAL YR 1970 TOTAL - MEAN - MAX - AC-FT -  
WAT YR 1971 TOTAL - MEAN - MAX - AC-FT -

† Diversions, in acre-feet, to Benton Lake, furnished by Fish and Wildlife Service.

## SUN RIVER BASIN

06089000 Sun River near Vaughn, Mont.

LOCATION.--Lat 47°31'37", long 111°29'05", in NW¼SE¼SW¼ sec.33, T.21 N., R.2 E., Cascade County, on right bank 3.7 miles downstream from Muddy Creek, 3.6 miles southeast of Vaughn, and at mile 14.6.

DRAINAGE AREA.--1,854 sq mi.

PERIOD OF RECORD.--July to October 1897 (gage heights and discharge measurements only, published as "near Great Falls"), April 1934 to current year. Monthly discharge only for April 1934, published in WSP 1309.

GAGE.--Water-stage recorder. Datum of gage is 3,317.12 ft above mean sea level. Prior to Oct. 30, 1897, non-recording gage at site 0.8 mile upstream at different datum. April 19 to Aug. 3, 1934, nonrecording gage at present site and datum.

AVERAGE DISCHARGE.--37 years, 734 cfs (531,800 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 7,620 cfs May 30 (gage height, 9.01 ft); minimum daily, 175 cfs Jan. 14.

Period of record: Maximum discharge, 53,500 cfs June 9, 1964 (42,200 cfs in main channel, plus 11,300 cfs in bypass channel), gage height, 23.4 ft, from floodmark; minimum, 20 cfs Apr. 24, 1944.

REMARKS.--Records good except those for winter period, which are poor. Flow regulated by Gibson, Pishkun, Willow Creek, and Nilan Reservoirs (see p. 182). Diversions for irrigation of about 110,000 acres above station. Records of chemical analyses and water temperatures for the current year are published in Part 2 of this report.

REVISIONS (WATER YEARS).--WSP 786: 1934. WSP 1729: Drainage area.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT           | NOV      | DEC       | JAN     | FFB           | MAR    | APR    | MAY     | JUN     | JUL    | AUG    | SEP    |
|-------------|---------------|----------|-----------|---------|---------------|--------|--------|---------|---------|--------|--------|--------|
| 1           | 298           | 409      | 265       | 280     | 340           | 240    | 350    | 1,680   | 6,500   | 1,090  | 691    | 845    |
| 2           | 337           | 402      | 270       | 280     | 330           | 245    | 357    | 1,690   | 5,320   | 1,080  | 670    | 789    |
| 3           | 344           | 395      | 270       | 275     | 310           | 245    | 363    | 1,540   | 4,510   | 913    | 642    | 726    |
| 4           | 337           | 395      | 270       | 270     | 295           | 245    | 370    | 1,490   | 4,320   | 691    | 656    | 670    |
| 5           | 350           | 395      | 270       | 260     | 285           | 250    | 370    | 1,570   | 4,300   | 649    | 607    | 649    |
| 6           | 409           | 402      | 270       | 250     | 270           | 255    | 376    | 1,710   | 4,460   | 607    | 579    | 607    |
| 7           | 395           | 395      | 270       | 245     | 265           | 270    | 389    | 1,910   | 4,380   | 614    | 586    | 572    |
| 8           | 389           | 389      | 275       | 235     | 265           | 280    | 389    | 2,130   | 4,600   | 593    | 579    | 544    |
| 9           | 350           | 383      | 280       | 225     | 290           | 300    | 389    | 2,130   | 5,250   | 593    | 600    | 506    |
| 10          | 344           | 383      | 285       | 210     | 350           | 310    | 389    | 2,060   | 5,760   | 537    | 607    | 537    |
| 11          | 337           | 376      | 285       | 195     | 440           | 330    | 383    | 2,010   | 5,240   | 493    | 600    | 537    |
| 12          | 330           | 376      | 280       | 185     | 480           | 344    | 383    | 2,870   | 4,200   | 500    | 551    | 530    |
| 13          | 350           | 376      | 280       | 180     | 495           | 357    | 383    | 4,750   | 3,150   | 409    | 474    | 506    |
| 14          | 344           | 370      | 275       | 175     | 500           | 363    | 389    | 6,220   | 2,740   | 395    | 500    | 480    |
| 15          | 350           | 370      | 270       | 180     | 450           | 350    | 389    | 6,070   | 3,120   | 402    | 572    | 480    |
| 16          | 402           | 363      | 270       | 200     | 390           | 337    | 220    | 4,630   | 3,060   | 305    | 600    | 500    |
| 17          | 395           | 363      | 270       | 270     | 360           | 330    | 448    | 3,970   | 2,580   | 324    | 600    | 537    |
| 18          | 389           | 363      | 270       | 310     | 340           | 330    | 621    | 3,520   | 2,030   | 285    | 642    | 572    |
| 19          | 376           | 363      | 260       | 350     | 325           | 330    | 705    | 2,870   | 1,780   | 272    | 579    | 579    |
| 20          | 376           | 344      | 240       | 400     | 310           | 324    | 712    | 2,630   | 1,470   | 285    | 519    | 572    |
| 21          | 370           | 300      | 230       | 380     | 300           | 330    | 513    | 2,350   | 1,130   | 305    | 513    | 607    |
| 22          | 376           | 270      | 225       | 365     | 295           | 330    | 402    | 2,140   | 1,050   | 324    | 519    | 600    |
| 23          | 370           | 260      | 220       | 355     | 285           | 324    | 324    | 1,930   | 1,470   | 363    | 551    | 593    |
| 24          | 370           | 245      | 220       | 350     | 275           | 324    | 279    | 1,840   | 3,050   | 402    | 513    | 593    |
| 25          | 363           | 240      | 220       | 350     | 265           | 324    | 272    | 1,860   | 3,370   | 448    | 519    | 586    |
| 26          | 363           | 240      | 220       | 350     | 255           | 330    | 389    | 2,350   | 3,190   | 480    | 493    | 579    |
| 27          | 363           | 240      | 225       | 355     | 250           | 330    | 441    | 3,830   | 2,430   | 500    | 454    | 607    |
| 28          | 350           | 240      | 240       | 370     | 245           | 330    | 747    | 5,960   | 2,030   | 480    | 428    | 621    |
| 29          | 363           | 245      | 260       | 380     | -----         | 330    | 1,340  | 7,400   | 1,300   | 593    | 402    | 614    |
| 30          | 395           | 255      | 275       | 370     | -----         | 344    | 1,590  | 7,570   | 1,150   | 677    | 454    | 621    |
| 31          | 422           | -----    | 280       | 350     | -----         | 344    | -----  | 7,300   | -----   | 677    | 656    | -----  |
| TOTAL       | 11,307        | 10,147   | 8,040     | 8,950   | 9,260         | 9,675  | 14,662 | 101,980 | 98,940  | 16,286 | 17,356 | 17,759 |
| MEAN        | 365           | 338      | 259       | 289     | 331           | 312    | 489    | 3,290   | 3,298   | 525    | 560    | 592    |
| MAX         | 422           | 409      | 285       | 400     | 500           | 363    | 1,580  | 7,570   | 6,500   | 1,090  | 691    | 845    |
| MIN         | 298           | 240      | 220       | 175     | 245           | 240    | 220    | 1,490   | 1,050   | 272    | 402    | 480    |
| AC-FT       | 22,430        | 20,130   | 15,950    | 17,750  | 18,370        | 19,190 | 29,080 | 202,300 | 196,200 | 32,300 | 34,430 | 35,220 |
| CAL YR 1970 | TOTAL 252,005 | MEAN 690 | MAX 6,530 | MIN 164 | AC-FT 499,900 |        |        |         |         |        |        |        |
| WTR YR 1971 | TOTAL 324,362 | MEAN 889 | MAX 7,570 | MIN 175 | AC-FT 643,400 |        |        |         |         |        |        |        |

NOTE.--Stage-discharge relation affected by ice Nov. 21 to Mar. 11.

06090300 Missouri River near Great Falls, Mont.

LOCATION.--Lat 47°34'55", long 111°03'35", in NE¼NW¼ sec.14, T.21 N., R.5 E., Cascade County, at Morony Dam, 12.6 miles northeast of Great Falls, and at mile 2,105.6.

DRAINAGE AREA.--23,292 sq mi.

PERIOD OF RECORD.--May to July 1953 (in WSP 1320-B), October 1956 to current year.

GAGE.--Nonrecording gage at cableway. Datum of gage is 2,809.21 ft above mean sea level (levels by Bureau of Reclamation). Foxboro meters are used for determining discharge through powerplant. Water-stage recorder on reservoir used for determining head on taintor gates; datum of gage is at mean sea level (levels by The Montana Power Co.).

AVERAGE DISCHARGE.--15 years, 7,672 cfs (5,558,000 acre-ft per year).

EXTREMES.--Current year: Maximum daily discharge, 26,400 cfs May 14; minimum daily, 3,490 cfs Dec. 20.

Period of record: Maximum discharge, 72,000 cfs June 10, 1964 (from hydrographic comparison with nearby stations); minimum, about 1 cfs Sept. 16, 1962, powerplant shutdown; minimum daily, 1,760 cfs Apr. 16, 1961.

Flood of June 10, 1964, is the highest since 1908.

REMARKS.--Records fair. Discharge through taintor gates on spillway computed from Morony Reservoir elevations at times. Nonrecording gage and cable 800 ft downstream for measurements to check discharge data supplied by The Montana Power Co. Flow regulated by 18 smaller irrigation reservoirs and powerplants (see p. 180), Clark Canyon Reservoir (see p. 23 ), and Canyon Ferry Reservoir (see p. 44 ). Diversions for irrigation of about 750,400 acres above station.

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

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT             | NOV     | DEC     | JAN         | FEB        | MAR       | APR             | MAY     | JUN     | JUL     | AUG     | SEP     |
|-------------|-----------------|---------|---------|-------------|------------|-----------|-----------------|---------|---------|---------|---------|---------|
| 1           | 6,660           | 8,150   | 7,950   | 7,730       | 7,260      | 7,840     | 9,330           | 16,000  | 22,500  | 17,700  | 8,510   | 6,690   |
| 2           | 6,230           | 9,200   | 7,910   | 8,420       | 8,190      | 7,690     | 9,360           | 16,800  | 21,200  | 18,600  | 8,340   | 6,730   |
| 3           | 6,350           | 8,390   | 6,810   | 8,100       | 9,700      | 9,390     | 9,440           | 17,000  | 20,700  | 19,600  | 8,640   | 7,630   |
| 4           | 6,550           | 8,000   | 5,930   | 7,280       | 9,770      | 9,200     | 9,430           | 17,000  | 21,200  | 19,700  | 8,670   | 6,580   |
| 5           | 7,040           | 7,710   | 5,390   | 6,900       | 9,260      | 8,930     | 9,370           | 17,700  | 20,900  | 19,600  | 8,500   | 6,470   |
| 6           | 6,080           | 6,820   | 6,770   | 7,060       | 8,460      | 8,780     | 9,710           | 18,400  | 21,100  | 19,300  | 8,560   | 6,080   |
| 7           | 5,540           | 6,950   | 8,800   | 7,390       | 8,430      | 8,600     | 8,740           | 19,800  | 21,100  | 18,900  | 8,530   | 6,570   |
| 8           | 6,090           | 8,850   | 8,750   | 8,270       | 8,620      | 8,930     | 9,990           | 22,100  | 20,500  | 17,800  | 8,170   | 6,030   |
| 9           | 5,810           | 7,100   | 6,900   | 8,900       | 9,070      | 9,090     | 12,400          | 22,500  | 19,000  | 16,400  | 8,650   | 6,750   |
| 10          | 5,940           | 6,620   | 7,490   | 7,620       | 8,960      | 9,060     | 13,400          | 23,000  | 16,400  | 16,000  | 8,630   | 6,310   |
| 11          | 6,940           | 8,600   | 7,130   | 6,970       | 9,150      | 8,790     | 13,300          | 22,500  | 15,600  | 14,700  | 7,850   | 6,240   |
| 12          | 6,290           | 8,310   | 6,680   | 5,710       | 9,440      | 8,570     | 13,300          | 23,500  | 15,100  | 14,100  | 8,470   | 5,950   |
| 13          | 6,070           | 8,960   | 6,840   | 6,880       | 10,300     | 8,620     | 12,800          | 25,700  | 14,300  | 13,700  | 8,360   | 6,030   |
| 14          | 7,290           | 8,210   | 6,810   | 7,690       | 11,000     | 8,840     | 12,700          | 26,400  | 13,700  | 12,500  | 8,400   | 5,480   |
| 15          | 5,970           | 7,900   | 7,190   | 7,810       | 11,400     | 8,630     | 11,600          | 25,200  | 13,800  | 12,000  | 7,930   | 6,020   |
| 16          | 5,970           | 8,440   | 7,120   | 8,530       | 11,200     | 8,580     | 12,500          | 23,300  | 13,700  | 10,400  | 8,180   | 7,710   |
| 17          | 4,870           | 8,570   | 7,420   | 8,910       | 9,340      | 8,490     | 12,400          | 23,500  | 13,800  | 9,640   | 8,020   | 7,240   |
| 18          | 7,600           | 8,710   | 6,210   | 8,730       | 8,990      | 8,330     | 12,900          | 23,900  | 11,000  | 8,240   | 7,370   | 6,410   |
| 19          | 6,160           | 5,430   | 5,250   | 8,990       | 8,980      | 8,500     | 12,900          | 23,100  | 11,700  | 8,730   | 6,400   | 8,470   |
| 20          | 5,720           | 7,450   | 3,490   | 9,020       | 8,920      | 8,730     | 13,100          | 23,100  | 11,400  | 7,340   | 6,460   | 8,410   |
| 21          | 4,560           | 5,930   | 4,870   | 8,900       | 8,710      | 9,210     | 13,400          | 23,700  | 10,300  | 7,770   | 6,510   | 8,510   |
| 22          | 5,420           | 6,700   | 7,190   | 10,000      | 8,540      | 8,960     | 13,500          | 22,100  | 10,500  | 8,240   | 5,360   | 7,980   |
| 23          | 6,470           | 6,750   | 6,470   | 8,510       | 8,240      | 9,070     | 13,600          | 22,000  | 11,600  | 7,220   | 6,440   | 7,950   |
| 24          | 6,520           | 6,660   | 7,820   | 7,760       | 8,890      | 8,600     | 13,800          | 21,800  | 11,600  | 7,900   | 6,450   | 7,660   |
| 25          | 6,880           | 5,850   | 7,490   | 8,890       | 8,250      | 9,310     | 15,800          | 21,300  | 12,800  | 7,600   | 5,570   | 7,780   |
| 26          | 7,240           | 6,700   | 7,040   | 9,110       | 8,490      | 9,270     | 16,400          | 18,900  | 12,600  | 7,800   | 6,590   | 7,800   |
| 27          | 6,740           | 8,120   | 7,890   | 9,020       | 7,380      | 9,330     | 15,000          | 18,900  | 12,800  | 7,980   | 6,590   | 8,610   |
| 28          | 5,990           | 6,480   | 8,480   | 8,980       | 8,390      | 9,360     | 14,300          | 20,800  | 12,500  | 7,800   | 5,920   | 8,440   |
| 29          | 6,150           | 8,250   | 7,910   | 9,010       | -----      | 9,290     | 14,800          | 21,900  | 13,900  | 8,140   | 5,650   | 8,360   |
| 30          | 8,820           | 7,930   | 8,470   | 9,130       | -----      | 9,340     | 16,600          | 22,500  | 16,100  | 8,550   | 6,540   | 8,260   |
| 31          | 8,170           | -----   | 7,980   | 8,960       | -----      | 9,360     | -----           | 22,500  | -----   | 8,580   | 6,690   | -----   |
| TOTAL       | 198,530         | 227,740 | 218,450 | 255,180     | 253,330    | 274,690   | 375,870         | 666,900 | 463,400 | 382,530 | 230,950 | 215,150 |
| MEAN        | 6,404           | 7,591   | 7,047   | 8,232       | 9,048      | 8,861     | 12,530          | 21,510  | 15,450  | 12,340  | 7,450   | 7,172   |
| MAX         | 8,820           | 9,200   | 8,800   | 10,000      | 11,400     | 9,390     | 16,600          | 26,400  | 22,500  | 19,700  | 8,670   | 8,610   |
| MIN         | 4,560           | 5,430   | 3,490   | 5,710       | 7,260      | 7,690     | 8,740           | 16,000  | 10,300  | 7,220   | 5,360   | 5,480   |
| AC-FT       | 393,800         | 451,700 | 433,300 | 506,100     | 502,500    | 544,800   | 745,500         | 1,323M  | 919,200 | 758,700 | 458,100 | 426,800 |
| CAL YR 1970 | TOTAL 3,397,950 |         |         | MEAN 9,309  | MAX 23,500 | MIN 3,490 | AC-FT 6,740,000 |         |         |         |         |         |
| WTR YR 1971 | TOTAL 3,762,720 |         |         | MEAN 10,310 | MAX 26,400 | MIN 3,490 | AC-FT 7,463,000 |         |         |         |         |         |



## BELT CREEK BASIN

06090500 Belt Creek near Monarch, Mont.

LOCATION.--Lat 47°12'27", long 110°55'53", in NW $\frac{1}{4}$ SE $\frac{1}{4}$ NW $\frac{1}{4}$  sec.26, T.17 N., R.6 E., Cascade County, on left bank 0.4 mile south of Riceville and 8.9 miles northwest of Monarch.

DRAINAGE AREA.--368 sq mi.

PERIOD OF RECORD.--April 1951 to current year.

GAGE.--Water-stage recorder. Altitude of gage is 3,960 ft (by barometer).

AVERAGE DISCHARGE.--20 years, 184 cfs (133,300 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 1,100 cfs May 31 (gage height, 3.96 ft); minimum, 24 cfs Mar. 16 (gage height, 1.02 ft), but may have been less during period of ice effect.

Period of record: Maximum discharge, 11,000 cfs June 4, 1953 (gage height, 10.12 ft), from rating curve extended above 2,500 cfs on basis of slope-area measurement of peak flow; no flow Feb. 21, Dec. 24, 1962, caused by ice jams upstream.

Flood in 1908 was several feet lower than in 1953, from information by local resident.

REMARKS.--Records good except those for winter period, which are poor. No regulation or diversion above station.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT           | NOV      | DEC       | JAN    | FEB           | MAR   | APR   | MAY    | JUN    | JUL   | AUG   | SEP   |
|-------------|---------------|----------|-----------|--------|---------------|-------|-------|--------|--------|-------|-------|-------|
| 1           | 73            | 62       | 58        | 50     | 46            | 30    | 53    | 146    | 885    | 221   | 76    | 53    |
| 2           | 72            | 58       | 56        | 48     | 47            | 31    | 47    | 200    | 808    | 206   | 73    | 50    |
| 3           | 72            | 54       | 54        | 46     | 48            | 32    | 47    | 281    | 772    | 200   | 72    | 50    |
| 4           | 70            | 55       | 56        | 40     | 47            | 34    | 38    | 390    | 742    | 185   | 74    | 49    |
| 5           | 69            | 66       | 58        | 39     | 45            | 32    | 40    | 470    | 706    | 175   | 69    | 47    |
| 6           | 79            | 66       | 60        | 43     | 41            | 33    | 59    | 590    | 742    | 168   | 67    | 44    |
| 7           | 77            | 61       | 53        | 46     | 42            | 33    | 90    | 605    | 948    | 163   | 67    | 44    |
| 8           | 74            | 59       | 53        | 48     | 43            | 33    | 93    | 645    | 976    | 153   | 65    | 44    |
| 9           | 76            | 61       | 50        | 45     | 45            | 32    | 90    | 700    | 934    | 148   | 61    | 42    |
| 10          | 83            | 61       | 62        | 42     | 50            | 32    | 114   | 694    | 864    | 144   | 59    | 41    |
| 11          | 80            | 56       | 64        | 40     | 56            | 32    | 88    | 682    | 802    | 144   | 59    | 41    |
| 12          | 86            | 62       | 58        | 40     | 64            | 33    | 80    | 724    | 712    | 134   | 56    | 39    |
| 13          | 88            | 60       | 46        | 38     | 74            | 34    | 66    | 826    | 655    | 128   | 55    | 39    |
| 14          | 82            | 55       | 46        | 35     | 55            | 32    | 76    | 871    | 605    | 123   | 54    | 39    |
| 15          | 76            | 55       | 42        | 38     | 53            | 30    | 117   | 784    | 555    | 117   | 53    | 40    |
| 16          | 74            | 61       | 44        | 50     | 44            | 28    | 109   | 754    | 505    | 112   | 53    | 44    |
| 17          | 76            | 60       | 39        | 52     | 38            | 30    | 96    | 700    | 458    | 110   | 52    | 52    |
| 18          | 76            | 59       | 38        | 52     | 39            | 67    | 82    | 630    | 426    | 106   | 52    | 50    |
| 19          | 76            | 56       | 37        | 56     | 39            | 50    | 66    | 565    | 414    | 102   | 50    | 48    |
| 20          | 76            | 52       | 38        | 54     | 44            | 32    | 76    | 565    | 370    | 99    | 49    | 55    |
| 21          | 76            | 46       | 39        | 52     | 76            | 33    | 83    | 510    | 341    | 98    | 49    | 54    |
| 22          | 76            | 44       | 38        | 46     | 61            | 35    | 99    | 462    | 320    | 106   | 47    | 50    |
| 23          | 74            | 50       | 41        | 47     | 39            | 39    | 104   | 442    | 308    | 98    | 48    | 48    |
| 24          | 73            | 54       | 42        | 47     | 38            | 40    | 128   | 480    | 293    | 93    | 48    | 47    |
| 25          | 70            | 52       | 45        | 46     | 38            | 36    | 206   | 535    | 275    | 91    | 47    | 49    |
| 26          | 67            | 50       | 45        | 44     | 37            | 56    | 180   | 655    | 266    | 90    | 46    | 54    |
| 27          | 67            | 48       | 46        | 46     | 36            | 50    | 142   | 832    | 269    | 85    | 43    | 55    |
| 28          | 59            | 45       | 47        | 48     | 35            | 43    | 128   | 1,030  | 263    | 91    | 43    | 53    |
| 29          | 64            | 50       | 48        | 50     | -----         | 42    | 125   | 1,070  | 281    | 94    | 43    | 50    |
| 30          | 70            | 60       | 50        | 48     | -----         | 54    | 130   | 1,070  | 248    | 83    | 53    | 52    |
| 31          | 66            | -----    | 52        | 45     | -----         | 67    | ----- | 1,010  | -----  | 79    | 60    | ----- |
| TOTAL       | 2,297         | 1,678    | 1,505     | 1,421  | 1,320         | 1,185 | 2,852 | 19,918 | 16,743 | 3,946 | 1,743 | 1,423 |
| MEAN        | 74.1          | 55.9     | 48.5      | 45.8   | 47.1          | 38.2  | 95.1  | 643    | 558    | 127   | 56.2  | 47.4  |
| MAX         | 88            | 66       | 64        | 56     | 76            | 67    | 206   | 1,070  | 976    | 221   | 76    | 55    |
| MIN         | 59            | 44       | 37        | 35     | 35            | 28    | 38    | 146    | 248    | 79    | 43    | 39    |
| AC-FT       | 4,560         | 3,330    | 2,990     | 2,820  | 2,620         | 2,350 | 5,660 | 39,510 | 33,210 | 7,830 | 3,460 | 2,820 |
| CAL YR 1970 | TOTAL 120,940 | MEAN 331 | MAX 2,880 | MIN 29 | AC-FT 239,900 |       |       |        |        |       |       |       |
| WTR YR 1971 | TOTAL 56,031  | MEAN 154 | MAX 1,070 | MIN 28 | AC-FT 111,100 |       |       |        |        |       |       |       |

## PEAK DISCHARGE (BASE, 600 CFS)

| DATE | TIME | G.H.T. | DISCHARGE | DATE | TIME | G.H.T. | DISCHARGE |
|------|------|--------|-----------|------|------|--------|-----------|
| 5-14 | 0115 | 3.69   | 913       | 6-8  | 0615 | 3.80   | 990       |
| 5-31 | 0045 | 3.96   | 1,100     |      |      |        |           |

NOTE.--Stage-discharge relation affected by ice Dec. 17 to Feb. 11.

06090800 Missouri River at Fort Benton, Mont.

LOCATION.--Lat 47°49'03", long 110°39'59", in SE $\frac{1}{4}$ SE $\frac{1}{4}$  sec.23, T.24 N., R.8 E., Chouteau County, on left bank at downstream side of abandoned highway bridge at Fort Benton, 3.8 miles upstream from Shonkin Creek, and at mile 2,073.2.

DRAINAGE AREA.--24,749 sq mi.

PERIOD OF RECORD.--October 1890 to current year. Records for June 1881 to September 1890, published in WSP 546 and 761, have been found to be unreliable and should not be used.

GAGE.--Water-stage recorder. Datum of gage is 2,614.05 ft above mean sea level. Prior to Oct. 11, 1920, non-recording gages, and Oct. 11, 1920, to Apr. 25, 1924, water-stage recorder, all at present site at datum 1.00 ft higher.

AVERAGE DISCHARGE.--81 years, 7,684 cfs (5,567,000 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 26,600 cfs May 14 (gage height, 7.07 ft); maximum gage height, 12.02 ft Jan. 14 (backwater from ice); minimum daily discharge, 4,310 cfs Dec. 20.

Period of record: Maximum discharge observed, about 140,000 cfs June 6, 1908 (gage height, 18.5 ft, present datum), from rating curve extended above 63,000 cfs; minimum, 320 cfs July 5, 1936 (gage height, -0.50 ft); minimum daily, 627 cfs July 5, 1936.

REMARKS.--Records good except those for winter period, which are fair. Flow regulated by 18 smaller irrigation reservoirs and powerplants (see p. 180), Clark Canyon Reservoir (see p. 23), and Canyon Ferry Reservoir (see p. 44). Diversions for irrigation of about 750,400 acres above station. Extreme diurnal fluctuation caused by powerplant at Morony Dam. Records of chemical analyses for the water year 1971 are published in Part 2 of this report.

REVISIONS (WATER YEARS).--WSP 746: 1932. WSP 1146: 1891-1907, 1908(M), 1909-18, 1937-38. WSP 1209: 1948(P). WSP 1309: 1929(M). WSP 1629: Drainage area. See also PERIOD OF RECORD.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT             | NOV     | DEC        | JAN     | FEB        | MAR     | APR       | MAY     | JUN             | JUL     | AUG     | SEP     |
|-------------|-----------------|---------|------------|---------|------------|---------|-----------|---------|-----------------|---------|---------|---------|
| 1           | 5,850           | 7,620   | 7,050      | 7,320   | 9,200      | 7,700   | 8,650     | 15,500  | 22,800          | 16,800  | 7,620   | 6,160   |
| 2           | 6,200           | 8,330   | 6,900      | 8,720   | 8,200      | 6,980   | 8,530     | 15,800  | 21,500          | 17,200  | 7,550   | 6,200   |
| 3           | 5,890           | 8,120   | 6,900      | 8,800   | 9,200      | 8,150   | 8,610     | 15,900  | 20,200          | 18,100  | 7,360   | 6,630   |
| 4           | 6,060           | 8,460   | 6,400      | 7,600   | 10,000     | 8,230   | 8,720     | 15,900  | 20,100          | 18,300  | 7,740   | 6,450   |
| 5           | 8,530           | 8,500   | 6,000      | 6,800   | 9,800      | 8,190   | 8,610     | 16,800  | 19,900          | 18,200  | 7,620   | 5,850   |
| 6           | 6,020           | 5,760   | 6,400      | 6,600   | 9,000      | 8,000   | 8,690     | 17,700  | 20,100          | 18,000  | 7,280   | 5,470   |
| 7           | 6,130           | 6,820   | 7,510      | 6,670   | 8,600      | 7,660   | 8,530     | 18,600  | 20,900          | 17,600  | 7,580   | 6,060   |
| 8           | 6,200           | 7,320   | 9,070      | 7,580   | 8,800      | 8,080   | 8,310     | 20,200  | 20,500          | 17,100  | 7,470   | 6,230   |
| 9           | 6,410           | 7,200   | 7,770      | 8,150   | 9,200      | 8,080   | 11,200    | 21,600  | 19,500          | 15,400  | 7,700   | 5,820   |
| 10          | 4,910           | 6,340   | 8,040      | 7,660   | 9,200      | 8,120   | 11,400    | 22,100  | 17,000          | 14,700  | 7,850   | 5,720   |
| 11          | 6,380           | 7,700   | 7,130      | 7,580   | 9,000      | 7,890   | 11,300    | 21,400  | 15,500          | 13,900  | 7,010   | 5,690   |
| 12          | 7,740           | 7,850   | 6,090      | 6,800   | 9,400      | 7,740   | 11,300    | 22,000  | 15,100          | 13,300  | 7,010   | 5,370   |
| 13          | 6,130           | 8,310   | 7,090      | 5,800   | 10,000     | 8,150   | 11,000    | 24,000  | 14,200          | 12,900  | 6,980   | 5,440   |
| 14          | 6,670           | 8,000   | 6,480      | 6,200   | 10,700     | 7,700   | 11,800    | 25,100  | 13,400          | 11,400  | 7,170   | 5,060   |
| 15          | 6,410           | 7,540   | 6,450      | 7,000   | 10,400     | 7,810   | 9,800     | 25,300  | 13,200          | 11,000  | 6,710   | 5,440   |
| 16          | 5,960           | 7,810   | 6,630      | 7,800   | 9,920      | 7,660   | 10,900    | 23,600  | 13,200          | 9,920   | 7,360   | 6,600   |
| 17          | 4,490           | 7,620   | 7,390      | 9,000   | 9,100      | 7,660   | 10,400    | 22,600  | 12,700          | 9,450   | 6,940   | 7,280   |
| 18          | 6,790           | 8,230   | 6,340      | 9,000   | 8,150      | 7,550   | 11,100    | 22,600  | 12,100          | 8,880   | 6,270   | 5,180   |
| 19          | 7,620           | 6,790   | 6,200      | 9,000   | 8,190      | 7,550   | 11,400    | 21,800  | 10,400          | 7,850   | 5,990   | 7,740   |
| 20          | 5,920           | 6,200   | 4,310      | 9,200   | 8,080      | 7,850   | 11,000    | 21,600  | 10,500          | 7,130   | 5,760   | 7,850   |
| 21          | 4,430           | 6,300   | 5,290      | 9,000   | 7,770      | 8,340   | 11,500    | 21,100  | 9,920           | 7,280   | 5,760   | 7,960   |
| 22          | 5,340           | 6,230   | 7,400      | 9,600   | 7,770      | 8,150   | 11,300    | 20,700  | 9,800           | 7,810   | 5,340   | 7,510   |
| 23          | 6,340           | 7,360   | 7,200      | 10,000  | 7,320      | 8,150   | 11,500    | 20,200  | 9,800           | 7,360   | 5,440   | 7,010   |
| 24          | 6,560           | 7,130   | 7,000      | 9,000   | 8,040      | 7,740   | 11,600    | 20,300  | 10,500          | 7,010   | 5,760   | 6,940   |
| 25          | 6,340           | 6,020   | 7,800      | 8,000   | 7,470      | 8,460   | 12,900    | 20,000  | 11,200          | 6,980   | 5,370   | 6,860   |
| 26          | 7,090           | 6,560   | 7,600      | 9,400   | 7,620      | 8,500   | 14,100    | 18,400  | 11,600          | 7,280   | 5,660   | 6,980   |
| 27          | 6,710           | 7,280   | 7,300      | 9,500   | 7,470      | 8,500   | 14,200    | 18,100  | 11,700          | 6,980   | 5,890   | 7,510   |
| 28          | 5,920           | 6,750   | 7,800      | 9,000   | 7,470      | 8,530   | 14,100    | 19,900  | 11,000          | 7,280   | 5,630   | 7,660   |
| 29          | 5,090           | 7,580   | 8,200      | 9,000   | -----      | 8,420   | 13,500    | 21,700  | 12,100          | 7,280   | 4,910   | 6,820   |
| 30          | 7,930           | 7,550   | 8,000      | 9,200   | -----      | 8,500   | 15,200    | 22,800  | 14,500          | 8,120   | 5,660   | 7,660   |
| 31          | 7,660           | -----   | 7,810      | 9,200   | -----      | 8,690   | -----     | 22,700  | -----           | 7,580   | 6,130   | -----   |
| TOTAL       | 195,720         | 219,370 | 217,550    | 254,180 | 245,070    | 248,730 | 331,150   | 636,000 | 444,920         | 358,090 | 204,520 | 195,150 |
| MEAN        | 6,314           | 7,112   | 7,018      | 8,199   | 8,753      | 8,024   | 11,040    | 20,520  | 14,830          | 11,550  | 6,597   | 6,505   |
| MAX         | 8,530           | 8,500   | 9,070      | 10,000  | 10,700     | 8,690   | 15,200    | 25,300  | 22,800          | 18,300  | 7,850   | 7,960   |
| MIN         | 4,430           | 5,760   | 4,310      | 5,800   | 7,320      | 6,980   | 8,310     | 15,500  | 9,800           | 6,980   | 4,910   | 5,060   |
| AC-FT       | 388,200         | 435,100 | 431,500    | 504,200 | 486,100    | 493,400 | 656,800   | 1,262M  | 882,500         | 710,300 | 405,700 | 387,100 |
| CAL YR 1970 | TOTAL 3,550,960 |         | MEAN 9,729 |         | MAX 25,400 |         | MIN 4,310 |         | AC-FT 7,043,000 |         |         |         |
| WTR YR 1971 | TOTAL 3,550,450 |         | MEAN 9,727 |         | MAX 25,300 |         | MIN 4,310 |         | AC-FT 7,042,000 |         |         |         |

NOTE.--Stage-discharge relation affected by ice Jan. 12 to Feb. 13.

## MARIAS RIVER BASIN

06092000 Two Medicine River near Browning, Mont.

LOCATION.--Lat 48°28'25", long 112°48'06", in NW1/4SE1/4 sec.5, T.31 N., R.9 W., Glacier County, on right bank 1,000 ft upstream from bridge on U.S. Highway 89, 11 miles southeast of Browning, and 15 miles upstream from Badger Creek.

DRAINAGE AREA.--317 sq mi.

PERIOD OF RECORD.--April 1907 to October 1924, May 1951 to current year. Monthly discharge only for some periods, published in WSP 1309. Published as Two Medicine River at Family 1907-24. October 1957 to September 1964, published as Two Medicine Creek near Browning.

GAGE.--Water-stage recorder. Altitude of gage is 3,930 ft (from topographic map). Prior to Nov. 1, 1924, non-recording gage at several sites within 3 miles of present site at various datums. May 1, 1951, to Sept. 30, 1964, and Oct. 1, 1964, to Sept. 27, 1967, water-stage recorder at site 150 ft downstream at datums 2.00 ft higher and present datum, respectively.

AVERAGE DISCHARGE.--37 years, 382 cfs (276,800 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 3,880 cfs May 13 (gage height, 5.82 ft); minimum daily, 2.8 cfs Oct. 1, 4, 5.

Period of record: Maximum discharge, 100,000 cfs June 8, 1964 (gage height, 15.5 ft, from floodmark in gage well, 16.0 ft from outside floodmark, present datum); minimum, 1.1 cfs Aug. 16, 1966.

REMARKS.--Records fair except those for winter period, which are poor. Flow regulated by Lower Two Medicine Lake (see p. 182). Diversions above station into Two Medicine Canal for irrigation of about 10,000 acres below station. Recorded diversions from Two Medicine River above station for the current year are listed in daily table below.

REVISIONS (WATER YEARS).--WSP 1309: 1908, 1910, 1913, 1916, 1918. WSP 1559: 1915(M), 1917-18(M), 1921-24. WSP 1729: Drainage area.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY   | OCT     | NOV   | DEC   | JAN   | FEB    | MAR   | APR    | MAY     | JUN    | JUL    | AUG     | SEP   |
|-------|---------|-------|-------|-------|--------|-------|--------|---------|--------|--------|---------|-------|
| 1     | 2.8     | 35    | 45    | 45    | 105    | 80    | 115    | 948     | 2,320  | 588    | 74      | 40    |
| 2     | 2.9     | 35    | 47    | 44    | 100    | 90    | 108    | 1,440   | 2,230  | 588    | 69      | 39    |
| 3     | 2.9     | 32    | 48    | 43    | 95     | 100   | 98     | 2,470   | 2,050  | 588    | 69      | 36    |
| 4     | 2.8     | 30    | 52    | 42    | 85     | 98    | 100    | 2,610   | 1,970  | 576    | 71      | 34    |
| 5     | 2.8     | 34    | 53    | 43    | 85     | 96    | 100    | 2,920   | 2,000  | 510    | 66      | 30    |
| 6     | 3.3     | 44    | 54    | 44    | 90     | 94    | 250    | 3,260   | 2,050  | 455    | 69      | 28    |
| 7     | 16      | 40    | 57    | 46    | 95     | 92    | 300    | 2,810   | 2,080  | 431    | 76      | 26    |
| 8     | 22      | 36    | 56    | 44    | 100    | 90    | 250    | 2,910   | 2,040  | 346    | 72      | 28    |
| 9     | 22      | 35    | 54    | 42    | 110    | 85    | 200    | 3,160   | 2,000  | 314    | 49      | 29    |
| 10    | 86      | 35    | 52    | 40    | 120    | 85    | 180    | 2,810   | 1,930  | 322    | 26      | 30    |
| 11    | 177     | 32    | 50    | 39    | 140    | 81    | 160    | 2,810   | 1,760  | 338    | 19      | 26    |
| 12    | 186     | 39    | 46    | 38    | 180    | 79    | 150    | 3,040   | 1,730  | 322    | 29      | 24    |
| 13    | 94      | 35    | 47    | 37    | 700    | 84    | 200    | 3,410   | 1,730  | 289    | 19      | 25    |
| 14    | 44      | 28    | 48    | 40    | 600    | 75    | 270    | 2,830   | 1,730  | 261    | 12      | 26    |
| 15    | 35      | 33    | 49    | 45    | 500    | 75    | 425    | 2,010   | 1,600  | 240    | 8.6     | 29    |
| 16    | 30      | 36    | 48    | 50    | 400    | 68    | 360    | 1,890   | 1,330  | 225    | 8.6     | 35    |
| 17    | 30      | 35    | 45    | 60    | 300    | 74    | 312    | 1,710   | 1,170  | 240    | 8.6     | 35    |
| 18    | 28      | 36    | 43    | 70    | 200    | 65    | 242    | 1,300   | 1,070  | 251    | 8.6     | 29    |
| 19    | 27      | 22    | 42    | 100   | 140    | 70    | 235    | 1,180   | 1,030  | 247    | 9.7     | 25    |
| 20    | 28      | 26    | 41    | 140   | 119    | 51    | 320    | 1,110   | 998    | 228    | 11      | 39    |
| 21    | 27      | 10    | 40    | 170   | 117    | 50    | 440    | 908     | 1,050  | 207    | 25      | 35    |
| 22    | 28      | 32    | 40    | 160   | 104    | 44    | 648    | 802     | 1,150  | 205    | 54      | 25    |
| 23    | 28      | 40    | 41    | 150   | 117    | 60    | 865    | 916     | 1,250  | 170    | 54      | 25    |
| 24    | 29      | 46    | 41    | 140   | 119    | 72    | 1,180  | 1,140   | 1,230  | 170    | 44      | 23    |
| 25    | 26      | 44    | 42    | 135   | 100    | 70    | 2,270  | 1,670   | 1,110  | 150    | 34      | 21    |
| 26    | 29      | 43    | 43    | 130   | 96     | 68    | 1,170  | 2,080   | 1,140  | 135    | 30      | 19    |
| 27    | 17      | 42    | 44    | 127   | 90     | 70    | 718    | 2,700   | 1,080  | 92     | 28      | 17    |
| 28    | 32      | 46    | 45    | 125   | 85     | 74    | 636    | 3,150   | 941    | 150    | 28      | 17    |
| 29    | 41      | 50    | 47    | 120   | -----  | 79    | 781    | 2,800   | 780    | 135    | 28      | 16    |
| 30    | 40      | 48    | 46    | 115   | -----  | 164   | 823    | 2,600   | 696    | 97     | 38      | 15    |
| 31    | 39      | ----- | 46    | 110   | -----  | 159   | -----  | 2,800   | -----  | 81     | 51      | ----- |
| TOTAL | 1,178.5 | 1,079 | 1,452 | 2,534 | 5,092  | 2,542 | 13,906 | 68,194  | 45,245 | 8,951  | 1,189.1 | 826   |
| MEAN  | 38.0    | 36.0  | 46.8  | 81.7  | 182    | 82.0  | 464    | 2,200   | 1,508  | 289    | 38.4    | 27.5  |
| MAX   | 186     | 50    | 57    | 170   | 700    | 164   | 2,270  | 3,410   | 2,320  | 588    | 76      | 40    |
| MIN   | 2.8     | 10    | 40    | 37    | 85     | 44    | 98     | 802     | 696    | 81     | 8.6     | 15    |
| AC-FT | 2,340   | 2,140 | 2,880 | 5,030 | 10,100 | 5,040 | 27,580 | 135,300 | 89,740 | 17,750 | 2,360   | 1,640 |
| (+)   | 308     | 0     | 0     | 0     | 0      | 0     | 0      | 2,170   | 6,650  | 13,150 | 9,730   | 6,770 |

|             |                 |          |           |         |               |     |        |
|-------------|-----------------|----------|-----------|---------|---------------|-----|--------|
| CAL YR 1970 | TOTAL 156,946.7 | MEAN 430 | MAX 5,480 | MIN 2.8 | AC-FT 311,300 | (+) | 33,940 |
| WTR YR 1971 | TOTAL 152,188.6 | MEAN 417 | MAX 3,410 | MIN 2.8 | AC-FT 301,900 | (+) | 38,780 |

+ Diversions, in acre-feet, by Two Medicine Canal.

NOTE.--Stage-discharge relation affected by ice Nov. 23 to Feb. 18 (no gage-height record Nov. 22, Jan. 12-15).

06092500 Badger Creek near Browning, Mont.

LOCATION.--Lat 48°21'03", long 112°50'27", in NE¼ sec.24, T.30 N., R.10 W., Glacier County, on right bank just upstream from point of diversion to Four Horns Canal, 15 miles upstream from mouth, and 17 miles southeast of Browning.

DRAINAGE AREA.--133 sq mi.

PERIOD OF RECORD.--May 1951 to current year.

GAGE.--Water-stage recorder and control consisting of concrete diversion dam and two taintor gates (regularly closed). Datum of gage is 4,179.26 ft above mean sea level (Bureau of Reclamation bench mark).

AVERAGE DISCHARGE.--20 years, 231 cfs (23.59 inches per year, 167,400 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 1,620 cfs May 28; minimum daily, 81 cfs Mar. 25.

Period of record: Maximum discharge, 49,700 cfs June 8, 1964 (gage height, 10.37 ft), from rating curve extended above 2,000 cfs on basis of slope-area measurement of peak flow; minimum daily, 25 cfs Dec. 11-15, 1963.

REMARKS.--Records good except those for winter period, which are poor. Water diverted into Four Horns Canal at station for irrigation of about 6,000 acres below station. Figures of discharge given herein are sum of flow over diversion dam and that diverted by Four Horns Canal.

REVISIONS (WATER YEARS).--WSP 1729: 1951(M).

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT          | NOV      | DEC       | JAN    | FEB       | MAR      | APR           | MAY    | JUN    | JUL    | AUG   | SEP   |
|-------------|--------------|----------|-----------|--------|-----------|----------|---------------|--------|--------|--------|-------|-------|
| 1           | 109          | 100      | 80        | 100    | 95        | 90       | 91            | 356    | 1,060  | 389    | 196   | 141   |
| 2           | 109          | 100      | 80        | 100    | 95        | 100      | 90            | 464    | 1,030  | 407    | 193   | 138   |
| 3           | 110          | 98       | 85        | 100    | 90        | 95       | 88            | 614    | 1,030  | 400    | 187   | 135   |
| 4           | 113          | 97       | 90        | 100    | 90        | 95       | 90            | 774    | 1,040  | 383    | 186   | 130   |
| 5           | 121          | 97       | 95        | 95     | 90        | 90       | 95            | 787    | 1,050  | 365    | 183   | 126   |
| 6           | 134          | 97       | 95        | 90     | 85        | 90       | 105           | 816    | 1,090  | 367    | 174   | 123   |
| 7           | 128          | 97       | 100       | 85     | 85        | 95       | 124           | 768    | 1,120  | 378    | 185   | 120   |
| 8           | 123          | 97       | 105       | 85     | 90        | 95       | 131           | 820    | 1,140  | 327    | 186   | 108   |
| 9           | 125          | 98       | 105       | 80     | 90        | 95       | 134           | 966    | 1,070  | 323    | 187   | 105   |
| 10          | 125          | 99       | 105       | 80     | 100       | 100      | 147           | 972    | 948    | 346    | 190   | 110   |
| 11          | 123          | 97       | 100       | 75     | 105       | 100      | 138           | 990    | 894    | 334    | 184   | 110   |
| 12          | 133          | 97       | 100       | 70     | 110       | 105      | 131           | 1,060  | 894    | 312    | 181   | 114   |
| 13          | 130          | 97       | 95        | 60     | 130       | 105      | 131           | 1,160  | 885    | 301    | 176   | 110   |
| 14          | 124          | 95       | 90        | 65     | 125       | 110      | 141           | 1,020  | 894    | 296    | 165   | 105   |
| 15          | 119          | 95       | 90        | 70     | 125       | 110      | 171           | 849    | 756    | 274    | 150   | 110   |
| 16          | 118          | 95       | 90        | 80     | 120       | 105      | 174           | 807    | 684    | 270    | 140   | 110   |
| 17          | 118          | 97       | 85        | 90     | 115       | 105      | 175           | 723    | 642    | 275    | 130   | 110   |
| 18          | 114          | 97       | 85        | 150    | 110       | 100      | 166           | 634    | 642    | 265    | 135   | 105   |
| 19          | 114          | 98       | 85        | 200    | 105       | 100      | 163           | 570    | 642    | 269    | 140   | 105   |
| 20          | 114          | 98       | 85        | 120    | 105       | 95       | 182           | 555    | 678    | 257    | 150   | 115   |
| 21          | 114          | 95       | 85        | 100    | 100       | 95       | 226           | 508    | 733    | 233    | 155   | 110   |
| 22          | 110          | 95       | 85        | 95     | 100       | 90       | 255           | 476    | 765    | 230    | 150   | 105   |
| 23          | 110          | 93       | 85        | 95     | 100       | 90       | 307           | 522    | 791    | 227    | 145   | 105   |
| 24          | 110          | 90       | 90        | 95     | 102       | 86       | 392           | 626    | 726    | 212    | 150   | 105   |
| 25          | 110          | 90       | 90        | 95     | 100       | 81       | 649           | 848    | 671    | 213    | 150   | 100   |
| 26          | 105          | 90       | 90        | 100    | 100       | 84       | 523           | 1,070  | 629    | 199    | 140   | 100   |
| 27          | 107          | 85       | 90        | 108    | 100       | 85       | 412           | 1,280  | 544    | 213    | 130   | 100   |
| 28          | 100          | 85       | 95        | 110    | 95        | 82       | 351           | 1,470  | 491    | 268    | 125   | 95    |
| 29          | 99           | 80       | 95        | 110    | -----     | 89       | 327           | 1,310  | 471    | 241    | 120   | 95    |
| 30          | 100          | 80       | 97        | 105    | -----     | 99       | 321           | 1,230  | 406    | 223    | 140   | 95    |
| 31          | 100          | -----    | 100       | 100    | -----     | 97       | -----         | 1,180  | -----  | 199    | 160   | ----- |
| TOTAL       | 3,569        | 2,829    | 2,847     | 3,008  | 2,857     | 2,958    | 6,430         | 26,225 | 24,416 | 8,996  | 4,983 | 3,340 |
| MEAN        | 115          | 94.3     | 91.8      | 97.0   | 102       | 95.4     | 214           | 846    | 814    | 290    | 161   | 111   |
| MAX         | 134          | 100      | 105       | 200    | 130       | 110      | 649           | 1,470  | 1,140  | 407    | 196   | 141   |
| MIN         | 99           | 80       | 80        | 60     | 85        | 81       | 88            | 356    | 406    | 199    | 120   | 95    |
| CFSM        | .86          | .71      | .69       | .73    | .77       | .72      | 1.61          | 6.36   | 6.12   | 2.18   | 1.21  | .83   |
| IN.         | 1.00         | .79      | .80       | .84    | .80       | .83      | 1.80          | 7.34   | 6.83   | 2.52   | 1.39  | .93   |
| AC-FT       | 7,080        | 5,610    | 5,650     | 5,970  | 5,670     | 5,870    | 12,750        | 52,020 | 48,430 | 17,840 | 9,880 | 6,620 |
| CAL YR 1970 | TOTAL 94,434 | MEAN 259 | MAX 2,910 | MIN 50 | CFSM 1.95 | IN 26.41 | AC-FT 187,300 |        |        |        |       |       |
| WTR YR 1971 | TOTAL 92,458 | MEAN 253 | MAX 1,470 | MIN 60 | CFSM 1.90 | IN 25.86 | AC-FT 183,400 |        |        |        |       |       |

NOTE.--Stage-discharge relation affected by ice Nov. 21 to Mar. 23 (no gage-height record Jan. 13, 14, 21-26, Feb. 6-8, 15-23, Feb. 25 to Mar. 1, Mar. 12-23).



## MARIAS RIVER BASIN

06099000 Cut Bank Creek at Cut Bank, Mont.

LOCATION.--Lat 48°38'00", long 112°20'46", in SW 1/4 sec. 11, T.33 N., R.6 W., Glacier County, on right bank at highway bridge 0.7 mile west of Cut Bank and 17 miles upstream from confluence with Two Medicine River.

DRAINAGE AREA.--1,065 sq mi.

PERIOD OF RECORD.--August 1905 to October 1919, May to July 1920, May 1922 to October 1924, May 1951 to current year. Monthly discharge only for some periods, published in WSP 1309.

GAGE.--Water-stage recorder. Altitude of gage is 3,550 ft (from topographic map). Prior to May 12, 1922, non-recording gages at several sites 0.5 mile upstream at various datums. May 12, 1922, to Nov. 1, 1924, non-recording gage at present site at different datum.

AVERAGE DISCHARGE.--36 years (1905-19, 1922-24, 1951-71), 195 cfs (141,300 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 1,080 cfs June 1 (gage height, 4.50 ft); maximum gage height, 8.31 ft Feb. 13 (backwater from ice); minimum daily discharge, 15 cfs Jan. 12-14.

Period of record: Maximum discharge, 16,600 cfs June 9, 1964 (gage height, 13.93 ft, 14.2 ft from flood-marks), from rating curve extended above 12,000 cfs on basis of slope-area measurement of peak flow; minimum observed, 4.0 cfs Dec. 1, 1905 (gage height, 2.4 ft, site and datum then in use).

REMARKS.--Records good except those for winter period, which are poor. Few minor diversions for irrigation of hay meadows above station. Natural flow of stream affected by water from Two Medicine Canal which irrigates land above station.

REVISIONS (WATER YEARS).--WSP 1309: 1907-8, 1910-11, 1924-25. WSP 1509: 1911, 1916(M). WSP 1559: 1905(M), 1908(M). WSP 1709: 1959. WSP 1729: Drainage area.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY   | OCT   | NOV   | DEC   | JAN   | FEB   | MAR   | APR    | MAY    | JUN    | JUL    | AUG   | SEP   |
|-------|-------|-------|-------|-------|-------|-------|--------|--------|--------|--------|-------|-------|
| 1     | 46    | 42    | 30    | 18    | 31    | 100   | 468    | 366    | 1,040  | 391    | 149   | 86    |
| 2     | 45    | 41    | 31    | 17    | 30    | 110   | 393    | 342    | 949    | 351    | 140   | 87    |
| 3     | 44    | 40    | 31    | 16    | 30    | 120   | 381    | 388    | 772    | 383    | 130   | 71    |
| 4     | 42    | 38    | 32    | 16    | 29    | 115   | 327    | 511    | 702    | 395    | 129   | 65    |
| 5     | 39    | 47    | 32    | 16    | 29    | 110   | 288    | 650    | 720    | 359    | 130   | 61    |
| 6     | 39    | 59    | 33    | 16    | 28    | 110   | 265    | 769    | 742    | 326    | 126   | 53    |
| 7     | 41    | 56    | 35    | 17    | 27    | 105   | 310    | 839    | 807    | 326    | 123   | 47    |
| 8     | 47    | 46    | 34    | 18    | 27    | 105   | 322    | 749    | 757    | 316    | 123   | 40    |
| 9     | 49    | 53    | 32    | 17    | 27    | 100   | 303    | 736    | 729    | 290    | 122   | 51    |
| 10    | 50    | 51    | 30    | 17    | 26    | 100   | 303    | 823    | 711    | 280    | 108   | 52    |
| 11    | 50    | 48    | 31    | 16    | 30    | 98    | 305    | 772    | 648    | 306    | 97    | 51    |
| 12    | 50    | 45    | 32    | 15    | 40    | 96    | 259    | 726    | 594    | 326    | 96    | 47    |
| 13    | 52    | 39    | 30    | 15    | 60    | 110   | 217    | 770    | 589    | 299    | 88    | 45    |
| 14    | 53    | 38    | 30    | 15    | 200   | 140   | 192    | 854    | 594    | 268    | 87    | 42    |
| 15    | 52    | 36    | 29    | 16    | 180   | 135   | 200    | 817    | 621    | 259    | 79    | 37    |
| 16    | 50    | 34    | 25    | 16    | 170   | 130   | 241    | 684    | 562    | 250    | 63    | 46    |
| 17    | 49    | 35    | 22    | 17    | 160   | 125   | 249    | 625    | 468    | 244    | 51    | 61    |
| 18    | 48    | 35    | 19    | 20    | 150   | 120   | 221    | 607    | 411    | 256    | 55    | 66    |
| 19    | 43    | 30    | 17    | 26    | 140   | 115   | 194    | 540    | 407    | 262    | 59    | 65    |
| 20    | 41    | 28    | 16    | 37    | 130   | 100   | 183    | 526    | 395    | 250    | 67    | 81    |
| 21    | 40    | 25    | 16    | 35    | 130   | 95    | 236    | 522    | 415    | 233    | 74    | 88    |
| 22    | 39    | 28    | 16    | 33    | 120   | 90    | 323    | 468    | 454    | 216    | 70    | 88    |
| 23    | 40    | 30    | 16    | 32    | 120   | 93    | 383    | 415    | 508    | 227    | 60    | 80    |
| 24    | 40    | 34    | 17    | 30    | 115   | 96    | 450    | 399    | 535    | 221    | 62    | 79    |
| 25    | 39    | 33    | 17    | 29    | 110   | 100   | 535    | 441    | 508    | 227    | 66    | 76    |
| 26    | 35    | 31    | 17    | 28    | 110   | 115   | 607    | 585    | 472    | 211    | 67    | 75    |
| 27    | 30    | 30    | 17    | 30    | 100   | 130   | 525    | 715    | 540    | 181    | 63    | 78    |
| 28    | 55    | 32    | 17    | 31    | 97    | 140   | 428    | 817    | 486    | 187    | 47    | 74    |
| 29    | 50    | 35    | 17    | 32    | ----- | 129   | 352    | 938    | 477    | 205    | 39    | 78    |
| 30    | 45    | 32    | 18    | 33    | ----- | 195   | 368    | 886    | 486    | 193    | 51    | 88    |
| 31    | 43    | ----- | 20    | 32    | ----- | 330   | -----  | 903    | -----  | 164    | 77    | ----- |
| TOTAL | 1,386 | 1,151 | 759   | 706   | 2,446 | 3,757 | 9,828  | 20,183 | 18,099 | 8,402  | 2,698 | 1,958 |
| MEAN  | 44.7  | 38.4  | 24.5  | 22.8  | 87.4  | 121   | 328    | 651    | 603    | 271    | 87.0  | 65.3  |
| MAX   | 55    | 59    | 35    | 37    | 200   | 330   | 607    | 938    | 1,040  | 395    | 149   | 88    |
| MIN   | 30    | 25    | 16    | 15    | 26    | 90    | 183    | 342    | 395    | 164    | 39    | 37    |
| AC-FT | 2,750 | 2,280 | 1,510 | 1,400 | 4,850 | 7,450 | 19,490 | 40,030 | 35,900 | 16,670 | 5,350 | 3,880 |

CAL YR 1970 TOTAL 66,131 MEAN 181 MAX 1,380 MIN 12 AC-FT 131,200  
WTR YR 1971 TOTAL 71,373 MEAN 196 MAX 1,040 MIN 15 AC-FT 141,600

Peak discharge (base 1,300 cfs).--No peak above base.

NOTE.--Stage-discharge relation affected by ice Nov. 19 to Mar. 28 (no gage height record Dec. 19-28).



06099500 Marias River near Shelby, Mont.

LOCATION.--Lat 48°25'38", long 111°53'20", in E.1/4 sec.20, T.31 N., R.2 W., Toole County, on left bank 200 ft downstream from bridge on U.S. Highway 91, 5.1 miles south of Shelby, 24 miles downstream from Cut Bank Creek, and at mile 168.

DRAINAGE AREA.--3,242 sq mi, of which 518 sq mi is probably noncontributing.

PERIOD OF RECORD.--April 1902 to December 1904, May 1905 to December 1906, May 1907 to January 1908, April 1911 to current year. Monthly discharge only for some periods, published in WSP 1309.

GAGE.--Water-stage recorder. Datum of gage is 3,087.72 ft above mean sea level. Prior to Dec. 23, 1947, non-recording gage or water-stage recorder at several sites within 1,000 ft of present site at approximately the same datum.

AVERAGE DISCHARGE.--63 years (1902-4, 1905-6, 1911-71), 952 cfs (689,700 acre-ft per year).

EXTREMES.--Current year: Maximum discharge during year, 5,950 cfs May 28 (gage height, 6.77 ft); minimum daily, 140 cfs Jan. 13.

Period of record: Maximum discharge, 241,000 cfs June 9, 1964, largely due to failure of Swift Dam (gage height, 23.64 ft, from floodmark), from rating curve extended above 34,000 cfs on basis of slope-area measurement of peak flow; minimum observed, 10 cfs Aug. 20, 1919.

Flood in June 1908 may have exceeded 40,000 cfs.

REMARKS.--Records good except those for winter period, which are poor. Some regulation by Lower Two Medicine Lake, Four Horns Reservoir, Swift Reservoir and Lake Frances (see p. 182), having a combined capacity of 172,630 acre-ft. Diversions for irrigation of about 50,000 acres above station and about 15,000 acres below.

REVISIONS (WATER YEARS).--WSP 1309: 1903-4, 1918, 1921, 1933, 1935, 1947. WSP 1509: 1902, 1912(M), 1916, 1943(M). WSP 1729: Drainage area.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT           | NOV        | DEC        | JAN     | FEB           | MAR    | APR    | MAY     | JUN     | JUL    | AUG    | SEP    |
|-------------|---------------|------------|------------|---------|---------------|--------|--------|---------|---------|--------|--------|--------|
| 1           | 367           | 415        | 185        | 175     | 205           | 360    | 958    | 1,900   | 5,720   | 1,790  | 638    | 276    |
| 2           | 379           | 407        | 180        | 170     | 205           | 360    | 932    | 2,030   | 5,250   | 1,600  | 590    | 282    |
| 3           | 371           | 391        | 175        | 170     | 205           | 370    | 900    | 2,520   | 4,760   | 1,570  | 545    | 272    |
| 4           | 351           | 391        | 180        | 170     | 205           | 380    | 829    | 3,130   | 4,440   | 1,580  | 492    | 254    |
| 5           | 343           | 387        | 200        | 170     | 200           | 400    | 793    | 3,660   | 4,360   | 1,550  | 469    | 234    |
| 6           | 347           | 433        | 210        | 170     | 200           | 420    | 775    | 3,890   | 4,530   | 1,440  | 451    | 215    |
| 7           | 363           | 424        | 220        | 170     | 205           | 420    | 861    | 4,460   | 4,660   | 1,350  | 428    | 191    |
| 8           | 359           | 407        | 215        | 170     | 215           | 433    | 978    | 4,210   | 4,640   | 1,310  | 399    | 179    |
| 9           | 363           | 420        | 210        | 165     | 240           | 451    | 1,000  | 4,410   | 4,630   | 1,170  | 379    | 161    |
| 10          | 383           | 474        | 200        | 160     | 300           | 464    | 1,000  | 4,680   | 4,440   | 1,140  | 375    | 182    |
| 11          | 391           | 403        | 205        | 155     | 400           | 464    | 1,140  | 4,560   | 4,060   | 1,100  | 359    | 227    |
| 12          | 530           | 420        | 210        | 145     | 600           | 482    | 1,010  | 4,590   | 3,780   | 1,120  | 350    | 227    |
| 13          | 575           | 424        | 205        | 140     | 1,400         | 525    | 926    | 4,940   | 3,640   | 1,120  | 330    | 221    |
| 14          | 545           | 407        | 210        | 145     | 3,000         | 492    | 842    | 5,300   | 3,600   | 1,020  | 310    | 224    |
| 15          | 456           | 411        | 210        | 150     | 2,600         | 525    | 854    | 4,710   | 3,580   | 958    | 300    | 227    |
| 16          | 428           | 415        | 205        | 160     | 2,160         | 469    | 1,070  | 4,010   | 3,180   | 920    | 270    | 227    |
| 17          | 407           | 403        | 190        | 170     | 1,510         | 438    | 1,120  | 3,790   | 2,740   | 894    | 230    | 265    |
| 18          | 379           | 403        | 180        | 200     | 1,160         | 424    | 1,090  | 3,580   | 2,520   | 900    | 206    | 307    |
| 19          | 375           | 391        | 170        | 250     | 1,060         | 411    | 984    | 3,210   | 2,450   | 906    | 206    | 314    |
| 20          | 363           | 347        | 170        | 380     | 926           | 380    | 932    | 3,110   | 2,380   | 900    | 206    | 355    |
| 21          | 367           | 230        | 175        | 500     | 751           | 350    | 1,020  | 3,000   | 2,390   | 861    | 212    | 391    |
| 22          | 383           | 170        | 175        | 250     | 671           | 320    | 1,250  | 2,750   | 2,510   | 805    | 218    | 379    |
| 23          | 387           | 165        | 175        | 230     | 704           | 318    | 1,540  | 2,620   | 2,620   | 787    | 234    | 351    |
| 24          | 391           | 165        | 180        | 220     | 676           | 359    | 1,740  | 2,690   | 2,680   | 787    | 262    | 328    |
| 25          | 339           | 190        | 190        | 220     | 644           | 442    | 2,340  | 3,020   | 2,600   | 781    | 254    | 318    |
| 26          | 307           | 195        | 190        | 215     | 555           | 451    | 2,900  | 3,730   | 2,440   | 775    | 230    | 314    |
| 27          | 321           | 180        | 190        | 215     | 433           | 469    | 2,350  | 4,440   | 2,390   | 721    | 212    | 318    |
| 28          | 367           | 175        | 190        | 215     | 379           | 515    | 1,940  | 5,210   | 2,250   | 688    | 191    | 314    |
| 29          | 407           | 190        | 195        | 215     | -----         | 575    | 1,730  | 5,830   | 2,080   | 751    | 185    | 314    |
| 30          | 420           | 190        | 200        | 210     | -----         | 638    | 1,810  | 5,420   | 2,050   | 793    | 182    | 328    |
| 31          | 424           | -----      | 180        | 210     | -----         | 861    | -----  | 5,430   | -----   | 698    | 227    | -----  |
| TOTAL       | 12,188        | 9,963      | 5,970      | 6,285   | 21,809        | 13,966 | 37,614 | 120,830 | 103,370 | 32,785 | 9,940  | 8,195  |
| MEAN        | 393           | 332        | 193        | 203     | 779           | 451    | 1,254  | 3,898   | 3,446   | 1,058  | 321    | 273    |
| MAX         | 575           | 433        | 220        | 500     | 3,000         | 861    | 2,900  | 5,830   | 5,720   | 1,790  | 638    | 391    |
| MIN         | 307           | 165        | 170        | 140     | 200           | 318    | 775    | 1,900   | 2,050   | 688    | 182    | 161    |
| AC-FT       | 24,170        | 19,760     | 11,840     | 12,470  | 43,260        | 27,700 | 74,610 | 239,700 | 205,000 | 65,030 | 19,720 | 16,250 |
| CAL YR 1970 | TOTAL 378,223 | MEAN 1,036 | MAX 10,100 | MIN 90  | AC-FT 750,200 |        |        |         |         |        |        |        |
| WTR YR 1971 | TOTAL 382,915 | MEAN 1,049 | MAX 5,830  | MIN 140 | AC-FT 759,500 |        |        |         |         |        |        |        |

NOTE.--Stage-discharge relation affected by ice Nov. 21 to Feb. 15 (no gage height record Jan. 28 to Feb. 4).

## MARIAS RIVER BASIN

06101300 Tiber Reservoir near Chester, Mont.

LOCATION.--Lat 48°19'06", long 111°05'27", in NW¼ sec.33, T.30 N., R.5 E., Liberty County, in control house of river outlet tunnel at Tiber Dam on Marias River, 15 miles southwest of Chester.

DRAINAGE AREA.--4,923 sq mi, of which 518 sq mi is probably noncontributing.

PERIOD OF RECORD.--October 1955 to current year (monthend contents only). Daily elevations and contents May to June 1964, published in WSP 1840-B.

GAGE.--Nonrecording gages read once daily except weekends and holidays. Datum of gage is at mean sea level (levels by Bureau of Reclamation).

EXTREMES.--Current year: Maximum contents observed, 682,600 acre-ft July 2 (elevation, 2,976.35 ft); minimum observed, 457,900 acre-ft Jan. 22 (elevation, 2,957.44 ft).

Period of record: Maximum contents observed, 1,193,000 acre-ft July 12, 13, 1965 (elevation, 3,005.59 ft); minimum observed since normal operation began, 422,100 acre-ft Apr. 1, 1968 (elevation, 2,953.81 ft).

REMARKS.--Reservoir is formed by rolled earthfill dam with concrete spillway chute; construction began September 1952, completed March 1956. Storage began Oct. 28, 1955. Usable capacity, 1,347,000 acre-ft between elevation 2,870 ft (trashrack sill) and 3,012.5 ft (top of flood control). Dead storage, 21,580 acre-ft below elevation 2,870 ft. Prior to Oct. 1, 1963, usable capacity was 1,313,000 acre-ft, dead storage was 24,000 acre-ft at same elevations. Figures given herein represent usable contents. Water is presently used for recreation and flood control.

COOPERATION.--Elevations and capacity table furnished by Bureau of Reclamation.

REVISIONS.--WSP 1729: Drainage area.

## MONTHEND ELEVATION AND CONTENTS, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| Date                  | Elevation<br>(feet) | Contents<br>(acre-feet) | Change in contents<br>(acre-feet) |
|-----------------------|---------------------|-------------------------|-----------------------------------|
| Sept. 30 . . . . .    | 2,966.48            | 557,000                 | -                                 |
| Oct. 31 . . . . .     | -                   | a493,800                | -63,200                           |
| Nov. 30 . . . . .     | 2,958.89            | 472,900                 | -20,900                           |
| Dec. 31 . . . . .     | 2,957.84            | 462,000                 | -10,900                           |
| CAL YR 1970 . . . . . |                     |                         | -95,300                           |
| Jan. 31 . . . . .     | 2,958.08            | b464,500                | +2,500                            |
| Feb. 28 . . . . .     | 2,959.72            | b481,600                | +17,100                           |
| Mar. 31 . . . . .     | 2,957.86            | 462,200                 | -19,400                           |
| Apr. 30 . . . . .     | 2,959.67            | 481,100                 | +18,900                           |
| May 31 . . . . .      | 2,970.87            | 610,200                 | +129,100                          |
| June 30 . . . . .     | 2,976.21            | 680,700                 | +70,500                           |
| July 31 . . . . .     | -                   | a650,300                | -30,400                           |
| Aug. 31 . . . . .     | 2,968.36            | 579,300                 | -71,000                           |
| Sept. 30 . . . . .    | 2,964.47            | 533,800                 | -45,500                           |
| WIR YR 1971 . . . . . |                     |                         | -23,200                           |

a Interpolated.

b First day of following month.

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LOCATION.--Lat 48°18'21", long 111°04'44", in SW1/4 sec.34, T.30 N., R.5 E., Liberty County, on left bank 2.0 miles downstream from Tiber Dam, 4.3 miles upstream from Pondera Coulee, and 15 miles southwest of Chester.

PERIOD OF RECORD.--April to September 1921, October 1945 to September 1947, October 1955 to current year.  
Monthly discharge only for some periods, published in WSP 1309.

EXTREMES.--Current year: Maximum discharge, 3,340 cfs June 15 (gage height, 6.32 ft); minimum daily, 195 cfs Jan. 21, 27-29.

Flood in June 1948 reached a stage of 16 ft, present datum.

REVISIONS.--WSP 1629: Drainage area.

| DAY         | OCT           | NOV    | DEC        | JAN    | FEB       | MAR    | APR     | MAY     | JUN           | JUL    | AUG    | SEP    |
|-------------|---------------|--------|------------|--------|-----------|--------|---------|---------|---------------|--------|--------|--------|
| 1           | 1,290         | 1,270  | 640        | 304    | 289       | 1,280  | 680     | 1,350   | 2,860         | 1,490  | 1,440  | 1,350  |
| 2           | 1,290         | 1,070  | 639        | 304    | 435       | 1,280  | 680     | 1,340   | 2,950         | 1,490  | 1,430  | 1,350  |
| 3           | 1,290         | 584    | 639        | 304    | 432       | 1,270  | 686     | 1,340   | 3,060         | 1,490  | 1,430  | 1,350  |
| 4           | 1,290         | 570    | 638        | 283    | 426       | 1,270  | 686     | 1,350   | 3,120         | 1,490  | 1,430  | 1,350  |
| 5           | 1,270         | 560    | 632        | 264    | 425       | 1,260  | 762     | 1,350   | 3,130         | 1,490  | 1,430  | 1,340  |
| 6           | 1,270         | 560    | 632        | 249    | 426       | 1,260  | 912     | 1,350   | 3,140         | 1,490  | 1,430  | 1,340  |
| 7           | 1,290         | 554    | 632        | 240    | 426       | 1,250  | 945     | 1,360   | 3,230         | 1,490  | 1,420  | 1,340  |
| 8           | 1,290         | 554    | 633        | 239    | 425       | 1,080  | 952     | 1,360   | 3,300         | 1,480  | 1,420  | 1,340  |
| 9           | 1,290         | 554    | 632        | 240    | 425       | 726    | 955     | 1,360   | 3,310         | 1,480  | 1,420  | 1,340  |
| 10          | 1,290         | 553    | 632        | 240    | 425       | 577    | 959     | 1,440   | 3,310         | 1,470  | 1,420  | 1,340  |
| 11          | 1,290         | 554    | 632        | 239    | 426       | 570    | 960     | 1,570   | 3,320         | 1,470  | 1,420  | 1,340  |
| 12          | 1,290         | 553    | 632        | 238    | 427       | 571    | 967     | 1,720   | 3,310         | 1,470  | 1,450  | 1,340  |
| 13          | 1,290         | 553    | 632        | 237    | 427       | 572    | 977     | 1,770   | 3,310         | 1,470  | 1,460  | 1,330  |
| 14          | 1,290         | 548    | 632        | 237    | 426       | 572    | 976     | 1,870   | 3,320         | 1,470  | 1,420  | 1,330  |
| 15          | 1,290         | 548    | 632        | 238    | 540       | 565    | 983     | 2,000   | 3,320         | 1,460  | 1,380  | 1,330  |
| 16          | 1,280         | 546    | 633        | 233    | 764       | 566    | 983     | 2,060   | 3,020         | 1,460  | 1,370  | 1,010  |
| 17          | 1,280         | 548    | 512        | 234    | 952       | 634    | 991     | 2,140   | 2,360         | 1,460  | 1,360  | 782    |
| 18          | 1,280         | 547    | 369        | 215    | 1,060     | 702    | 999     | 2,280   | 2,130         | 1,460  | 1,360  | 550    |
| 19          | 1,280         | 547    | 312        | 196    | 1,240     | 698    | 1,000   | 2,340   | 2,130         | 1,460  | 1,360  | 500    |
| 20          | 1,280         | 575    | 304        | 196    | 1,300     | 694    | 1,010   | 2,340   | 2,130         | 1,460  | 1,360  | 500    |
| 21          | 1,280         | 648    | 304        | 195    | 1,300     | 696    | 1,010   | 2,330   | 1,820         | 1,450  | 1,360  | 500    |
| 22          | 1,280         | 649    | 304        | 196    | 1,300     | 697    | 1,020   | 2,330   | 1,540         | 1,450  | 1,360  | 500    |
| 23          | 1,280         | 650    | 304        | 196    | 1,290     | 692    | 1,030   | 2,330   | 1,530         | 1,450  | 1,350  | 500    |
| 24          | 1,280         | 648    | 304        | 196    | 1,290     | 692    | 1,020   | 2,330   | 1,530         | 1,450  | 1,360  | 500    |
| 25          | 1,280         | 647    | 304        | 196    | 1,290     | 692    | 1,030   | 2,340   | 1,540         | 1,450  | 1,350  | 500    |
| 26          | 1,270         | 648    | 304        | 196    | 1,290     | 693    | 1,170   | 2,340   | 1,540         | 1,440  | 1,350  | 500    |
| 27          | 1,270         | 645    | 304        | 195    | 1,280     | 686    | 1,340   | 2,410   | 1,540         | 1,440  | 1,350  | 500    |
| 28          | 1,270         | 640    | 304        | 195    | 1,280     | 686    | 1,340   | 2,450   | 1,490         | 1,440  | 1,350  | 500    |
| 29          | 1,270         | 641    | 304        | 195    | -----     | 686    | 1,350   | 2,560   | 1,470         | 1,440  | 1,350  | 500    |
| 30          | 1,270         | 640    | 304        | 196    | -----     | 685    | 1,350   | 2,630   | 1,490         | 1,440  | 1,350  | 500    |
| 31          | 1,270         | -----  | 304        | 196    | -----     | 680    | -----   | 2,740   | -----         | 1,440  | 1,350  | -----  |
| TOTAL       | 39,730        | 18,804 | 14,983     | 7,082  | 22,016    | 24,982 | 29,723  | 60,480  | 75,250        | 45,380 | 43,090 | 28,452 |
| MEAN        | 1,282         | 627    | 483        | 228    | 786       | 806    | 991     | 1,951   | 2,508         | 1,464  | 1,390  | 948    |
| MAX         | 1,290         | 1,270  | 640        | 304    | 1,300     | 1,280  | 1,350   | 2,740   | 3,320         | 1,490  | 1,460  | 1,350  |
| MIN         | 1,270         | 546    | 304        | 195    | 289       | 565    | 680     | 1,340   | 1,470         | 1,440  | 1,350  | 500    |
| AC-FT       | 78,800        | 37,300 | 29,720     | 14,050 | 43,670    | 49,550 | 58,960  | 120,000 | 149,300       | 90,010 | 85,470 | 56,430 |
| CAL YR 1970 | TOTAL 416,912 |        | MEAN 1,142 |        | MAX 3,410 |        | MIN 304 |         | AC-FT 826,900 |        |        |        |
| WTR YR 1971 | TOTAL 409,972 |        | MEAN 1,123 |        | MAX 3,320 |        | MIN 195 |         | AC-FT 813,200 |        |        |        |

## MARIAS RIVER BASIN

06102050 Marias River near Loma, Mont.

LOCATION.--Lat 47°56'47", long 110°34'47", in SE $\frac{1}{4}$ SW $\frac{1}{4}$  sec.4, T.25 N., R.9 E., Chouteau County, on left bank 3.7 miles west of Loma, and 7.7 miles upstream from mouth.

DRAINAGE AREA.--6,995 sq mi, of which 518 sq mi is probably noncontributing.

PERIOD OF RECORD.--October 1959 to current year.

GAGE.--Water-stage recorder. Altitude of gage is 2,570 ft (from topographic map). Prior to May 4, 1960, non-recording gage at same site and datum.

AVERAGE DISCHARGE.--12 years, 957 cfs (693,300 acre-ft per year).

EXTREMES.--Current year: Maximum discharge observed, 3,290 cfs June 14, 16 (gage height, 4.78 ft); maximum gage height, 5.90 ft occurred during period Feb. 16 to Apr. 1 (from high-water mark in well, backwater from ice); minimum daily discharge, 180 cfs Jan. 13.

Period of record: Maximum discharge, 10,800 cfs June 16, 1964 (gage height, 8.72 ft); minimum daily, 45 cfs Dec. 11, 1962.

REMARKS.--Records fair. Flow regulated by Tiber Reservoir (see p. 62 ).

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY   | OCT    | NOV    | DEC    | JAN    | FEB    | MAR    | APR    | MAY     | JUN     | JUL    | AUG    | SEP    |
|-------|--------|--------|--------|--------|--------|--------|--------|---------|---------|--------|--------|--------|
| 1     | 1,290  | 1,280  | 860    | 360    | 190    | 1,000  | 771    | 1,400   | 2,690   | 1,410  | 1,360  | 1,310  |
| 2     | 1,290  | 1,280  | 800    | 340    | 250    | 960    | 762    | 1,400   | 2,750   | 1,390  | 1,350  | 1,290  |
| 3     | 1,290  | 1,030  | 700    | 330    | 400    | 1,100  | 753    | 1,400   | 2,810   | 1,390  | 1,350  | 1,280  |
| 4     | 1,290  | 554    | 600    | 320    | 450    | 1,100  | 735    | 1,400   | 3,020   | 1,390  | 1,350  | 1,280  |
| 5     | 1,290  | 554    | 560    | 280    | 410    | 1,100  | 735    | 1,400   | 3,050   | 1,390  | 1,350  | 1,290  |
| 6     | 1,290  | 554    | 540    | 270    | 430    | 1,100  | 762    | 1,400   | 3,050   | 1,380  | 1,350  | 1,290  |
| 7     | 1,290  | 530    | 600    | 240    | 430    | 1,100  | 720    | 1,400   | 3,080   | 1,370  | 1,350  | 1,300  |
| 8     | 1,290  | 530    | 580    | 230    | 430    | 1,100  | 950    | 1,400   | 3,230   | 1,370  | 1,350  | 1,290  |
| 9     | 1,290  | 530    | 560    | 230    | 430    | 900    | 950    | 1,400   | 3,230   | 1,390  | 1,350  | 1,280  |
| 10    | 1,290  | 530    | 540    | 230    | 430    | 700    | 940    | 1,400   | 3,230   | 1,390  | 1,350  | 1,280  |
| 11    | 1,280  | 523    | 520    | 230    | 450    | 550    | 940    | 1,500   | 3,260   | 1,380  | 1,360  | 1,280  |
| 12    | 1,280  | 516    | 560    | 230    | 500    | 560    | 950    | 1,600   | 3,230   | 1,380  | 1,360  | 1,270  |
| 13    | 1,280  | 516    | 600    | 180    | 600    | 560    | 950    | 1,700   | 3,260   | 1,380  | 1,370  | 1,260  |
| 14    | 1,280  | 509    | 600    | 200    | 300    | 560    | 980    | 1,800   | 3,290   | 1,370  | 1,400  | 1,260  |
| 15    | 1,280  | 509    | 600    | 210    | 1,000  | 560    | 970    | 1,900   | 3,260   | 1,370  | 1,380  | 1,260  |
| 16    | 1,280  | 509    | 600    | 230    | 1,200  | 560    | 950    | 2,000   | 3,290   | 1,370  | 1,350  | 1,140  |
| 17    | 1,280  | 516    | 580    | 210    | 1,300  | 560    | 960    | 2,050   | 2,810   | 1,370  | 1,340  | 890    |
| 18    | 1,280  | 516    | 500    | 230    | 1,200  | 600    | 990    | 2,100   | 2,190   | 1,370  | 1,320  | 708    |
| 19    | 1,280  | 516    | 500    | 260    | 1,200  | 700    | 880    | 2,200   | 2,130   | 1,370  | 1,310  | 530    |
| 20    | 1,280  | 516    | 490    | 400    | 1,200  | 800    | 990    | 2,300   | 2,100   | 1,370  | 1,320  | 529    |
| 21    | 1,280  | 488    | 350    | 450    | 1,200  | 700    | 1,050  | 2,300   | 2,100   | 1,380  | 1,320  | 529    |
| 22    | 1,280  | 450    | 300    | 350    | 1,200  | 620    | 990    | 2,300   | 1,760   | 1,390  | 1,310  | 529    |
| 23    | 1,280  | 460    | 300    | 200    | 1,200  | 700    | 1,000  | 2,250   | 1,460   | 1,370  | 1,320  | 522    |
| 24    | 1,280  | 500    | 300    | 200    | 1,200  | 700    | 1,010  | 2,240   | 1,460   | 1,380  | 1,310  | 522    |
| 25    | 1,280  | 560    | 300    | 200    | 1,200  | 700    | 960    | 2,270   | 1,460   | 1,360  | 1,300  | 529    |
| 26    | 1,280  | 540    | 300    | 200    | 1,200  | 700    | 970    | 2,270   | 1,460   | 1,370  | 1,300  | 529    |
| 27    | 1,280  | 520    | 310    | 190    | 1,100  | 720    | 1,080  | 2,270   | 1,460   | 1,360  | 1,300  | 529    |
| 28    | 1,280  | 520    | 320    | 200    | 900    | 740    | 1,240  | 2,300   | 1,460   | 1,360  | 1,300  | 522    |
| 29    | 1,280  | 600    | 330    | 200    | -----  | 760    | 1,400  | 2,380   | 1,510   | 1,360  | 1,290  | 515    |
| 30    | 1,280  | 750    | 350    | 200    | -----  | 800    | 1,400  | 2,500   | 1,410   | 1,370  | 1,290  | 522    |
| 31    | 1,280  | -----  | 380    | 190    | -----  | 900    | -----  | 2,550   | -----   | 1,360  | 1,310  | -----  |
| TOTAL | 39,780 | 17,906 | 15,430 | 7,793  | 22,500 | 24,210 | 28,938 | 58,780  | 74,500  | 42,660 | 41,370 | 28,265 |
| MEAN  | 1,283  | 597    | 498    | 251    | 804    | 781    | 965    | 1,896   | 2,483   | 1,376  | 1,335  | 942    |
| MAX   | 1,290  | 1,280  | 860    | 450    | 1,300  | 1,100  | 1,400  | 2,550   | 3,290   | 1,410  | 1,400  | 1,310  |
| MIN   | 1,280  | 450    | 300    | 180    | 190    | 550    | 735    | 1,400   | 1,410   | 1,360  | 1,290  | 515    |
| AC-FT | 78,900 | 35,520 | 30,610 | 15,450 | 44,630 | 48,020 | 57,400 | 116,600 | 147,800 | 84,620 | 82,060 | 56,060 |

CAL YR 1970 TOTAL 421,395 MEAN 1,155 MAX 3,600 MIN 300 AC-FT 835,800  
WTR YR 1971 TOTAL 402,129 MEAN 1,102 MAX 3,290 MIN 180 AC-FT 797,600

MARIAS RIVER BASIN

65

06108000 Teton River near Dutton, Mont.

LOCATION.--Lat 47°55'45", long 111°33'12", near center of south line of SW¼ sec.12, T.25 N., R.1 E., Teton County, on right bank 1,500 ft upstream from Kerr Bridge, 0.9 mile downstream from Hunt Coulee, and 9.5 miles northeast of Dutton.

DRAINAGE AREA.--1,307 sq mi. Area at site used prior to July 17, 1965, 1,308 sq mi.

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

GAGE.--Water-stage recorder. Altitude of gage is 3,235 ft (from topographic map). Prior to July 17, 1965, water-stage recorder at site 1,800 ft downstream at datum 1.97 ft lower.

AVERAGE DISCHARGE.--17 years, 163 cfs (118,100 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, about 1,700 cfs June 2 (gage height, 7.62 ft, backwater from road fill); maximum gage height, 8.90 ft Feb. 14 (backwater from ice jam); minimum daily discharge, 30 cfs Jan. 13.

Period of record: Maximum discharge, 71,300 cfs June 9, 1964 (gage height, 20.48 ft, present site and datum, from floodmark), from slope-area measurement of peak flow; minimum discharge, 12 cfs Nov. 17, 1963.

REMARKS.--Records fair except those for period of indefinite stage-discharge relation and those for winter period, which are poor. Water is diverted on left bank in sec.34, T.25 N., R.7 W., for storage in Bynum Reservoir (usable capacity, 75,000 acre-ft). Diversions for irrigation of about 44,000 acres above station.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT          | NOV      | DEC       | JAN    | FEB           | MAR    | APR    | MAY    | JUN    | JUL   | AUG   | SEP   |
|-------------|--------------|----------|-----------|--------|---------------|--------|--------|--------|--------|-------|-------|-------|
| 1           | 81           | 59       | 75        | 45     | 80            | 185    | 297    | 277    | 1,260  | 212   | 90    | 70    |
| 2           | 80           | 57       | 75        | 45     | 85            | 200    | 257    | 267    | 1,620  | 196   | 81    | 87    |
| 3           | 83           | 57       | 70        | 40     | 80            | 200    | 237    | 254    | 1,440  | 170   | 75    | 70    |
| 4           | 80           | 61       | 70        | 40     | 80            | 200    | 223    | 257    | 1,170  | 160   | 95    | 66    |
| 5           | 79           | 73       | 75        | 45     | 80            | 200    | 219    | 277    | 991    | 146   | 95    | 68    |
| 6           | 81           | 74       | 80        | 45     | 85            | 200    | 214    | 383    | 888    | 133   | 88    | 69    |
| 7           | 84           | 68       | 85        | 45     | 100           | 200    | 219    | 574    | 838    | 123   | 92    | 66    |
| 8           | 83           | 68       | 87        | 45     | 130           | 200    | 225    | 665    | 847    | 123   | 87    | 61    |
| 9           | 83           | 69       | 87        | 40     | 150           | 195    | 219    | 542    | 865    | 131   | 78    | 59    |
| 10          | 83           | 67       | 85        | 35     | 175           | 195    | 209    | 472    | 937    | 127   | 75    | 58    |
| 11          | 78           | 67       | 85        | 35     | 200           | 195    | 198    | 453    | 699    | 117   | 76    | 57    |
| 12          | 76           | 68       | 80        | 35     | 300           | 180    | 185    | 428    | 472    | 110   | 74    | 59    |
| 13          | 75           | 68       | 70        | 30     | 400           | 180    | 177    | 425    | 404    | 104   | 67    | 59    |
| 14          | 73           | 72       | 60        | 35     | 700           | 180    | 164    | 595    | 377    | 96    | 63    | 54    |
| 15          | 72           | 72       | 50        | 35     | 600           | 180    | 152    | 825    | 363    | 89    | 55    | 57    |
| 16          | 69           | 75       | 45        | 40     | 500           | 180    | 148    | 888    | 354    | 87    | 53    | 56    |
| 17          | 67           | 73       | 40        | 45     | 508           | 175    | 154    | 711    | 354    | 78    | 50    | 57    |
| 18          | 63           | 73       | 35        | 50     | 377           | 180    | 168    | 657    | 319    | 70    | 47    | 65    |
| 19          | 61           | 75       | 35        | 55     | 316           | 180    | 166    | 747    | 292    | 68    | 44    | 67    |
| 20          | 61           | 69       | 35        | 60     | 274           | 170    | 181    | 865    | 272    | 66    | 42    | 75    |
| 21          | 58           | 50       | 40        | 150    | 252           | 160    | 200    | 661    | 272    | 66    | 39    | 79    |
| 22          | 58           | 45       | 40        | 110    | 230           | 145    | 266    | 529    | 269    | 65    | 38    | 79    |
| 23          | 63           | 50       | 45        | 95     | 216           | 133    | 308    | 431    | 295    | 66    | 35    | 79    |
| 24          | 66           | 65       | 45        | 90     | 209           | 209    | 284    | 360    | 316    | 63    | 34    | 79    |
| 25          | 64           | 70       | 45        | 85     | 297           | 214    | 267    | 324    | 300    | 63    | 38    | 79    |
| 26          | 60           | 70       | 40        | 85     | 189           | 200    | 284    | 319    | 289    | 63    | 45    | 81    |
| 27          | 60           | 65       | 40        | 85     | 183           | 207    | 338    | 340    | 257    | 66    | 45    | 76    |
| 28          | 59           | 60       | 40        | 85     | 190           | 212    | 357    | 401    | 225    | 75    | 43    | 72    |
| 29          | 55           | 75       | 45        | 80     | -----         | 252    | 313    | 624    | 209    | 84    | 42    | 68    |
| 30          | 54           | 80       | 50        | 75     | -----         | 262    | 292    | 684    | 219    | 105   | 45    | 66    |
| 31          | 58           | -----    | 50        | 75     | -----         | 282    | -----  | 747    | -----  | 104   | 57    | ----- |
| TOTAL       | 2,167        | 1,995    | 1,804     | 1,860  | 6,986         | 6,051  | 6,921  | 15,982 | 17,413 | 3,226 | 1,888 | 2,038 |
| MEAN        | 69.9         | 66.5     | 58.2      | 60.0   | 250           | 195    | 231    | 516    | 580    | 104   | 60.9  | 67.9  |
| MAX         | 84           | 80       | 87        | 150    | 700           | 282    | 357    | 888    | 1,620  | 212   | 95    | 87    |
| MIN         | 54           | 45       | 35        | 30     | 80            | 133    | 148    | 254    | 209    | 63    | 34    | 54    |
| AC-FT       | 4,300        | 3,960    | 3,580     | 3,690  | 13,860        | 12,000 | 13,730 | 31,700 | 34,540 | 6,400 | 3,740 | 4,040 |
| CAL YR 1970 | TOTAL 57,257 | MEAN 157 | MAX 1,000 | MIN 32 | AC-FT 113,600 |        |        |        |        |       |       |       |
| WTR YR 1971 | TOTAL 68,331 | MEAN 187 | MAX 1,620 | MIN 30 | AC-FT 135,500 |        |        |        |        |       |       |       |

NOTE.--Stage-discharge relation affected by ice Nov. 22 to Feb. 16. Stage-discharge relation indefinite Apr. 22 to Sept. 30.



## MISSOURI RIVER MAIN STEM

06109500 Missouri River at Virgelle, Mont.

LOCATION.--Lat 48°00'14", long 110°15'19", in SW1/4SE1/4 sec.13, T.26 N., R.11 E., Chouteau County, on left bank 0.2 mile upstream from Virgelle ferry, 0.6 mile southwest of Virgelle, 3.4 miles downstream from Spring Coulee, and at mile 2,032.6.

DRAINAGE AREA.--34,379 sq mi.

PERIOD OF RECORD.--February 1935 to current year. Prior to October 1953, published as "at Loma."

GAGE.--Water-stage recorder. Datum of gage is 2,507.50 ft above mean sea level. Prior to Sept. 30, 1953, water-stage recorder at Loma (18 miles upstream) at datum 2,543.40 ft above mean sea level.

AVERAGE DISCHARGE.--36 years, 8,360 cfs (6,057,000 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 27,600 cfs May 15 (gage height, 9.27 ft); maximum gage height, 12.75 ft Dec. 29 (backwater from ice); minimum daily discharge, 5,270 cfs Dec. 20.

Period of record: Maximum discharge, 122,000 cfs June 5, 1953 (gage height, 23.4 ft, from floodmark), from rating curve for former site at Loma extended above 66,000 cfs, adjusted to present site; minimum daily, 638 cfs July 5, 1936.

Flood in June 1908 reached a stage about 2 ft higher than that of June 5, 1953, from information by local residents.

REMARKS.--Records good except those for winter period, which are fair. Flow regulated by 23 smaller irrigation reservoirs and powerplants (see p.180 ), Clark Canyon Reservoir (see p. 23 ), Canyon Ferry Reservoir (see p. 44 ), and Tiber Reservoir (see p. 62). Diversions for irrigation of about 850,400 acres above station.

REVISIONS.--WSP 1729: Drainage area.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT             | NOV     | DEC         | JAN     | FEB        | MAR     | APR       | MAY     | JUN             | JUL     | AUG     | SEP     |
|-------------|-----------------|---------|-------------|---------|------------|---------|-----------|---------|-----------------|---------|---------|---------|
| 1           | 7,800           | 9,620   | 8,330       | 8,300   | 9,800      | 9,610   | 9,850     | 17,500  | 26,000          | 17,400  | 9,000   | 7,460   |
| 2           | 7,340           | 9,150   | 8,770       | 7,800   | 9,800      | 10,900  | 9,690     | 16,500  | 25,700          | 18,400  | 8,510   | 7,420   |
| 3           | 7,600           | 9,510   | 8,620       | 8,000   | 9,400      | 11,500  | 9,640     | 16,900  | 24,700          | 18,900  | 8,450   | 7,390   |
| 4           | 7,500           | 9,270   | 8,220       | 8,400   | 10,500     | 10,600  | 9,770     | 17,100  | 24,000          | 19,500  | 8,760   | 8,410   |
| 5           | 9,230           | 8,570   | 7,550       | 8,000   | 11,000     | 10,200  | 9,630     | 17,600  | 24,100          | 19,400  | 8,810   | 7,270   |
| 6           | 7,620           | 7,630   | 7,260       | 7,600   | 10,500     | 9,950   | 9,550     | 18,800  | 24,100          | 19,200  | 8,670   | 7,290   |
| 7           | 7,720           | 7,500   | 7,960       | 7,200   | 10,000     | 9,720   | 9,960     | 19,500  | 24,600          | 18,800  | 8,620   | 7,000   |
| 8           | 7,510           | 7,330   | 9,760       | 7,200   | 9,400      | 9,680   | 9,290     | 21,300  | 24,900          | 18,100  | 8,720   | 7,640   |
| 9           | 7,870           | 8,110   | 9,340       | 7,400   | 9,600      | 9,750   | 11,300    | 22,800  | 24,300          | 17,500  | 8,800   | 6,910   |
| 10          | 6,730           | 7,060   | 9,010       | 7,800   | 10,000     | 9,630   | 12,700    | 23,400  | 22,200          | 15,800  | 9,220   | 7,060   |
| 11          | 7,690           | 7,510   | 8,890       | 8,100   | 10,000     | 9,080   | 12,700    | 23,300  | 19,900          | 15,400  | 8,670   | 6,910   |
| 12          | 8,920           | 8,440   | 7,490       | 8,100   | 10,000     | 8,900   | 12,500    | 23,400  | 19,000          | 14,200  | 8,150   | 6,750   |
| 13          | 7,770           | 8,690   | 7,420       | 7,600   | 10,300     | 9,200   | 12,300    | 25,100  | 18,400          | 14,000  | 8,180   | 6,640   |
| 14          | 8,190           | 9,040   | 7,870       | 6,600   | 11,000     | 8,720   | 12,200    | 26,600  | 17,300          | 13,000  | 8,540   | 6,640   |
| 15          | 7,940           | 8,340   | 8,180       | 7,000   | 12,000     | 8,690   | 11,800    | 27,400  | 16,900          | 12,000  | 8,390   | 6,350   |
| 16          | 7,590           | 7,830   | 7,520       | 7,600   | 11,800     | 8,690   | 12,100    | 26,600  | 16,700          | 11,600  | 8,090   | 6,920   |
| 17          | 6,930           | 8,390   | 7,550       | 8,500   | 11,600     | 8,480   | 11,800    | 25,300  | 16,100          | 10,500  | 8,480   | 8,530   |
| 18          | 7,340           | 8,710   | 7,830       | 9,400   | 11,000     | 8,360   | 12,200    | 25,000  | 15,600          | 9,950   | 7,830   | 6,270   |
| 19          | 8,610           | 8,730   | 7,020       | 9,400   | 10,000     | 8,450   | 12,400    | 24,800  | 12,800          | 8,780   | 7,460   | 7,470   |
| 20          | 7,570           | 6,450   | 5,270       | 9,400   | 10,000     | 8,630   | 12,400    | 24,500  | 13,100          | 8,480   | 7,130   | 8,190   |
| 21          | 6,970           | 7,480   | 6,200       | 9,700   | 10,000     | 9,110   | 12,500    | 24,000  | 12,500          | 8,270   | 7,100   | 8,180   |
| 22          | 6,250           | 6,510   | 7,700       | 10,000  | 9,600      | 8,990   | 12,700    | 23,700  | 11,800          | 8,330   | 7,050   | 8,100   |
| 23          | 7,280           | 7,310   | 7,500       | 10,500  | 9,600      | 9,020   | 12,700    | 23,400  | 11,500          | 8,240   | 6,270   | 7,660   |
| 24          | 7,950           | 8,310   | 7,300       | 11,000  | 9,300      | 8,750   | 13,000    | 22,800  | 11,900          | 8,300   | 7,130   | 7,540   |
| 25          | 7,810           | 7,590   | 8,500       | 10,500  | 10,000     | 9,080   | 13,600    | 22,800  | 12,400          | 8,240   | 7,020   | 7,350   |
| 26          | 8,510           | 7,050   | 8,200       | 9,400   | 9,700      | 9,560   | 15,100    | 22,100  | 13,000          | 7,800   | 6,340   | 7,540   |
| 27          | 8,120           | 7,690   | 8,000       | 10,000  | 10,300     | 9,360   | 15,800    | 20,600  | 13,100          | 8,150   | 7,250   | 7,530   |
| 28          | 7,630           | 8,130   | 8,500       | 10,000  | 10,500     | 9,520   | 15,000    | 21,800  | 13,200          | 8,210   | 7,030   | 8,060   |
| 29          | 6,930           | 8,340   | 9,000       | 9,800   | -----      | 9,460   | 15,100    | 24,000  | 13,000          | 8,270   | 6,410   | 7,810   |
| 30          | 8,080           | 8,350   | 8,600       | 9,800   | -----      | 9,460   | 15,800    | 25,400  | 14,700          | 8,670   | 6,390   | 7,870   |
| 31          | 9,230           | -----   | 8,400       | 9,800   | -----      | 9,720   | -----     | 26,100  | -----           | 8,760   | 7,280   | -----   |
| TOTAL       | 240,230         | 242,640 | 247,760     | 269,900 | 286,700    | 290,570 | 365,080   | 700,100 | 537,500         | 392,150 | 243,750 | 222,160 |
| MEAN        | 7,749           | 8,088   | 7,992       | 8,706   | 10,240     | 9,373   | 12,170    | 22,580  | 17,920          | 12,650  | 7,863   | 7,405   |
| MAX         | 9,230           | 9,620   | 9,760       | 11,000  | 12,000     | 11,500  | 15,800    | 27,400  | 26,000          | 19,500  | 9,220   | 8,530   |
| MIN         | 6,250           | 6,450   | 5,270       | 6,600   | 9,300      | 8,360   | 9,290     | 16,500  | 11,500          | 7,800   | 6,270   | 6,270   |
| AC-FT       | 476,500         | 481,300 | 491,400     | 535,300 | 568,700    | 576,300 | 724,100   | 1,389M  | 1,066M          | 777,800 | 483,500 | 440,700 |
| CAL YR 1970 | TOTAL 4,100,920 |         | MEAN 11,240 |         | MAX 28,700 |         | MIN 5,270 |         | AC-FT 8,134,000 |         |         |         |
| WTR YR 1971 | TOTAL 4,038,540 |         | MEAN 11,060 |         | MAX 27,400 |         | MIN 5,270 |         | AC-FT 8,010,000 |         |         |         |

NOTE.--Stage-discharge relation affected by ice Dec. 21 to Feb. 26 (no gage height record Jan. 11-16).

## JUDITH RIVER BASIN

67

06109800 South Fork Judith River near Utica, Mont.

LOCATION.--Lat 46°45'00", long 110°18'54", in S½ sec.34, T.12 N., R.11 E., Judith Basin County, Lewis and Clark National Forest, on right bank just downstream from Trask Gulch, 8 miles upstream from confluence with Middle Fork, and 18 miles southwest of Utica.

DRAINAGE AREA.--58.7 sq mi.

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

GAGE.--Water-stage recorder. Altitude of gage is 5,300 ft (from topographic map).

AVERAGE DISCHARGE.--13 years, 21.0 cfs (15,210 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 224 cfs May 5 (gage height, 4.27 ft); minimum daily, 2.0 cfs Jan. 12.

Period of record: Maximum discharge, 1,340 cfs May 30, 1967 (gage height, 6.87 ft), from rating curve extended above 180 cfs on basis of slope-area measurement of peak flow; minimum daily, 1.0 cfs Nov. 27, 1958.

Flood of May 30, 1967, is the highest since 1927, from information by local resident.

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

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT   | NOV      | DEC   | JAN   | FEB   | MAR   | APR   | MAY   | JUN   | JUL    | AUG   | SEP   |
|-------------|-------|----------|-------|-------|-------|-------|-------|-------|-------|--------|-------|-------|
| 1           | 7.6   | 4.9      | 5.2   | 3.6   | 4.2   | 3.9   | 4.7   | 57    | 57    | 21     | 9.6   | 10    |
| 2           | 7.6   | 4.7      | 4.7   | 3.4   | 5.4   | 3.9   | 4.9   | 81    | 54    | 20     | 10    | 8.7   |
| 3           | 7.6   | 4.7      | 4.7   | 3.2   | 5.2   | 3.7   | 4.0   | 104   | 52    | 20     | 10    | 9.0   |
| 4           | 7.6   | 5.4      | 4.5   | 3.2   | 5.0   | 3.4   | 4.0   | 146   | 49    | 18     | 11    | 8.7   |
| 5           | 7.6   | 6.5      | 4.5   | 3.0   | 4.8   | 3.2   | 4.7   | 186   | 46    | 18     | 11    | 8.2   |
| 6           | 7.9   | 6.3      | 4.5   | 3.0   | 4.6   | 3.7   | 7.0   | 172   | 43    | 17     | 9.6   | 7.6   |
| 7           | 7.6   | 5.8      | 4.5   | 2.8   | 4.6   | 3.7   | 13    | 172   | 41    | 17     | 9.0   | 7.9   |
| 8           | 7.3   | 5.6      | 4.5   | 3.0   | 4.5   | 3.7   | 13    | 174   | 38    | 16     | 8.7   | 7.3   |
| 9           | 7.6   | 6.0      | 4.5   | 3.4   | 4.5   | 3.7   | 15    | 166   | 37    | 17     | 8.4   | 7.3   |
| 10          | 7.6   | 5.6      | 4.3   | 3.2   | 4.5   | 3.7   | 18    | 149   | 36    | 16     | 8.2   | 7.0   |
| 11          | 7.3   | 5.4      | 4.3   | 2.4   | 4.3   | 3.7   | 14    | 141   | 34    | 16     | 8.2   | 6.7   |
| 12          | 7.6   | 5.8      | 4.3   | 2.0   | 4.5   | 3.7   | 10    | 137   | 32    | 15     | 7.6   | 6.7   |
| 13          | 7.9   | 5.4      | 4.0   | 2.2   | 4.9   | 3.9   | 9.6   | 138   | 30    | 15     | 7.6   | 6.7   |
| 14          | 6.0   | 4.3      | 4.0   | 2.8   | 4.9   | 3.9   | 14    | 123   | 29    | 14     | 7.6   | 6.7   |
| 15          | 6.5   | 5.4      | 4.0   | 3.6   | 4.7   | 3.9   | 22    | 107   | 28    | 14     | 7.3   | 6.7   |
| 16          | 6.0   | 5.4      | 4.2   | 3.6   | 4.3   | 3.9   | 16    | 105   | 27    | 13     | 7.3   | 7.0   |
| 17          | 6.5   | 5.2      | 4.0   | 3.6   | 4.3   | 3.9   | 13    | 94    | 26    | 13     | 7.3   | 7.3   |
| 18          | 6.5   | 4.7      | 3.8   | 3.4   | 4.2   | 3.8   | 11    | 89    | 25    | 13     | 7.0   | 7.0   |
| 19          | 6.7   | 5.4      | 3.8   | 3.6   | 4.0   | 3.7   | 11    | 82    | 25    | 13     | 6.7   | 6.7   |
| 20          | 6.5   | 5.2      | 3.8   | 3.4   | 3.8   | 3.7   | 13    | 77    | 23    | 13     | 6.7   | 7.3   |
| 21          | 6.5   | 3.9      | 3.6   | 3.4   | 3.7   | 3.6   | 17    | 73    | 22    | 14     | 6.7   | 7.0   |
| 22          | 6.5   | 3.7      | 3.6   | 3.2   | 3.7   | 3.6   | 21    | 68    | 22    | 15     | 6.7   | 7.3   |
| 23          | 6.5   | 3.7      | 3.8   | 3.4   | 3.7   | 3.9   | 25    | 66    | 21    | 14     | 6.7   | 7.0   |
| 24          | 6.7   | 5.2      | 3.8   | 3.6   | 4.0   | 4.0   | 45    | 60    | 21    | 12     | 6.5   | 6.7   |
| 25          | 5.4   | 5.4      | 4.0   | 3.6   | 4.0   | 4.0   | 46    | 58    | 21    | 12     | 6.3   | 7.0   |
| 26          | 5.2   | 5.4      | 4.0   | 3.4   | 3.6   | 4.2   | 34    | 57    | 21    | 11     | 6.5   | 7.3   |
| 27          | 6.5   | 5.2      | 4.0   | 3.6   | 3.4   | 4.2   | 27    | 56    | 28    | 11     | 6.5   | 7.0   |
| 28          | 5.8   | 4.9      | 4.0   | 3.8   | 3.9   | 4.0   | 27    | 56    | 27    | 12     | 6.3   | 7.0   |
| 29          | 6.7   | 5.2      | 3.8   | 4.0   | ----- | 4.3   | 29    | 56    | 27    | 12     | 6.7   | 6.7   |
| 30          | 6.7   | 5.2      | 4.0   | 3.8   | ----- | 5.8   | 37    | 60    | 25    | 10     | 15    | 6.7   |
| 31          | 6.5   | -----    | 3.8   | 3.2   | ----- | 7.0   | ----- | 61    | ----- | 10     | 12    | ----- |
| TOTAL       | 212.5 | 155.5    | 128.5 | 101.4 | 121.2 | 123.3 | 529.9 | 3,171 | 967   | 452    | 254.7 | 220.2 |
| MEAN        | 6.85  | 5.18     | 4.15  | 3.27  | 4.33  | 3.98  | 17.7  | 102   | 32.2  | 14.6   | 8.22  | 7.34  |
| MAX         | 7.9   | 6.5      | 5.2   | 4.0   | 5.4   | 7.0   | 46    | 186   | 57    | 21     | 15    | 10    |
| MIN         | 5.2   | 3.7      | 3.6   | 2.0   | 3.4   | 3.2   | 4.0   | 56    | 21    | 10     | 6.3   | 6.7   |
| AC-FT       | 421   | 308      | 255   | 201   | 240   | 245   | 1,050 | 6,290 | 1,920 | 897    | 505   | 437   |
| CAL YR 1970 | TOTAL | 10,414.3 | MEAN  | 28.5  | MAX   | 632   | MIN   | 1.5   | AC-FT | 20,660 |       |       |
| WTR YR 1971 | TOTAL | 6,437.2  | MEAN  | 17.6  | MAX   | 186   | MIN   | 2.0   | AC-FT | 12,770 |       |       |

PEAK DISCHARGE (BASE, 80 CFS)

NOTE.--Stage-discharge relation affected by ice Dec. 29 to Feb. 7.

| DATE | TIME | G.HT. | DISCHARGE | DATE | TIME | G.HT. | DISCHARGE |
|------|------|-------|-----------|------|------|-------|-----------|
| 5-5  | 2000 | 4.27  | 224       |      |      |       |           |

## JUDITH RIVER BASIN

06110000 Judith River near Utica, Mont.

LOCATION.--Lat 46°53'30", long 110°13'54", in NW¼ sec.17, T.13 N., R.12 E., Judith Basin County, on left bank at Noel Ranch, 4 miles downstream from confluence of South and Middle Forks, 9 miles southwest of Utica, and at mile 99.3.

DRAINAGE AREA.--328 sq mi.

PERIOD OF RECORD.--October 1919 to current year. Monthly discharge only for some periods, published in WSP 1309.

GAGE.--Water-stage recorder. Concrete control since October 1938. Altitude of gage is 4,790 ft (by barometer). Prior to June 6, 1937, nonrecording gage at present site and datum.

AVERAGE DISCHARGE.--52 years, 49.1 cfs (38,830 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 397 cfs May 31 (gage height, 4.42 ft); minimum daily, 2.0 cfs Mar. 22, 23.

Period of record: Maximum discharge observed, 1,120 cfs June 11, 12, 1927 (gage height, 5.70 ft), from rating curve extended above 580 cfs; maximum gage height recorded, 5.81 ft May 21, 1970; no flow Mar. 19-21, 1933.

REMARKS.--Records good. Few minor diversions for irrigation of hay meadows above station.

REVISIONS (WATER YEARS).--WSP 896: 1939. WSP 1309: 1920, 1922(M), 1925, 1927(M), 1929-30, 1931(M), 1936(M), 1938(M).

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT            | NOV   | DEC       | JAN   | FEB     | MAR  | APR     | MAY    | JUN          | JUL   | AUG  | SEP   |
|-------------|----------------|-------|-----------|-------|---------|------|---------|--------|--------------|-------|------|-------|
| 1           | 15             | 14    | 10        | 3.2   | 5.1     | 3.8  | 2.2     | 23     | 343          | 108   | 26   | 12    |
| 2           | 15             | 14    | 10        | 3.0   | 4.7     | 3.5  | 2.2     | 57     | 313          | 106   | 25   | 12    |
| 3           | 15             | 14    | 9.2       | 2.8   | 4.7     | 3.8  | 2.4     | 94     | 297          | 98    | 23   | 12    |
| 4           | 15             | 14    | 11        | 4.7   | 4.5     | 3.5  | 2.4     | 165    | 300          | 92    | 21   | 12    |
| 5           | 16             | 14    | 10        | 6.1   | 4.0     | 3.3  | 2.4     | 228    | 300          | 86    | 21   | 12    |
| 6           | 16             | 14    | 9.2       | 6.5   | 4.5     | 3.5  | 2.4     | 245    | 297          | 81    | 19   | 12    |
| 7           | 16             | 14    | 9.2       | 6.5   | 4.7     | 3.5  | 2.4     | 242    | 297          | 76    | 18   | 12    |
| 8           | 16             | 14    | 8.6       | 6.5   | 4.7     | 3.5  | 2.4     | 264    | 291          | 71    | 18   | 11    |
| 9           | 16             | 12    | 7.2       | 6.5   | 4.7     | 3.5  | 2.6     | 270    | 300          | 68    | 18   | 11    |
| 10          | 16             | 12    | 6.8       | 6.0   | 5.1     | 3.5  | 2.6     | 267    | 297          | 66    | 17   | 11    |
| 11          | 16             | 12    | 6.5       | 3.8   | 4.7     | 3.5  | 2.8     | 253    | 294          | 63    | 16   | 11    |
| 12          | 16             | 12    | 6.1       | 2.5   | 4.5     | 3.5  | 2.6     | 276    | 282          | 60    | 16   | 11    |
| 13          | 16             | 12    | 6.5       | 3.0   | 4.4     | 3.5  | 2.8     | 310    | 267          | 57    | 16   | 11    |
| 14          | 16             | 12    | 6.1       | 2.8   | 4.0     | 3.5  | 2.6     | 330    | 250          | 52    | 15   | 11    |
| 15          | 17             | 11    | 5.8       | 4.0   | 3.6     | 3.0  | 2.8     | 300    | 240          | 50    | 15   | 11    |
| 16          | 17             | 11    | 5.8       | 4.5   | 3.4     | 3.0  | 3.0     | 291    | 235          | 47    | 15   | 11    |
| 17          | 16             | 11    | 5.4       | 4.7   | 3.4     | 3.0  | 3.0     | 279    | 220          | 45    | 15   | 11    |
| 18          | 15             | 11    | 5.1       | 4.7   | 3.4     | 3.0  | 3.0     | 262    | 200          | 45    | 14   | 11    |
| 19          | 15             | 11    | 5.1       | 4.4   | 3.4     | 3.0  | 3.0     | 231    | 185          | 45    | 14   | 11    |
| 20          | 14             | 11    | 5.1       | 4.0   | 3.4     | 3.0  | 3.0     | 214    | 170          | 45    | 13   | 11    |
| 21          | 14             | 11    | 4.7       | 4.0   | 3.4     | 2.5  | 3.2     | 196    | 155          | 47    | 13   | 11    |
| 22          | 14             | 11    | 4.4       | 4.0   | 3.2     | 2.0  | 3.2     | 183    | 140          | 50    | 13   | 11    |
| 23          | 14             | 11    | 4.0       | 4.0   | 3.5     | 2.0  | 3.2     | 165    | 125          | 45    | 13   | 11    |
| 24          | 14             | 11    | 4.0       | 4.0   | 3.8     | 2.2  | 3.4     | 154    | 115          | 40    | 12   | 11    |
| 25          | 14             | 11    | 4.0       | 4.4   | 3.8     | 2.2  | 3.8     | 152    | 110          | 35    | 12   | 11    |
| 26          | 14             | 11    | 4.0       | 4.4   | 3.8     | 2.2  | 10      | 170    | 110          | 30    | 12   | 11    |
| 27          | 14             | 10    | 3.8       | 4.7   | 3.8     | 2.2  | 11      | 214    | 125          | 30    | 12   | 10    |
| 28          | 14             | 10    | 3.8       | 4.7   | 3.8     | 2.2  | 9.7     | 288    | 150          | 30    | 12   | 10    |
| 29          | 14             | 10    | 3.6       | 5.0   | -----   | 2.5  | 8.1     | 336    | 130          | 32    | 12   | 10    |
| 30          | 14             | 10    | 3.4       | 5.5   | -----   | 2.5  | 11      | 373    | 115          | 31    | 12   | 10    |
| 31          | 14             | ----- | 3.4       | 5.1   | -----   | 2.2  | -----   | 373    | -----        | 28    | 12   | ----- |
| TOTAL       | 468            | 356   | 191.8     | 140.0 | 114.0   | 92.1 | 119.2   | 7,205  | 6,653        | 1,759 | 490  | 333   |
| MEAN        | 15.1           | 11.9  | 6.19      | 4.52  | 4.07    | 2.97 | 3.97    | 232    | 222          | 56.7  | 15.8 | 11.1  |
| MAX         | 17             | 14    | 11        | 6.5   | 5.1     | 3.8  | 11      | 373    | 343          | 108   | 26   | 12    |
| MIN         | 14             | 10    | 3.4       | 2.5   | 3.2     | 2.0  | 2.2     | 23     | 110          | 28    | 12   | 10    |
| AC-FT       | 928            | 706   | 380       | 278   | 226     | 183  | 236     | 14,290 | 13,200       | 3,490 | 972  | 661   |
| CAL YR 1970 | TOTAL 38,297.6 |       | MEAN 105  |       | MAX 909 |      | MIN 1.5 |        | AC-FT 75,960 |       |      |       |
| WTR YR 1971 | TOTAL 17,921.1 |       | MEAN 49.1 |       | MAX 373 |      | MIN 2.0 |        | AC-FT 35,550 |       |      |       |

## PEAK DISCHARGE (BASE, 120 CFS)

| DATE | TIME | G.HT. | DISCHARGE | DATE | TIME | G.HT. | DISCHARGE |
|------|------|-------|-----------|------|------|-------|-----------|
| 5-14 | 0600 | 4.22  | 340       | 5-31 | 0130 | 4.42  | 397       |

## MISSOURI RIVER MAIN STEM

69

06115200 Missouri River near Landusky, Mont.

LOCATION.--Lat 47°37'51", long 108°41'13", in NW¼ sec.31, T.22 N., R.24 E., Fergus County, Fort Peck Game Range, on right bank 380 ft upstream from bridge on U.S. Highway 191, 0.9 mile upstream from Armells Creek, 20 miles south of Landusky, and at mile 1,921.61.

DRAINAGE AREA.--40,987 sq mi. Area at site used prior to Dec. 13, 1968, 40,763 sq mi.

PERIOD OF RECORD.--February 1934 to current year. Prior to October 1968, published as "at powerplant ferry, near Zortman."

GAGE.--Water-stage recorder. Datum of gage is 2,239.96 ft above mean sea level (State Highway bench mark). Prior to Feb. 7, 1935, nonrecording gage, and Feb. 7, 1935, to Dec. 12, 1968, water-stage recorder, at site 16.5 miles upstream at datum 33.06 ft higher.

AVERAGE DISCHARGE.--37 years, 9,084 cfs (6,581,000 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 28,500 cfs May 16 (gage height, 19.30 ft); maximum gage height, 22.43 ft Feb. 15 (backwater from ice); minimum daily discharge, 5,600 cfs Dec. 22.

Period of record: Maximum discharge, 137,000 cfs June 6, 1953 (gage height, 22.20 ft, from graph based on gage readings, site and datum then in use); maximum gage height, 30.16 ft Mar. 19, 1947 (ice jam), from floodmark, site and datum then in use; minimum discharge, 1,120 cfs July 8, 1936.

REMARKS.--Records good except those for winter period, which are poor. Flow regulated by 24 smaller irrigation reservoirs and powerplants (see p. 180), Clark Canyon Reservoir (see p. 23), Canyon Ferry Reservoir (see p. 44), and Tiber Reservoir (see p. 62). Diversions for irrigation of about 870,400 acres above station.

REVISIONS.--WSP 1729: Drainage area.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT             | NOV     | DEC     | JAN         | FEB     | MAR        | APR     | MAY       | JUN     | JUL             | AUG     | SEP     |
|-------------|-----------------|---------|---------|-------------|---------|------------|---------|-----------|---------|-----------------|---------|---------|
| 1           | 8,540           | 9,380   | 8,400   | 8,800       | 9,800   | 10,000     | 11,700  | 15,900    | 25,900  | 14,900          | 9,180   | 7,580   |
| 2           | 8,480           | 9,160   | 8,400   | 8,400       | 9,800   | 10,500     | 11,300  | 17,500    | 26,200  | 17,400          | 9,140   | 7,880   |
| 3           | 8,200           | 9,060   | 8,400   | 8,200       | 9,600   | 10,000     | 10,900  | 16,600    | 26,000  | 18,300          | 8,960   | 7,680   |
| 4           | 8,240           | 9,600   | 8,700   | 7,800       | 9,600   | 11,000     | 10,700  | 17,300    | 25,400  | 18,800          | 8,880   | 7,720   |
| 5           | 8,100           | 8,980   | 8,600   | 8,200       | 9,400   | 11,500     | 10,700  | 17,500    | 24,700  | 19,500          | 9,000   | 8,300   |
| 6           | 8,480           | 8,880   | 8,400   | 8,600       | 11,000  | 11,000     | 10,700  | 17,900    | 24,400  | 19,500          | 9,120   | 7,880   |
| 7           | 9,250           | 8,780   | 8,000   | 7,800       | 11,000  | 10,000     | 10,600  | 19,300    | 24,700  | 19,300          | 8,980   | 7,600   |
| 8           | 8,140           | 7,480   | 7,600   | 7,200       | 11,000  | 10,000     | 11,200  | 20,300    | 25,000  | 18,900          | 8,940   | 7,380   |
| 9           | 8,160           | 7,800   | 8,200   | 6,800       | 10,000  | 9,600      | 10,700  | 22,100    | 25,800  | 18,300          | 9,020   | 7,820   |
| 10          | 8,280           | 8,320   | 9,600   | 6,800       | 9,400   | 9,600      | 12,000  | 23,700    | 24,900  | 17,300          | 8,960   | 7,540   |
| 11          | 8,420           | 8,000   | 9,400   | 7,200       | 9,600   | 9,700      | 13,300  | 24,300    | 22,900  | 16,000          | 9,330   | 7,640   |
| 12          | 7,520           | 7,400   | 9,200   | 7,800       | 10,000  | 9,600      | 13,200  | 24,100    | 21,100  | 15,500          | 9,080   | 7,300   |
| 13          | 8,640           | 8,640   | 9,000   | 8,200       | 10,000  | 9,400      | 12,700  | 24,500    | 20,300  | 14,400          | 8,560   | 7,280   |
| 14          | 9,020           | 8,580   | 8,600   | 8,600       | 9,800   | 9,100      | 12,600  | 26,200    | 19,800  | 14,200          | 8,580   | 7,000   |
| 15          | 8,280           | 8,960   | 7,600   | 8,400       | 10,000  | 9,400      | 12,500  | 27,400    | 18,100  | 13,300          | 8,700   | 7,060   |
| 16          | 8,600           | 8,480   | 8,000   | 6,800       | 11,000  | 9,200      | 12,500  | 28,300    | 17,600  | 12,200          | 8,780   | 6,730   |
| 17          | 8,400           | 8,360   | 8,400   | 7,000       | 12,000  | 8,600      | 12,300  | 27,200    | 17,400  | 12,000          | 8,400   | 7,080   |
| 18          | 8,080           | 8,580   | 8,000   | 8,000       | 13,000  | 8,600      | 12,400  | 26,000    | 16,900  | 11,000          | 8,860   | 8,240   |
| 19          | 7,180           | 8,660   | 7,600   | 9,000       | 12,000  | 8,600      | 12,400  | 25,800    | 16,600  | 10,400          | 8,400   | 7,820   |
| 20          | 8,800           | 8,860   | 7,800   | 9,400       | 11,000  | 8,600      | 12,600  | 25,400    | 14,000  | 9,600           | 7,920   | 6,900   |
| 21          | 8,740           | 7,400   | 7,400   | 9,400       | 10,000  | 8,800      | 12,700  | 24,900    | 14,000  | 9,500           | 7,740   | 8,420   |
| 22          | 7,960           | 6,800   | 5,600   | 9,400       | 10,000  | 9,200      | 12,700  | 24,100    | 13,600  | 8,620           | 7,540   | 8,480   |
| 23          | 6,790           | 7,400   | 7,000   | 9,600       | 10,000  | 9,600      | 12,900  | 23,800    | 12,700  | 8,940           | 7,500   | 8,500   |
| 24          | 7,620           | 6,800   | 6,600   | 10,000      | 9,600   | 9,000      | 13,000  | 22,800    | 12,300  | 9,180           | 6,940   | 8,160   |
| 25          | 8,400           | 7,400   | 7,400   | 11,000      | 9,400   | 9,200      | 13,300  | 22,400    | 12,400  | 8,500           | 7,300   | 7,900   |
| 26          | 8,300           | 8,200   | 7,200   | 11,000      | 9,600   | 9,700      | 13,900  | 22,200    | 13,300  | 8,660           | 7,540   | 7,840   |
| 27          | 8,320           | 7,800   | 8,600   | 10,500      | 10,000  | 10,200     | 15,200  | 21,600    | 13,800  | 8,520           | 7,000   | 7,860   |
| 28          | 8,560           | 7,400   | 8,200   | 9,200       | 9,800   | 11,000     | 15,700  | 20,500    | 14,100  | 8,680           | 7,460   | 7,920   |
| 29          | 8,180           | 8,000   | 8,000   | 10,000      | -----   | 12,000     | 15,300  | 21,800    | 15,400  | 8,580           | 7,520   | 8,320   |
| 30          | 7,820           | 8,200   | 8,800   | 10,200      | -----   | 11,900     | 15,100  | 24,100    | 13,400  | 8,720           | 7,160   | 8,280   |
| 31          | 7,560           | -----   | 9,000   | 10,200      | -----   | 11,900     | -----   | 25,700    | -----   | 8,880           | 6,760   | -----   |
| TOTAL       | 255,060         | 247,360 | 251,700 | 269,500     | 287,400 | 306,500    | 376,800 | 701,200   | 572,700 | 407,580         | 257,250 | 232,110 |
| MEAN        | 8,228           | 8,245   | 8,119   | 8,694       | 10,260  | 9,887      | 12,560  | 22,620    | 19,090  | 13,150          | 8,298   | 7,737   |
| MAX         | 9,250           | 9,600   | 9,600   | 11,000      | 13,000  | 12,000     | 15,700  | 28,300    | 26,200  | 19,500          | 9,330   | 8,500   |
| MIN         | 6,790           | 6,800   | 5,600   | 6,800       | 9,400   | 8,600      | 10,600  | 15,900    | 12,300  | 8,500           | 6,760   | 6,730   |
| AC-FT       | 505,900         | 490,600 | 499,200 | 534,600     | 570,100 | 607,900    | 747,400 | 1,391M    | 1,136M  | 808,400         | 510,300 | 460,400 |
| CAL YR 1970 | TOTAL 4,403,290 |         |         | MEAN 12,060 |         | MAX 35,200 |         | MIN 5,500 |         | AC-FT 8,734,000 |         |         |
| WTR YR 1971 | TOTAL 4,165,160 |         |         | MEAN 11,410 |         | MAX 28,300 |         | MIN 5,600 |         | AC-FT 8,262,000 |         |         |

Stage-discharge relation affected by ice Nov. 22 to Mar. 28 (no gage height record Dec. 5 to Jan. 7, Feb. 7-16).

## MUSSELSHELL RIVER BASIN

06115500 North Fork Musselshell River near Delpine, Mont.

LOCATION.--Lat 46°36'36", long 110°34'30", in SW 1/4 sec. 22, T.10 N., R.9 E., Meagher County, on right bank 0.5 mile upstream from high-water line of Durand Reservoir at elevation 5,330 ft, 3 miles downstream from Lion Creek, and 4 miles northwest of Delpine.

DRAINAGE AREA.--31.4 sq mi.

PERIOD OF RECORD.--May 1940 to current year.

GAGE.--Water-stage recorder. Altitude of gage is 5,380 ft (by barometer).

AVERAGE DISCHARGE.--31 years, 12.2 cfs (8,840 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 156 cfs Apr. 7 (gage height, 2.47 ft); maximum gage height, 2.74 ft Mar. 30 (backwater from ice); minimum daily, 3.0 cfs Jan. 11-13.

Period of record: Maximum discharge, 423 cfs Apr. 1, 1950 (gage height, 4.63 ft), from rating curve extended above 150 cfs; minimum, 1.6 cfs Aug. 16, 1941 (gage height, 0.32 ft).

REMARKS.--Records good except those for winter period, which are poor. Small diversions for irrigation of hay meadows above station.

REVISIONS.--WSP 1559: Drainage area.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY   | OCT   | NOV   | DEC   | JAN   | FEB   | MAR   | APR   | MAY   | JUN   | JUL   | AUG   | SEP   |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1     | 4.5   | 8.5   | 7.0   | 5.5   | 15    | 4.5   | 15    | 24    | 34    | 12    | 7.3   | 5.0   |
| 2     | 4.5   | 8.0   | 6.5   | 5.5   | 10    | 4.0   | 7.5   | 26    | 33    | 13    | 7.0   | 5.0   |
| 3     | 4.4   | 8.0   | 6.5   | 5.0   | 7.5   | 4.0   | 7.5   | 27    | 33    | 13    | 7.0   | 5.0   |
| 4     | 4.4   | 8.5   | 7.0   | 4.5   | 6.5   | 3.5   | 10    | 29    | 33    | 12    | 6.8   | 5.0   |
| 5     | 4.2   | 8.5   | 7.0   | 4.5   | 5.5   | 3.5   | 20    | 31    | 32    | 12    | 6.3   | 4.9   |
| 6     | 4.7   | 8.5   | 7.5   | 4.5   | 5.5   | 3.5   | 36    | 31    | 31    | 12    | 6.3   | 4.7   |
| 7     | 4.2   | 8.5   | 7.5   | 5.0   | 5.0   | 4.0   | 56    | 31    | 30    | 11    | 6.3   | 4.7   |
| 8     | 5.4   | 8.7   | 7.0   | 5.0   | 5.5   | 4.0   | 37    | 31    | 30    | 11    | 6.1   | 4.5   |
| 9     | 9.5   | 8.2   | 7.0   | 4.5   | 6.0   | 4.0   | 34    | 32    | 30    | 11    | 5.9   | 4.4   |
| 10    | 10    | 8.5   | 7.0   | 4.0   | 6.5   | 4.0   | 30    | 33    | 29    | 11    | 5.6   | 4.4   |
| 11    | 9.8   | 8.5   | 7.0   | 3.0   | 7.0   | 4.0   | 26    | 33    | 28    | 10    | 5.6   | 4.4   |
| 12    | 9.8   | 8.5   | 7.0   | 3.0   | 7.0   | 4.0   | 23    | 34    | 27    | 9.8   | 5.4   | 4.2   |
| 13    | 9.5   | 8.2   | 7.0   | 3.0   | 7.5   | 4.5   | 20    | 35    | 26    | 9.5   | 5.4   | 4.2   |
| 14    | 9.3   | 8.0   | 7.0   | 4.0   | 7.0   | 5.0   | 29    | 36    | 25    | 9.0   | 5.2   | 4.2   |
| 15    | 9.3   | 8.0   | 7.0   | 5.0   | 7.0   | 5.0   | 30    | 37    | 24    | 8.5   | 5.2   | 4.4   |
| 16    | 9.5   | 8.0   | 7.0   | 6.5   | 6.5   | 5.0   | 22    | 38    | 24    | 8.2   | 5.0   | 4.5   |
| 17    | 9.5   | 8.0   | 7.0   | 7.5   | 6.5   | 5.0   | 20    | 38    | 23    | 8.0   | 4.9   | 4.7   |
| 18    | 9.3   | 8.0   | 6.5   | 8.0   | 6.5   | 4.5   | 18    | 36    | 24    | 8.0   | 5.0   | 4.5   |
| 19    | 9.3   | 8.0   | 6.5   | 8.2   | 6.0   | 4.5   | 19    | 36    | 24    | 7.7   | 4.5   | 4.5   |
| 20    | 9.3   | 8.0   | 6.5   | 8.2   | 5.5   | 5.0   | 21    | 36    | 23    | 7.7   | 4.5   | 4.5   |
| 21    | 9.3   | 7.0   | 6.0   | 8.0   | 5.0   | 5.0   | 23    | 34    | 22    | 7.7   | 4.5   | 4.4   |
| 22    | 9.3   | 6.5   | 5.5   | 7.5   | 5.5   | 5.5   | 26    | 34    | 20    | 8.0   | 4.5   | 4.4   |
| 23    | 9.3   | 6.5   | 6.0   | 8.2   | 6.0   | 6.0   | 27    | 33    | 20    | 7.3   | 4.4   | 4.2   |
| 24    | 9.5   | 7.0   | 6.5   | 8.2   | 6.0   | 6.0   | 33    | 31    | 20    | 7.0   | 4.4   | 4.2   |
| 25    | 9.0   | 7.0   | 6.5   | 8.0   | 5.5   | 7.0   | 32    | 31    | 19    | 6.8   | 4.4   | 4.4   |
| 26    | 9.0   | 7.5   | 7.0   | 8.0   | 5.0   | 7.5   | 27    | 30    | 20    | 6.8   | 4.4   | 4.4   |
| 27    | 8.7   | 7.5   | 6.5   | 7.7   | 5.0   | 7.5   | 25    | 27    | 21    | 6.8   | 4.4   | 4.4   |
| 28    | 8.5   | 7.0   | 6.5   | 7.7   | 4.5   | 7.5   | 25    | 28    | 20    | 8.7   | 4.4   | 4.4   |
| 29    | 8.7   | 7.0   | 7.0   | 7.7   | ----- | 8.5   | 24    | 30    | 19    | 8.5   | 4.5   | 4.2   |
| 30    | 8.7   | 7.5   | 7.0   | 9.0   | ----- | 30    | 24    | 33    | 16    | 8.0   | 8.5   | 4.2   |
| 31    | 8.7   | ----- | 6.5   | 20    | ----- | 25    | ----- | 35    | ----- | 7.7   | 5.9   | ----- |
| TOTAL | 249.1 | 235.6 | 209.5 | 204.4 | 182.0 | 201.0 | 747.0 | 1,000 | 760   | 287.7 | 169.6 | 134.9 |
| MEAN  | 8.04  | 7.85  | 6.76  | 6.59  | 6.50  | 6.48  | 24.9  | 32.3  | 25.3  | 9.28  | 5.47  | 4.50  |
| MAX   | 10    | 8.7   | 7.5   | 20    | 15    | 30    | 56    | 38    | 34    | 13    | 8.5   | 5.0   |
| MIN   | 4.2   | 6.5   | 5.5   | 3.0   | 4.5   | 3.5   | 7.5   | 24    | 16    | 6.8   | 4.4   | 4.2   |
| AC-FT | 494   | 467   | 416   | 405   | 361   | 399   | 1,480 | 1,980 | 1,510 | 571   | 336   | 268   |

CAL YR 1970 TOTAL 5,307.0 MEAN 14.5 MAX 78 MIN 4.2 AC-FT 10,530  
 WTR YR 1971 TOTAL 4,380.8 MEAN 12.0 MAX 56 MIN 3.0 AC-FT 8,690

## PEAK DISCHARGE (BASE, 50 CFS)

| DATE | TIME | G.HT. | DISCHARGE | DATE | TIME | G.HT. | DISCHARGE |
|------|------|-------|-----------|------|------|-------|-----------|
| 4-7  | 1800 | 2.47  | 156       | 4-14 | 2300 | 1.48  | 52        |

NOTE.--Stage-discharge relation affected by ice Nov. 21 to Jan. 17, Jan. 30 to Mar. 30 (no gage height record Dec. 25 to Jan. 15, Feb. 1, 2, Feb. 7 to Mar. 10, Mar. 20, 21, 23-29).



## MUSSELSHELL RIVER BASIN

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06118500 South Fork Musselshell River above Martinsdale, Mont.

LOCATION.--Lat 46°27'21", long 110°22'54", in NW¼ sec.17, T.8 N., R.11 E., Meagher County, on left bank 2 miles downstream from Cottonwood Creek, 3 miles west of Martinsdale, and 6 miles upstream from confluence with North Fork.

DRAINAGE AREA.--287 sq mi.

PERIOD OF RECORD.--October 1941 to current year. Monthly discharge only November 1941 to May 1942, published in WSP 1309.

GAGE.--Water-stage recorder. Altitude of gage is 4,900 ft (by barometer). Prior to May 15, 1942, nonrecording gage at same site and datum.

AVERAGE DISCHARGE.--30 years, 84.0 cfs (60,860 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 648 cfs May 29; maximum gage height, 5.25 ft May 14; minimum discharge, 1.8 cfs Aug. 27 (gage height, 2.41 ft).

Period of record: Maximum discharge, 1,330 cfs May 31, 1967 (gage height, 6.19 ft); maximum gage height, 6.56 ft June 5, 1948; minimum discharge, 0.1 cfs Aug. 28 to Sept. 2, 1949, Mar. 29, 1950.

REMARKS.--Records good except those for winter period, which are poor. Diversions for irrigation of about 6,600 acres, of which 250 acres is below station.

REVISIONS (WATER YEARS).--WSP 1309: 1942(M), 1944(M). WSP 1729: Drainage area.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT            | NOV       | DEC     | JAN     | FEB          | MAR   | APR   | MAY    | JUN    | JUL   | AUG   | SEP   |
|-------------|----------------|-----------|---------|---------|--------------|-------|-------|--------|--------|-------|-------|-------|
| 1           | 28             | 24        | 22      | 20      | 150          | 20    | 110   | 127    | 424    | 173   | 28    | 39    |
| 2           | 28             | 17        | 20      | 20      | 100          | 20    | 85    | 182    | 382    | 156   | 26    | 31    |
| 3           | 29             | 17        | 20      | 15      | 50           | 20    | 72    | 237    | 343    | 151   | 26    | 35    |
| 4           | 29             | 16        | 18      | 15      | 40           | 20    | 68    | 337    | 355    | 138   | 23    | 37    |
| 5           | 29             | 21        | 20      | 15      | 30           | 25    | 74    | 406    | 349    | 132   | 21    | 31    |
| 6           | 35             | 29        | 23      | 15      | 25           | 25    | 110   | 379    | 334    | 118   | 19    | 26    |
| 7           | 35             | 28        | 24      | 20      | 25           | 25    | 192   | 349    | 328    | 110   | 21    | 24    |
| 8           | 33             | 24        | 28      | 20      | 25           | 25    | 243   | 376    | 331    | 99    | 16    | 24    |
| 9           | 33             | 29        | 23      | 20      | 30           | 25    | 156   | 430    | 391    | 95    | 10    | 21    |
| 10          | 37             | 28        | 20      | 20      | 40           | 25    | 194   | 427    | 388    | 87    | 8.0   | 19    |
| 11          | 37             | 19        | 15      | 20      | 50           | 26    | 110   | 418    | 394    | 80    | 9.0   | 21    |
| 12          | 39             | 29        | 12      | 15      | 50           | 24    | 97    | 430    | 346    | 74    | 7.0   | 14    |
| 13          | 45             | 26        | 12      | 15      | 55           | 28    | 78    | 508    | 331    | 64    | 5.2   | 11    |
| 14          | 43             | 19        | 13      | 15      | 55           | 29    | 95    | 608    | 325    | 62    | 4.5   | 11    |
| 15          | 37             | 17        | 15      | 20      | 50           | 31    | 160   | 475    | 292    | 62    | 5.2   | 16    |
| 16          | 35             | 23        | 16      | 30      | 45           | 31    | 129   | 424    | 253    | 57    | 5.2   | 21    |
| 17          | 33             | 26        | 15      | 35      | 40           | 31    | 108   | 364    | 217    | 51    | 4.5   | 24    |
| 18          | 33             | 24        | 13      | 35      | 35           | 37    | 95    | 307    | 189    | 47    | 4.5   | 26    |
| 19          | 33             | 16        | 12      | 35      | 30           | 24    | 87    | 245    | 180    | 47    | 4.0   | 23    |
| 20          | 33             | 17        | 10      | 30      | 25           | 26    | 101   | 235    | 171    | 41    | 3.5   | 26    |
| 21          | 33             | 15        | 13      | 30      | 25           | 24    | 104   | 220    | 165    | 47    | 3.5   | 29    |
| 22          | 31             | 10        | 15      | 30      | 30           | 29    | 154   | 217    | 156    | 47    | 4.0   | 29    |
| 23          | 31             | 10        | 18      | 30      | 30           | 26    | 154   | 194    | 156    | 43    | 3.0   | 24    |
| 24          | 33             | 12        | 20      | 25      | 30           | 24    | 185   | 185    | 149    | 39    | 2.5   | 23    |
| 25          | 29             | 15        | 25      | 25      | 30           | 29    | 295   | 194    | 145    | 37    | 2.5   | 21    |
| 26          | 23             | 22        | 25      | 25      | 25           | 41    | 171   | 240    | 158    | 39    | 2.5   | 21    |
| 27          | 24             | 20        | 25      | 25      | 20           | 140   | 129   | 367    | 266    | 39    | 2.5   | 24    |
| 28          | 17             | 20        | 25      | 25      | 20           | 110   | 118   | 511    | 264    | 41    | 2.0   | 26    |
| 29          | 24             | 18        | 25      | 25      | -----        | 78    | 118   | 612    | 215    | 41    | 2.5   | 26    |
| 30          | 31             | 20        | 25      | 25      | -----        | 114   | 110   | 596    | 187    | 35    | 43    | 28    |
| 31          | 26             | -----     | 25      | 75      | -----        | 158   | ----- | 522    | -----  | 29    | 80    | ----- |
| TOTAL       | 986            | 611       | 592     | 770     | 1,160        | 1,290 | 3,902 | 11,122 | 8,184  | 2,281 | 398.6 | 731   |
| MEAN        | 31.8           | 20.4      | 19.1    | 24.8    | 41.4         | 41.6  | 130   | 359    | 273    | 73.6  | 12.9  | 24.4  |
| MAX         | 45             | 29        | 28      | 75      | 150          | 158   | 295   | 612    | 424    | 173   | 80    | 39    |
| MIN         | 17             | 10        | 10      | 15      | 20           | 20    | 68    | 127    | 145    | 29    | 2.0   | 11    |
| AC-FT       | 1,960          | 1,210     | 1,170   | 1,530   | 2,300        | 2,560 | 7,740 | 22,060 | 16,230 | 4,520 | 791   | 1,450 |
| CAL YR 1970 | TOTAL 42,534.0 | MEAN 117  | MAX 960 | MIN 9.0 | AC-FT 84,370 |       |       |        |        |       |       |       |
| WTR YR 1971 | TOTAL 32,027.6 | MEAN 87.7 | MAX 612 | MIN 2.0 | AC-FT 63,530 |       |       |        |        |       |       |       |

## PEAK DISCHARGE (BASE, 480 CFS)

| DATE | TIME | G.HT. | DISCHARGE | DATE | TIME | G.HT. | DISCHARGE |
|------|------|-------|-----------|------|------|-------|-----------|
| 5-14 | 0800 | 5.25  | 636       | 5-29 | 0830 | 5.16  | 648       |

NOTE.--Stage-discharge relation affected by ice Dec. 10 to Mar. 10 (no gage-height record Jan. 12-18, Feb. 5-9, Mar. 7-10).

## MUSSELSHELL RIVER BASIN

06120500 Musselshell River at Harlowton, Mont.

LOCATION.--Lat 46°25'48", long 109°50'24", in NE¼ sec.28, T.8 N., R.15 E., Wheatland County, on left bank 350 ft downstream from bridge on State Highway 19, 1 mile southwest of Harlowton, and 6 miles upstream from American Fork.

DRAINAGE AREA.--1,125 sq mi.

PERIOD OF RECORD.--July 1907 to November 1929, March 1930 to December 1932, April to August 1933, February 1934 to current year. Monthly discharge only for some periods, published in WSP 1309.

GAGE.--Water-stage recorder. Altitude of gage is 4,160 ft (by barometer). Prior to Dec. 8, 1937, nonrecording gages at site 1.2 miles downstream at different datums. Dec. 8, 1937, to Aug. 26, 1955, nonrecording gage at bridge 300 ft upstream at different datums.

AVERAGE DISCHARGE.--61 years (1907-29, 1930-32, 1934-71), 160 cfs (115,900 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 732 cfs May 15 (gage height, 4.36 ft); maximum gage height, 4.52 ft Feb. 16 (backwater from ice), minimum daily discharge, 35 cfs Jan. 13.

Period of record: Maximum discharge observed, 4,530 cfs June 24, 1938 (gage height, 8.72 ft, datum then in use), from rating curve extended above 2,100 cfs; no flow at times.

REMARKS.--Records good except those for winter period, which are poor. Some regulation by Bair and Martinsdale Reservoirs (see p.183-184). Diversions for irrigation of about 37,000 acres above station, of which 2,300 acres is flood irrigated.

REVISIONS (WATER YEARS).--WSP 1309: 1912, 1915(M), 1918, 1925. WSP 1729: Drainage area.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY   | OCT   | NOV   | DEC   | JAN   | FEB   | MAR   | APR    | MAY    | JUN    | JUL   | AUG   | SEP   |
|-------|-------|-------|-------|-------|-------|-------|--------|--------|--------|-------|-------|-------|
| 1     | 79    | 81    | 80    | 90    | 150   | 64    | 237    | 228    | 525    | 231   | 164   | 191   |
| 2     | 78    | 78    | 80    | 80    | 140   | 66    | 181    | 258    | 412    | 205   | 160   | 157   |
| 3     | 95    | 74    | 80    | 70    | 120   | 68    | 152    | 324    | 338    | 200   | 150   | 138   |
| 4     | 93    | 75    | 85    | 60    | 100   | 72    | 136    | 398    | 293    | 181   | 152   | 150   |
| 5     | 93    | 75    | 80    | 54    | 80    | 70    | 128    | 539    | 258    | 172   | 144   | 142   |
| 6     | 103   | 82    | 90    | 56    | 70    | 70    | 136    | 627    | 228    | 157   | 134   | 128   |
| 7     | 100   | 84    | 95    | 58    | 75    | 75    | 196    | 622    | 222    | 140   | 124   | 128   |
| 8     | 98    | 82    | 100   | 60    | 80    | 80    | 296    | 587    | 217    | 128   | 119   | 123   |
| 9     | 96    | 81    | 95    | 55    | 85    | 80    | 324    | 592    | 282    | 136   | 126   | 124   |
| 10    | 96    | 82    | 90    | 50    | 100   | 75    | 270    | 617    | 331    | 155   | 109   | 112   |
| 11    | 95    | 79    | 95    | 45    | 150   | 70    | 276    | 602    | 349    | 164   | 85    | 93    |
| 12    | 102   | 78    | 100   | 40    | 500   | 72    | 200    | 592    | 321    | 155   | 87    | 82    |
| 13    | 105   | 82    | 110   | 35    | 300   | 76    | 179    | 602    | 279    | 157   | 82    | 78    |
| 14    | 105   | 79    | 115   | 45    | 200   | 80    | 157    | 672    | 279    | 134   | 81    | 72    |
| 15    | 98    | 76    | 115   | 55    | 150   | 96    | 184    | 687    | 261    | 126   | 82    | 72    |
| 16    | 95    | 75    | 100   | 65    | 130   | 87    | 261    | 587    | 225    | 121   | 88    | 79    |
| 17    | 91    | 76    | 90    | 70    | 110   | 81    | 228    | 534    | 208    | 128   | 81    | 87    |
| 18    | 90    | 79    | 70    | 75    | 100   | 88    | 198    | 476    | 186    | 103   | 62    | 95    |
| 19    | 90    | 78    | 60    | 80    | 90    | 82    | 169    | 401    | 160    | 81    | 61    | 96    |
| 20    | 90    | 74    | 64    | 80    | 90    | 88    | 160    | 328    | 157    | 74    | 60    | 95    |
| 21    | 90    | 74    | 66    | 75    | 95    | 91    | 167    | 303    | 176    | 88    | 61    | 102   |
| 22    | 90    | 68    | 70    | 70    | 90    | 84    | 228    | 289    | 167    | 140   | 52    | 90    |
| 23    | 90    | 60    | 80    | 75    | 85    | 90    | 279    | 240    | 196    | 138   | 46    | 85    |
| 24    | 90    | 60    | 90    | 80    | 85    | 90    | 273    | 200    | 148    | 138   | 46    | 82    |
| 25    | 87    | 70    | 100   | 80    | 80    | 103   | 377    | 176    | 162    | 132   | 53    | 79    |
| 26    | 85    | 70    | 100   | 80    | 76    | 105   | 480    | 150    | 184    | 130   | 50    | 78    |
| 27    | 82    | 65    | 100   | 90    | 72    | 126   | 391    | 167    | 408    | 126   | 50    | 78    |
| 28    | 79    | 70    | 105   | 100   | 70    | 196   | 310    | 249    | 458    | 152   | 47    | 75    |
| 29    | 78    | 75    | 105   | 100   | ----- | 172   | 252    | 363    | 384    | 164   | 51    | 79    |
| 30    | 82    | 75    | 110   | 105   | ----- | 162   | 231    | 525    | 296    | 164   | 128   | 79    |
| 31    | 84    | ----- | 100   | 110   | ----- | 225   | -----  | 607    | -----  | 162   | 228   | ----- |
| TOTAL | 2,829 | 2,257 | 2,820 | 2,188 | 3,473 | 2,984 | 7,056  | 13,542 | 8,110  | 4,482 | 2,963 | 3,069 |
| MEAN  | 91.3  | 75.2  | 91.0  | 70.6  | 124   | 96.3  | 235    | 437    | 270    | 145   | 95.6  | 102   |
| MAX   | 105   | 84    | 115   | 110   | 500   | 225   | 480    | 687    | 525    | 231   | 228   | 191   |
| MIN   | 78    | 60    | 60    | 35    | 70    | 64    | 128    | 150    | 148    | 74    | 46    | 72    |
| AC-FT | 5,610 | 4,480 | 5,590 | 4,340 | 6,890 | 5,920 | 14,000 | 26,860 | 16,090 | 8,890 | 5,880 | 6,090 |

CAL YR 1970 TOTAL 75,334 MEAN 206 MAX 1,640 MIN 38 AC-FT 149,400  
WTR YR 1971 TOTAL 55,773 MEAN 153 MAX 687 MIN 35 AC-FT 110,600

NOTE.--Stage-discharge relation affected by ice Nov. 23 to Mar. 14 (no gage-height record Dec. 19 to Jan. 20).

06123500 Musselshell River near Ryegate, Mont.

LOCATION.--Lat 46°18'02", long 109°12'20", in center of S $\frac{1}{2}$  sec.3, T.6 N., R.20 E., Golden Valley County, on downstream side of county bridge 2 miles upstream from Careless Creek and 2 miles east of Ryegate.

DRAINAGE AREA.--1,979 sq mi.

PERIOD OF RECORD.--July 1946 to current year. Monthly discharge only for July 1946, published in WSP 1309.

GAGE.--Nonrecording gage. Altitude of gage is 3,600 ft (from topographic map). Prior to June 23, 1967, water-stage recorder at site 1 mile downstream at different datum.

AVERAGE DISCHARGE.--25 years, 169 cfs (122,400 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, about 1,500 cfs Feb. 13; maximum gage height observed, 6.03 ft Feb. 12 (backwater from ice); minimum daily discharge, 18 cfs Jan. 14.

Period of record: Maximum discharge, 9,500 cfs June 16, 1967 (gage height, 10.7 ft, from floodmark at present site and datum, 11.8 ft, from floodmark at former site and datum); no flow Aug. 17-28, 1946.

REMARKS.--Records good except those for winter period, which are poor. Some regulation by Bair and Martinsdale Reservoirs (see p. 183-184). Water is diverted on left bank in sec.8, T.7 N., R.17 E., for storage in Deadman's Basin Reservoir (see p. 184), and can be returned to the stream by canal at a point about 9 miles above station or through Careless Creek 2 miles below station. Diversions for irrigation of about 45,000 acres above station, of which 2,700 acres is flood irrigated.

REVISIONS.--WSP 1729: Drainage area.

## DISCHARGE, IN CUBIC FEET PER SECCND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY   | OCT   | NOV   | DEC   | JAN   | FEB    | MAR   | APR    | MAY    | JUN    | JUL    | AUG   | SEP   |
|-------|-------|-------|-------|-------|--------|-------|--------|--------|--------|--------|-------|-------|
| 1     | 32    | 34    | 43    | 28    | 48     | 110   | 252    | 256    | 629    | 409    | 170   | 243   |
| 2     | 32    | 30    | 44    | 27    | 49     | 100   | 229    | 238    | 497    | 398    | 170   | 225   |
| 3     | 32    | 28    | 46    | 26    | 49     | 105   | 208    | 285    | 393    | 376    | 188   | 220   |
| 4     | 32    | 36    | 48    | 25    | 49     | 98    | 208    | 345    | 305    | 355    | 188   | 208   |
| 5     | 36    | 36    | 46    | 24    | 49     | 92    | 166    | 464    | 243    | 325    | 180   | 220   |
| 6     | 42    | 36    | 45    | 24    | 49     | 86    | 136    | 640    | 243    | 261    | 173   | 208   |
| 7     | 46    | 36    | 44    | 23    | 50     | 80    | 124    | 673    | 243    | 216    | 177   | 198   |
| 8     | 36    | 36    | 42    | 24    | 50     | 78    | 180    | 695    | 229    | 216    | 139   | 177   |
| 9     | 32    | 36    | 42    | 24    | 50     | 77    | 270    | 679    | 261    | 204    | 136   | 163   |
| 10    | 32    | 36    | 42    | 23    | 52     | 78    | 300    | 673    | 315    | 212    | 130   | 156   |
| 11    | 44    | 36    | 43    | 21    | 58     | 80    | 252    | 690    | 387    | 204    | 133   | 149   |
| 12    | 56    | 36    | 44    | 20    | 110    | 98    | 225    | 635    | 420    | 212    | 130   | 133   |
| 13    | 62    | 36    | 42    | 19    | 1,000  | 115   | 196    | 651    | 376    | 208    | 130   | 133   |
| 14    | 66    | 36    | 38    | 18    | 820    | 110   | 163    | 662    | 345    | 238    | 145   | 115   |
| 15    | 64    | 32    | 35    | 19    | 640    | 107   | 127    | 734    | 247    | 220    | 113   | 115   |
| 16    | 62    | 32    | 33    | 19    | 530    | 103   | 98     | 734    | 184    | 208    | 121   | 121   |
| 17    | 58    | 46    | 32    | 20    | 400    | 105   | 105    | 673    | 149    | 196    | 130   | 124   |
| 18    | 58    | 58    | 31    | 20    | 330    | 105   | 121    | 635    | 130    | 196    | 136   | 130   |
| 19    | 56    | 66    | 30    | 22    | 270    | 105   | 173    | 552    | 98     | 204    | 118   | 136   |
| 20    | 54    | 66    | 29    | 29    | 230    | 100   | 204    | 475    | 115    | 196    | 115   | 130   |
| 21    | 56    | 40    | 29    | 37    | 185    | 100   | 180    | 415    | 115    | 163    | 115   | 130   |
| 22    | 54    | 21    | 30    | 37    | 165    | 98    | 156    | 387    | 115    | 163    | 115   | 127   |
| 23    | 52    | 24    | 31    | 36    | 175    | 84    | 173    | 350    | 115    | 156    | 130   | 124   |
| 24    | 50    | 28    | 32    | 36    | 160    | 84    | 256    | 325    | 121    | 149    | 130   | 118   |
| 25    | 50    | 42    | 33    | 37    | 145    | 105   | 280    | 216    | 90     | 149    | 130   | 124   |
| 26    | 50    | 40    | 34    | 40    | 130    | 118   | 409    | 127    | 115    | 156    | 130   | 90    |
| 27    | 56    | 39    | 33    | 42    | 115    | 124   | 508    | 86     | 130    | 156    | 118   | 90    |
| 28    | 78    | 40    | 32    | 45    | 115    | 124   | 453    | 90     | 371    | 163    | 121   | 88    |
| 29    | 52    | 41    | 30    | 50    | -----  | 192   | 355    | 177    | 673    | 163    | 130   | 88    |
| 30    | 54    | 42    | 29    | 50    | -----  | 177   | 295    | 503    | 640    | 173    | 145   | 90    |
| 31    | 50    | ----- | 29    | 48    | -----  | 177   | -----  | 723    | -----  | 184    | 180   | ----- |
| TOTAL | 1,540 | 1,155 | 1,141 | 913   | 6,073  | 3,305 | 6,802  | 14,788 | 8,294  | 6,829  | 4,366 | 4,363 |
| MEAN  | 49.7  | 38.5  | 36.8  | 29.5  | 217    | 107   | 227    | 477    | 276    | 220    | 141   | 145   |
| MAX   | 78    | 66    | 48    | 50    | 1,000  | 192   | 508    | 734    | 673    | 409    | 188   | 243   |
| MIN   | 32    | 21    | 29    | 18    | 48     | 77    | 98     | 86     | 90     | 149    | 113   | 88    |
| AC-FT | 3,050 | 2,290 | 2,260 | 1,810 | 12,050 | 6,560 | 13,490 | 29,330 | 16,450 | 13,550 | 8,660 | 8,650 |

CAL YR 1970 TOTAL 72,252 MEAN 198 MAX 1,580 MIN 21 AC-FT 143,300  
WTR YR 1971 TOTAL 59,569 MEAN 163 MAX 1,000 MIN 18 AC-FT 118,200

NOTE.--Stage-discharge relation affected by ice Nov. 21 to Mar. 15.

## MUSSELSHELL RIVER BASIN

06125700 Big Coulee near Lavina, Mont.

LOCATION.--Lat 46°15'53", long 108°56'50", in SE¼ sec.15, T.6 N., R.22 E., Golden Valley County, on left bank 2 miles upstream from mouth and 2 miles southwest of Lavina.

DRAINAGE AREA.--232 sq mi.

PERIOD OF RECORD.--August 1957 to current year.

GAGE.--Water-stage recorder. Altitude of gage is 3,480 ft (from topographic map).

AVERAGE DISCHARGE.--14 years, 7.37 cfs (5,340 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, about 50 cfs Mar. 21 (gage height, 2.44 ft); maximum gage height, 4.48 ft Jan. 30 (backwater from ice); minimum daily discharge, 1.2 cfs Aug. 2-7, 19-30.

Period of record: Maximum discharge, 2,400 cfs June 18, 1967 (gage height, 6.88 ft); no flow at times most years.

REMARKS.--Records poor. Minor flood irrigation in headwaters.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY   | OCT   | NOV   | DEC   | JAN   | FEB   | MAR   | APR   | MAY   | JUN   | JUL  | AUG  | SEP   |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|------|-------|
| 1     | 8.9   | 7.6   | 8.0   | 6.5   | 9.0   | 9.0   | 12    | 12    | 13    | 3.2  | 1.3  | 5.2   |
| 2     | 8.8   | 6.9   | 7.5   | 5.9   | 8.0   | 8.0   | 12    | 10    | 11    | 3.5  | 1.2  | 5.0   |
| 3     | 8.8   | 6.5   | 6.0   | 5.0   | 7.0   | 9.0   | 11    | 9.5   | 8.4   | 3.5  | 1.2  | 4.5   |
| 4     | 8.9   | 6.5   | 5.5   | 4.5   | 6.0   | 7.3   | 11    | 9.1   | 9.2   | 3.2  | 1.2  | 3.8   |
| 5     | 9.0   | 6.9   | 5.0   | 3.5   | 5.0   | 9.0   | 11    | 9.1   | 9.1   | 3.3  | 1.2  | 3.0   |
| 6     | 9.9   | 12    | 6.0   | 3.0   | 4.0   | 11    | 10    | 8.7   | 8.2   | 3.1  | 1.2  | 2.5   |
| 7     | 10    | 11    | 9.0   | 5.0   | 3.5   | 10    | 11    | 8.3   | 7.3   | 2.9  | 1.2  | 2.2   |
| 8     | 9.8   | 7.9   | 7.5   | 7.0   | 8.0   | 9.9   | 11    | 8.1   | 7.2   | 2.7  | 3.0  | 2.0   |
| 9     | 9.1   | 8.0   | 7.0   | 6.5   | 10    | 8.5   | 11    | 7.9   | 6.8   | 2.5  | 2.0  | 1.8   |
| 10    | 9.3   | 7.9   | 7.0   | 6.0   | 15    | 15    | 11    | 7.5   | 6.6   | 2.3  | 1.6  | 1.7   |
| 11    | 9.1   | 7.5   | 7.0   | 5.5   | 23    | 17    | 10    | 7.0   | 6.4   | 2.2  | 1.5  | 1.7   |
| 12    | 12    | 8.3   | 7.0   | 4.5   | 30    | 19    | 9.7   | 7.0   | 6.3   | 2.0  | 1.5  | 1.6   |
| 13    | 12    | 8.1   | 7.0   | 3.5   | 26    | 25    | 9.9   | 6.8   | 5.9   | 1.9  | 1.4  | 1.5   |
| 14    | 11    | 7.4   | 7.0   | 2.5   | 24    | 16    | 10    | 6.5   | 5.8   | 1.8  | 1.4  | 1.5   |
| 15    | 9.8   | 7.2   | 7.0   | 3.0   | 22    | 15    | 11    | 6.0   | 5.5   | 1.7  | 1.3  | 1.5   |
| 16    | 9.0   | 8.0   | 6.5   | 3.5   | 20    | 19    | 14    | 5.8   | 5.3   | 1.6  | 1.3  | 1.7   |
| 17    | 8.9   | 7.6   | 6.0   | 4.0   | 18    | 12    | 17    | 5.6   | 5.1   | 1.6  | 1.3  | 4.0   |
| 18    | 8.8   | 7.3   | 5.5   | 4.5   | 16    | 11    | 14    | 5.4   | 4.8   | 1.5  | 1.3  | 3.7   |
| 19    | 8.9   | 6.9   | 5.0   | 5.0   | 15    | 12    | 13    | 5.2   | 4.5   | 1.5  | 1.2  | 3.5   |
| 20    | 8.9   | 6.9   | 6.0   | 6.0   | 16    | 18    | 12    | 5.0   | 4.2   | 1.5  | 1.2  | 3.3   |
| 21    | 8.5   | 6.5   | 6.5   | 10    | 14    | 32    | 13    | 6.0   | 4.0   | 1.5  | 1.2  | 3.2   |
| 22    | 8.4   | 5.0   | 7.0   | 9.0   | 20    | 11    | 14    | 8.1   | 3.7   | 1.5  | 1.2  | 3.1   |
| 23    | 8.4   | 2.5   | 7.0   | 8.0   | 13    | 8.8   | 14    | 8.8   | 3.6   | 1.4  | 1.2  | 2.9   |
| 24    | 8.5   | 5.0   | 8.0   | 7.0   | 13    | 19    | 13    | 8.4   | 3.4   | 1.4  | 1.2  | 2.8   |
| 25    | 8.0   | 11    | 8.5   | 6.5   | 13    | 22    | 12    | 7.4   | 3.3   | 1.4  | 1.2  | 2.8   |
| 26    | 7.7   | 5.0   | 7.5   | 6.0   | 12    | 17    | 11    | 6.4   | 3.2   | 1.3  | 1.2  | 2.8   |
| 27    | 7.6   | 6.0   | 6.9   | 8.0   | 11    | 16    | 12    | 5.5   | 3.5   | 1.3  | 1.2  | 2.8   |
| 28    | 7.4   | 7.0   | 5.9   | 14    | 10    | 13    | 12    | 5.0   | 3.6   | 1.3  | 1.2  | 2.7   |
| 29    | 7.2   | 10    | 5.8   | 13    | ----- | 12    | 12    | 5.5   | 3.6   | 1.3  | 1.2  | 2.7   |
| 30    | 9.4   | 9.0   | 5.8   | 12    | ----- | 11    | 12    | 7.1   | 3.6   | 1.3  | 1.2  | 2.7   |
| 31    | 8.3   | ----- | 5.9   | 11    | ----- | 12    | ----- | 11    | ----- | 1.3  | 4.4  | ----- |
| TOTAL | 280.3 | 223.4 | 207.3 | 199.4 | 391.5 | 434.5 | 356.6 | 229.7 | 176.1 | 62.5 | 44.9 | 84.2  |
| MEAN  | 9.04  | 7.45  | 6.69  | 6.43  | 14.0  | 14.0  | 11.9  | 7.41  | 5.87  | 2.02 | 1.45 | 2.81  |
| MAX   | 12    | 12    | 9.0   | 14    | 30    | 32    | 17    | 12    | 13    | 3.5  | 4.4  | 5.2   |
| MIN   | 7.2   | 2.5   | 5.0   | 2.5   | 3.5   | 7.3   | 9.7   | 5.0   | 3.2   | 1.3  | 1.2  | 1.5   |
| AC-FT | 556   | 443   | 411   | 396   | 777   | 862   | 707   | 456   | 349   | 124  | 89   | 167   |

CAL YR 1970 TOTAL 5,361.7 MEAN 14.7 MAX 165 MIN 1.0 AC-FT 10,630  
WTR YR 1971 TOTAL 2,690.4 MEAN 7.37 MAX 32 MIN 1.2 AC-FT 5,340

## PEAK DISCHARGE (BASE, 25 CFS)

| DATE | TIME | G.HT. | DISCHARGE | DATE | TIME | G.HT. | DISCHARGE |
|------|------|-------|-----------|------|------|-------|-----------|
| 2-12 | 1000 | a4.21 | b40       | 3-21 | 0930 | 2.44  | b50       |
| 3-13 | 2015 | 1.91  | b35       | 3-24 | 2215 | 1.79  | b30       |
| 3-16 | 0845 | 2.11  | b40       |      |      |       |           |

a Backwater from ice.

b About.

## MUSSELSHELL RIVER BASIN

75

06126500 Musselshell River near Roundup, Mont.

LOCATION.--Lat 46°25'48", long 108°34'18", in SE $\frac{1}{4}$  sec.22, T.8 N., R.25 E., Musselshell County, on left bank just downstream from Half Breed Creek, 0.1 mile upstream from bridge on U.S. Highway 87, and 2.5 miles west of Roundup.

DRAINAGE AREA.--4,023 sq mi.

PERIOD OF RECORD.--May 1946 to current year. Monthly discharge only for October 1947 to September 1949, published in WSP 1309.

GAGE.--Water-stage recorder. Datum of gage is 3,188.22 ft above mean sea level. Prior to Sept. 26, 1949, nonrecording gage at present site and datum.

AVERAGE DISCHARGE.--25 years, 202 cfs (146,300 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, about 3,000 cfs Feb. 13; maximum gage height, 12.78 ft Feb. 13 (ice jam); minimum daily discharge, 30 cfs Nov. 22.

Period of record: Maximum discharge, 9,610 cfs June 18, 1967 (gage height, 12.45 ft); maximum gage height, 12.78 ft Feb. 13, 1971 (ice jam); minimum discharge, 0.60 cfs May 12, 1962 (gage height, 0.63 ft).

REMARKS.--Records good except those for winter period, which are poor. Some regulation by Bair, Martinsdale, and Deadman's Basin Reservoirs (see p. 183-184). Diversions for irrigation of about 59,600 acres above station, of which about 11,000 acres is flood irrigated.

REVISIONS (WATER YEARS).--WSP 1086: 1946. WSP 1729: Drainage area.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY   | OCT   | NOV   | DEC   | JAN   | FEB    | MAR    | APR    | MAY    | JUN    | JUL    | AUG    | SEP    |
|-------|-------|-------|-------|-------|--------|--------|--------|--------|--------|--------|--------|--------|
| 1     | 69    | 79    | 65    | 45    | 70     | 182    | 269    | 368    | 812    | 688    | 273    | 277    |
| 2     | 67    | 76    | 70    | 43    | 75     | 160    | 317    | 330    | 668    | 584    | 266    | 308    |
| 3     | 65    | 75    | 75    | 40    | 75     | 178    | 310    | 314    | 521    | 448    | 262    | 287    |
| 4     | 65    | 71    | 80    | 38    | 75     | 170    | 278    | 330    | 425    | 392    | 260    | 280    |
| 5     | 64    | 76    | 75    | 37    | 72     | 163    | 253    | 382    | 382    | 365    | 251    | 269    |
| 6     | 73    | 68    | 72    | 35    | 68     | 149    | 236    | 485    | 330    | 328    | 221    | 260    |
| 7     | 76    | 82    | 72    | 35    | 65     | 150    | 227    | 620    | 306    | 284    | 212    | 255    |
| 8     | 79    | 83    | 70    | 35    | 70     | 157    | 224    | 672    | 335    | 259    | 208    | 250    |
| 9     | 81    | 79    | 68    | 38    | 75     | 160    | 271    | 660    | 342    | 221    | 192    | 230    |
| 10    | 89    | 80    | 65    | 35    | 180    | 165    | 365    | 652    | 342    | 218    | 187    | 212    |
| 11    | 85    | 79    | 68    | 33    | 300    | 181    | 365    | 672    | 382    | 224    | 179    | 206    |
| 12    | 90    | 78    | 68    | 33    | 1,200  | 189    | 355    | 672    | 412    | 224    | 170    | 196    |
| 13    | 99    | 77    | 65    | 32    | 2,000  | 223    | 328    | 632    | 428    | 248    | 177    | 186    |
| 14    | 95    | 76    | 62    | 33    | 1,650  | 206    | 287    | 596    | 395    | 235    | 166    | 173    |
| 15    | 97    | 75    | 60    | 35    | 916    | 199    | 268    | 628    | 358    | 235    | 172    | 167    |
| 16    | 103   | 72    | 58    | 43    | 844    | 194    | 236    | 716    | 289    | 212    | 176    | 167    |
| 17    | 99    | 77    | 55    | 45    | 644    | 181    | 184    | 688    | 228    | 232    | 164    | 168    |
| 18    | 96    | 74    | 50    | 47    | 497    | 146    | 212    | 632    | 186    | 241    | 147    | 175    |
| 19    | 94    | 71    | 45    | 47    | 422    | 134    | 206    | 592    | 163    | 239    | 140    | 176    |
| 20    | 91    | 70    | 40    | 45    | 358    | 147    | 244    | 497    | 139    | 244    | 145    | 178    |
| 21    | 84    | 60    | 43    | 47    | 316    | 152    | 255    | 422    | 104    | 233    | 143    | 164    |
| 22    | 82    | 30    | 45    | 48    | 251    | 162    | 259    | 385    | 60     | 230    | 149    | 160    |
| 23    | 84    | 45    | 50    | 50    | 273    | 158    | 273    | 378    | 92     | 230    | 157    | 160    |
| 24    | 86    | 50    | 55    | 55    | 253    | 141    | 310    | 338    | 131    | 241    | 158    | 162    |
| 25    | 85    | 55    | 55    | 60    | 241    | 154    | 352    | 268    | 184    | 246    | 154    | 150    |
| 26    | 80    | 52    | 55    | 65    | 224    | 165    | 355    | 217    | 179    | 228    | 155    | 143    |
| 27    | 78    | 52    | 52    | 70    | 194    | 203    | 462    | 162    | 221    | 230    | 164    | 123    |
| 28    | 80    | 55    | 50    | 75    | 197    | 203    | 524    | 80     | 382    | 242    | 171    | 133    |
| 29    | 79    | 58    | 47    | 80    | -----  | 219    | 488    | 111    | 740    | 257    | 187    | 138    |
| 30    | 80    | 60    | 45    | 75    | -----  | 275    | 422    | 277    | 788    | 271    | 221    | 138    |
| 31    | 79    | ----- | 48    | 70    | -----  | 275    | -----  | 576    | -----  | 275    | 251    | -----  |
| TOTAL | 2,574 | 2,035 | 1,828 | 1,469 | 11,605 | 5,541  | 9,135  | 14,352 | 10,324 | 8,804  | 5,878  | 5,891  |
| MEAN  | 83.0  | 67.8  | 59.0  | 47.4  | 414    | 179    | 305    | 463    | 344    | 284    | 190    | 196    |
| MAX   | 103   | 83    | 80    | 80    | 2,000  | 275    | 524    | 716    | 812    | 688    | 273    | 308    |
| MIN   | 64    | 30    | 40    | 32    | 65     | 134    | 184    | 80     | 60     | 212    | 140    | 123    |
| AC-FT | 5,110 | 4,040 | 3,630 | 2,910 | 23,020 | 10,990 | 18,120 | 28,470 | 20,480 | 17,460 | 11,660 | 11,680 |

CAL YR 1970 TOTAL 92,182 MEAN 253 MAX 1,730 MIN 28 AC-FT 182,800  
WTR YR 1971 TOTAL 79,436 MEAN 218 MAX 2,000 MIN 30 AC-FT 157,600

NOTE.--Stage-discharge relation affected by ice Nov. 21 to Feb. 13.



## MUSSELSHELL RIVER BASIN

06127500 Musselshell River at Musselshell, Mont.

LOCATION.--Lat 46°31'23", long 108°06'30", in S½SW¼ sec.20, T.9 N., R.29 E., Musselshell County, on left bank 0.9 mile upstream from Hawk Creek and 1 mile west of Musselshell.

DRAINAGE AREA.--4,568 sq mi.

PERIOD OF RECORD.--August 1928 to September 1932 (no records December to February for the water years 1930-31), August 1945 to current year. Monthly discharge only for some periods, published in WSP 1309.

GAGE.--Water-stage recorder. Altitude of gage is 2,990 ft (by barometer). Prior to Oct. 8, 1949, nonrecording gage at site 1 mile downstream at different datums.

AVERAGE DISCHARGE.--28 years (1928-29, 1931-32, 1945-71), 190 cfs (137,700 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, about 3,300 cfs Feb. 14 (gage height, 8.55 ft, backwater from ice); minimum, 12 cfs Nov. 22, result of freezeup.

Period of record: Maximum discharge, 9,850 cfs June 19, 1967 (gage height, 11.57 ft); no flow at times.

Maximum stage known, about 12 ft May 19, 1917, at site and datum used August 1945 to October 1949, from information by local residents.

REMARKS.--Records good except those for winter period, which are poor. Some regulation by Bair, Martinsdale, and Deadman's Basin Reservoirs (see p.183-184). Diversions for irrigation of about 63,300 acres above station, of which 12,500 acres is flood irrigated.

REVISIONS.--WSP 1729: Drainage area.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT           | NOV   | DEC      | JAN       | FEB    | MAR           | APR    | MAY    | JUN    | JUL    | AUG   | SEP    |
|-------------|---------------|-------|----------|-----------|--------|---------------|--------|--------|--------|--------|-------|--------|
| 1           | 81            | 75    | 71       | 53        | 80     | 205           | 271    | 381    | 538    | 564    | 190   | 226    |
| 2           | 75            | 75    | 77       | 50        | 85     | 163           | 283    | 352    | 586    | 503    | 202   | 271    |
| 3           | 74            | 74    | 79       | 48        | 85     | 185           | 319    | 328    | 493    | 426    | 193   | 292    |
| 4           | 71            | 70    | 87       | 44        | 85     | 196           | 298    | 322    | 419    | 361    | 196   | 292    |
| 5           | 71            | 66    | 79       | 43        | 80     | 183           | 274    | 346    | 364    | 337    | 188   | 280    |
| 6           | 71            | 65    | 77       | 40        | 75     | 170           | 253    | 388    | 331    | 307    | 180   | 274    |
| 7           | 74            | 67    | 78       | 38        | 70     | 165           | 238    | 479    | 313    | 262    | 168   | 262    |
| 8           | 77            | 75    | 78       | 42        | 75     | 178           | 232    | 542    | 295    | 229    | 170   | 259    |
| 9           | 81            | 78    | 79       | 44        | 80     | 165           | 229    | 559    | 313    | 190    | 178   | 250    |
| 10          | 85            | 79    | 74       | 40        | 85     | 173           | 295    | 546    | 304    | 158    | 168   | 226    |
| 11          | 87            | 77    | 75       | 35        | 500    | 175           | 361    | 546    | 328    | 160    | 160   | 211    |
| 12          | 90            | 75    | 75       | 35        | 1,200  | 185           | 343    | 564    | 349    | 173    | 150   | 202    |
| 13          | 91            | 75    | 75       | 34        | 1,800  | 202           | 349    | 550    | 370    | 165    | 128   | 188    |
| 14          | 94            | 74    | 68       | 35        | 2,200  | 226           | 310    | 522    | 377    | 165    | 126   | 180    |
| 15          | 91            | 74    | 66       | 45        | 1,140  | 208           | 292    | 518    | 355    | 153    | 124   | 172    |
| 16          | 93            | 72    | 63       | 50        | 790    | 196           | 271    | 550    | 325    | 143    | 130   | 170    |
| 17          | 97            | 70    | 63       | 50        | 690    | 193           | 223    | 591    | 250    | 130    | 128   | 170    |
| 18          | 94            | 74    | 58       | 50        | 518    | 183           | 190    | 550    | 196    | 158    | 120   | 172    |
| 19          | 93            | 71    | 51       | 50        | 454    | 153           | 220    | 530    | 160    | 165    | 102   | 178    |
| 20          | 91            | 70    | 47       | 50        | 412    | 145           | 211    | 479    | 128    | 165    | 93    | 178    |
| 21          | 87            | 63    | 50       | 50        | 388    | 155           | 262    | 426    | 108    | 165    | 93    | 178    |
| 22          | 82            | 20    | 56       | 50        | 364    | 158           | 262    | 377    | 85     | 160    | 97    | 168    |
| 23          | 79            | 40    | 62       | 55        | 322    | 163           | 262    | 358    | 55     | 145    | 102   | 162    |
| 24          | 81            | 53    | 65       | 60        | 298    | 158           | 283    | 349    | 65     | 145    | 118   | 162    |
| 25          | 82            | 57    | 65       | 65        | 292    | 148           | 322    | 310    | 95     | 155    | 118   | 162    |
| 26          | 81            | 54    | 65       | 70        | 262    | 160           | 346    | 247    | 132    | 163    | 108   | 150    |
| 27          | 78            | 55    | 58       | 80        | 217    | 178           | 364    | 196    | 140    | 143    | 112   | 140    |
| 28          | 75            | 55    | 56       | 90        | 220    | 202           | 451    | 140    | 190    | 143    | 120   | 130    |
| 29          | 75            | 59    | 54       | 100       | -----  | 202           | 454    | 83     | 419    | 150    | 130   | 136    |
| 30          | 75            | 63    | 53       | 90        | -----  | 235           | 426    | 110    | 573    | 158    | 173   | 140    |
| 31          | 77            | ----- | 54       | 80        | -----  | 283           | -----  | 304    | -----  | 183    | 208   | -----  |
| TOTAL       | 2,553         | 1,975 | 2,058    | 1,666     | 12,867 | 5,691         | 8,894  | 12,543 | 8,656  | 6,624  | 4,473 | 5,981  |
| MEAN        | 82.4          | 65.8  | 66.4     | 53.7      | 460    | 184           | 296    | 405    | 289    | 214    | 144   | 199    |
| MAX         | 97            | 79    | 87       | 100       | 2,200  | 283           | 454    | 591    | 586    | 564    | 208   | 292    |
| MIN         | 71            | 20    | 47       | 34        | 70     | 145           | 190    | 83     | 55     | 130    | 93    | 130    |
| AC-FT       | 5,060         | 3,920 | 4,080    | 3,300     | 25,520 | 11,290        | 17,640 | 24,880 | 17,170 | 13,140 | 8,870 | 11,860 |
| CAL YR 1970 | TOTAL 103,722 |       | MEAN 284 | MAX 2,180 | MIN 20 | AC-FT 205,700 |        |        |        |        |       |        |
| WTR YR 1971 | TOTAL 73,981  |       | MEAN 203 | MAX 2,200 | MIN 20 | AC-FT 146,700 |        |        |        |        |       |        |

NOTE.--Stage-discharge relation affected by ice Jan. 10 to Feb. 14.

MUSSELSHELL RIVER BASIN

77

06129000 Box Elder Creek near Winnett, Mont.

LOCATION.--Lat 47°00'45", long 108°09'30", in SW 1/4 sec. 34, T.15 N., R.28 E., Petroleum County, on right bank 500 ft upstream from bridge on State Highway 20, 0.4 mile upstream from McDonald Creek, 7 miles upstream from mouth, and 9 miles east of Winnett.

DRAINAGE AREA.--684 sq mi.

PERIOD OF RECORD.--June 1930 to December 1932, February 1934 to September 1936, April to August 1937, March to September 1938, August 1958 to current year. Monthly discharge only for some periods, published in WSP 1309.

GAGE.--Water-stage recorder. Altitude of gage is 2,720 ft (by barometer). Prior to Aug. 22, 1958, nonrecording gages 1,500 ft downstream at different datums.

AVERAGE DISCHARGE.--17 years (1930-32, 1934-36, 1958-71), 23.0 cfs (16,660 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, about 1,000 cfs Feb. 16 (gage height, 13.12 ft, backwater from ice); no flow for many days.

Period of record: Maximum discharge, 9,910 cfs June 16, 1962 (gage height, 15.34 ft); no flow for many days each year.

REMARKS.--Records fair except those for winter period, which are poor. Some diversions for storage and irrigation.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY   | OCT  | NOV   | DEC   | JAN   | FEB      | MAR   | APR   | MAY    | JUN   | JUL  | AUG  | SEP   |
|-------|------|-------|-------|-------|----------|-------|-------|--------|-------|------|------|-------|
| 1     | 0    | .14   | .40   | 3.6   | 3.4      | 140   | 57    | 18     | 3.2   | .96  | 0    | 0     |
| 2     | 0    | .16   | .30   | 3.2   | 3.0      | 120   | 52    | 14     | 2.4   | .24  | 0    | 0     |
| 3     | 0    | .18   | .20   | 2.2   | 2.6      | 180   | 42    | 14     | 2.4   | .24  | 0    | 0     |
| 4     | 0    | .10   | .10   | 1.8   | 2.0      | 200   | 38    | 16     | .78   | .12  | 0    | 0     |
| 5     | 0    | .16   | .10   | 1.4   | 1.6      | 120   | 34    | 15     | 1.8   | .06  | 0    | 0     |
| 6     | 0    | .16   | .10   | 1.4   | 1.2      | 95    | 31    | 14     | 2.4   | 0    | 0    | 0     |
| 7     | 0    | .16   | .10   | 1.6   | 1.0      | 70    | 30    | 13     | 1.3   | 0    | 0    | 0     |
| 8     | 0    | .16   | .10   | 2.0   | .60      | 100   | 32    | 11     | 2.2   | 0    | 0    | 0     |
| 9     | 0    | .16   | .10   | 1.0   | .40      | 200   | 33    | 8.7    | 3.0   | 0    | 0    | 0     |
| 10    | 0    | .18   | .10   | .60   | .30      | 350   | 33    | 5.0    | .96   | 0    | 0    | 0     |
| 11    | 0    | .18   | .10   | .50   | .40      | 400   | 30    | 3.5    | 2.3   | 0    | 0    | 0     |
| 12    | 0    | .18   | .10   | .40   | 1.00     | 350   | 23    | 2.2    | 2.4   | 0    | 0    | 0     |
| 13    | 0    | .16   | .05   | .30   | 4.00     | 250   | 22    | 2.4    | 1.3   | 0    | 0    | 0     |
| 14    | 0    | .14   | .10   | .30   | 0.00     | 200   | 21    | 2.2    | 2.4   | 0    | 0    | 0     |
| 15    | 0    | .14   | .05   | .30   | 7.00     | 150   | 21    | 3.2    | 2.4   | 0    | 0    | 0     |
| 16    | 0    | .16   | .10   | 3.0   | 7.00     | 110   | 14    | 3.0    | 2.7   | 0    | 0    | 0     |
| 17    | 0    | .16   | .10   | 2.3   | 3.80     | 40    | 17    | 2.7    | 1.9   | 0    | 0    | .02   |
| 18    | 0    | .10   | .05   | 2.6   | 3.00     | 75    | 17    | 1.3    | 2.8   | 0    | 0    | .02   |
| 19    | 0    | .02   | .05   | 3.5   | 3.00     | 50    | 15    | .78    | 1.9   | 0    | 0    | .02   |
| 20    | 0    | 0     | 0     | 4.2   | 2.50     | 45    | 14    | 1.1    | 4.4   | 0    | 0    | .02   |
| 21    | 0    | 0     | 0     | 4.5   | 2.40     | 40    | 15    | 3.0    | 1.9   | 0    | 0    | .02   |
| 22    | 0    | 0     | 0     | 3.6   | 2.60     | 40    | 17    | 2.7    | 1.1   | 0    | 0    | .02   |
| 23    | 0    | 0     | 0     | 3.9   | 2.00     | 35    | 16    | 3.8    | .48   | 0    | 0    | .02   |
| 24    | .05  | 0     | 0     | 4.0   | 2.60     | 30    | 15    | 4.4    | .20   | 0    | 0    | .02   |
| 25    | .14  | 0     | 0     | 3.4   | 3.00     | 30    | 13    | 3.0    | .16   | 0    | 0    | .02   |
| 26    | .14  | 0     | 3.2   | 3.2   | 2.60     | 30    | 13    | 1.1    | .14   | 0    | 0    | .02   |
| 27    | .14  | 0     | 2.4   | 3.0   | 2.20     | 34    | 16    | .56    | .36   | 0    | 0    | .02   |
| 28    | .12  | 0     | 2.8   | 2.6   | 1.80     | 36    | 17    | .36    | .43   | 0    | 0    | .02   |
| 29    | .12  | 0     | 3.6   | 4.3   | -----    | 36    | 19    | .20    | 0     | 0    | 0    | 0     |
| 30    | .14  | 0     | 3.4   | 5.0   | -----    | 45    | 16    | .60    | .21   | 0    | .08  | 0     |
| 31    | .14  | ----- | 3.6   | 4.0   | -----    | 62    | ----- | 2.0    | ----- | 0    | .02  | ----- |
| TOTAL | .99  | 2.36  | 21.30 | 78.20 | 5,776.60 | 3,723 | 742   | 173.70 | 67.52 | 1.62 | .10  | .24   |
| MEAN  | .032 | .095  | .69   | 2.52  | 206      | 120   | 24.7  | 5.60   | 2.25  | .052 | .003 | .008  |
| MAX   | .14  | .18   | 3.6   | 5.0   | 7.00     | 400   | 59    | 18     | 1.9   | .96  | .08  | .02   |
| MIN   | 0    | 0     | 0     | .30   | .40      | 30    | 13    | .20    | 0     | 0    | 0    | 0     |
| AC-FT | 2.0  | 5.7   | 42    | 155   | 11,460   | 7,380 | 1,470 | 345    | 134   | 3.2  | .2   | .5    |

CAL YR 1970 TOTAL 19,430.45 MEAN 50.5 MAX 1,750 MIN 0 AC-FT 36,600  
 WTR YR 1971 TOTAL 10,538.13 MEAN 29.0 MAX 700 MIN 0 AC-FT 21,000

PEAK DISCHARGE (BASE, 200 CFS)

| DATE | TIME | G.H.T. | DISCHARGE | DATE | TIME | G.H.T. | DISCHARGE |
|------|------|--------|-----------|------|------|--------|-----------|
| 2-16 | 1700 | a13.12 | b1,000    | 3-11 | 1215 | a8.66  | b700      |
| 2-25 | --   | --     | b350      |      |      |        |           |

a Backwater from ice.  
 b About.

NOTE.--Stage-discharge relation affected by ice Nov. 27 to Mar. 25 (no gage height record Dec. 20 to Jan. 7, Feb. 19-25).

## MUSSELSHELL RIVER BASIN

06130500. Musselshell River at Mosby, Mont.

LOCATION.--Lat 46°59'41", long 107°53'18", in NW1/4 sec.11, T.14 N., R.30 E., Petroleum County, near center of downstream side of bridge on State Highway 20, 0.3 mile west of Mosby, 10.9 miles downstream from Flatwillow Creek, and at mile 60.0.

DRAINAGE AREA.--7,846 sq mi.

PERIOD OF RECORD.--May to November 1929, March 1930 to September 1932, February 1934 to current year. Monthly discharge only for some periods, published in WSP 1309.

GAGE.--Water-stage recorder. Altitude of gage is 2,500 ft (by barometer). May 16, 1929, to Sept. 30, 1932, nonrecording gage at site 0.5 mile upstream at different datum. Feb. 4, 1934, to Mar. 8, 1936, nonrecording gage at present site at datum 1.35 ft higher; Mar. 9, 1936, to Dec. 5, 1962, nonrecording gage at present site and datum. Dec. 6, 1962, to Mar. 14, 1966, water-stage recorder at site 800 ft downstream at datum 1.12 ft lower. Water-stage recorder at present site used periodically during high stages in 1935-44.

AVERAGE DISCHARGE.--39 years (1930-32, 1934-71), 251 cfs (181,800 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 11,600 cfs Feb. 15 (gage height, 13.05 ft; maximum gage height, 14.51 ft Feb. 13 (backwater from ice); minimum daily discharge, 11 cfs Aug. 24, 25.

Period of record: Maximum discharge, 18,000 cfs June 18, 1944 (gage height, 14.43 ft), from rating curve extended above 10,000 cfs; no flow at times.

REMARKS.--Records good except those for winter period, which are poor. Some regulation by Bair, Martinsdale, and Deadman's Basin Reservoirs (see p. 183-184). Diversions for irrigation of about 103,000 acres above station.

REVISIONS (WATER YEARS).--WSP 1559: 1935-36. WSP 1729: Drainage area.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT                                                    | NOV   | DEC   | JAN   | FEB     | MAR    | APR    | MAY    | JUN    | JUL   | AUG   | SEP    |
|-------------|--------------------------------------------------------|-------|-------|-------|---------|--------|--------|--------|--------|-------|-------|--------|
| 1           | 106                                                    | 88    | 96    | 78    | 70      | 558    | 570    | 682    | 136    | 505   | 46    | 150    |
| 2           | 92                                                     | 88    | 102   | 72    | 68      | 462    | 566    | 602    | 419    | 558   | 67    | 185    |
| 3           | 85                                                     | 81    | 90    | 65    | 60      | 518    | 510    | 542    | 606    | 476   | 75    | 210    |
| 4           | 81                                                     | 75    | 95    | 56    | 56      | 534    | 610    | 518    | 522    | 378   | 89    | 296    |
| 5           | 78                                                     | 76    | 86    | 48    | 52      | 546    | 546    | 487    | 452    | 282   | 84    | 299    |
| 6           | 80                                                     | 83    | 94    | 44    | 48      | 582    | 490    | 490    | 381    | 246   | 83    | 282    |
| 7           | 85                                                     | 78    | 109   | 50    | 42      | 518    | 455    | 534    | 357    | 206   | 89    | 274    |
| 8           | 81                                                     | 78    | 100   | 55    | 35      | 590    | 473    | 626    | 322    | 168   | 88    | 260    |
| 9           | 81                                                     | 83    | 92    | 48    | 60      | 690    | 462    | 726    | 314    | 147   | 84    | 260    |
| 10          | 93                                                     | 95    | 89    | 40    | 90      | 980    | 473    | 758    | 313    | 118   | 81    | 263    |
| 11          | 99                                                     | 97    | 98    | 37    | 200     | 1,120  | 570    | 744    | 310    | 105   | 81    | 233    |
| 12          | 99                                                     | 95    | 97    | 30    | 800     | 1,120  | 690    | 722    | 319    | 70    | 73    | 201    |
| 13          | 110                                                    | 93    | 94    | 24    | 2,500   | 1,100  | 690    | 717    | 345    | 44    | 66    | 203    |
| 14          | 113                                                    | 92    | 90    | 20    | 10,000  | 1,040  | 682    | 695    | 420    | 45    | 51    | 201    |
| 15          | 113                                                    | 92    | 98    | 34    | 10,700  | 975    | 626    | 670    | 381    | 43    | 41    | 181    |
| 16          | 110                                                    | 92    | 92    | 50    | 7,620   | 855    | 558    | 638    | 357    | 37    | 34    | 172    |
| 17          | 110                                                    | 90    | 89    | 67    | 4,450   | 690    | 522    | 662    | 327    | 34    | 31    | 168    |
| 18          | 106                                                    | 90    | 82    | 60    | 3,180   | 538    | 514    | 726    | 263    | 24    | 24    | 166    |
| 19          | 108                                                    | 90    | 72    | 80    | 2,110   | 469    | 441    | 682    | 253    | 21    | 34    | 168    |
| 20          | 108                                                    | 88    | 62    | 95    | 1,610   | 452    | 431    | 634    | 185    | 19    | 37    | 172    |
| 21          | 106                                                    | 90    | 50    | 90    | 1,130   | 594    | 441    | 566    | 147    | 17    | 32    | 174    |
| 22          | 113                                                    | 90    | 45    | 84    | 1,010   | 502    | 445    | 514    | 131    | 21    | 23    | 172    |
| 23          | 106                                                    | 89    | 40    | 90    | 936     | 414    | 455    | 431    | 116    | 24    | 14    | 170    |
| 24          | 99                                                     | 95    | 37    | 88    | 964     | 387    | 455    | 372    | 108    | 27    | 11    | 160    |
| 25          | 99                                                     | 100   | 65    | 82    | 1,560   | 420    | 473    | 357    | 102    | 23    | 11    | 158    |
| 26          | 95                                                     | 90    | 74    | 72    | 1,060   | 462    | 518    | 316    | 78     | 21    | 15    | 158    |
| 27          | 93                                                     | 86    | 72    | 80    | 870     | 510    | 590    | 263    | 72     | 15    | 29    | 158    |
| 28          | 92                                                     | 85    | 72    | 90    | 690     | 646    | 586    | 208    | 91     | 13    | 32    | 158    |
| 29          | 90                                                     | 106   | 78    | 105   | -----   | 530    | 590    | 170    | 97     | 39    | 33    | 131    |
| 30          | 87                                                     | 101   | 74    | 97    | -----   | 487    | 722    | 152    | 171    | 34    | 80    | 116    |
| 31          | 87                                                     | ----- | 90    | 82    | -----   | 510    | -----  | 138    | -----  | 43    | 187   | -----  |
| TOTAL       | 3,005                                                  | 2,676 | 2,524 | 2,013 | 52,021  | 19,799 | 16,354 | 16,342 | 8,095  | 3,803 | 1,725 | 5,899  |
| MEAN        | 96.9                                                   | 89.2  | 81.4  | 64.9  | 1,958   | 639    | 545    | 527    | 270    | 123   | 55.6  | 197    |
| MAX         | 113                                                    | 106   | 109   | 105   | 10,700  | 1,120  | 722    | 758    | 606    | 558   | 187   | 299    |
| MIN         | 78                                                     | 75    | 37    | 20    | 35      | 387    | 431    | 138    | 72     | 13    | 11    | 116    |
| AC-FT       | 5,960                                                  | 5,310 | 5,010 | 3,990 | 103,200 | 39,270 | 32,440 | 32,410 | 16,060 | 7,540 | 3,420 | 11,700 |
| CAL YR 1970 | TOTAL 174,325 MEAN 478 MAX 4,440 MIN 25 AC-FT 345,800  |       |       |       |         |        |        |        |        |       |       |        |
| WTR YR 1971 | TOTAL 134,256 MEAN 368 MAX 10,700 MIN 11 AC-FT 266,300 |       |       |       |         |        |        |        |        |       |       |        |

NOTE.--Stage-discharge relation affected by ice Nov. 21 to Feb. 13 (no gage height record Jan. 30 to Feb. 1).

## BIG DRY CREEK BASIN

79

06131000 Big Dry Creek near Van Norman, Mont.

LOCATION.--Lat 47°20'57", long 106°21'33", in NW 1/4 SE 1/4 NW 1/4 sec.3, T.18 N., R.42 E., Garfield County, on left bank 500 ft downstream from Little Dry Creek, 3.2 miles northeast of Van Norman Post Office, and 26 miles east of Jordan.

DRAINAGE AREA.--2,554 sq mi.

PERIOD OF RECORD.--October 1939 to July 1969, July 1970 to current year (discharge measurements only, October 1947 to March 1949). Prior to July 1970, published as "Dry Creek near Van Norman".

GAGE.--Water-stage recorder. Altitude of gage is 2,330 ft (by barometer).

AVERAGE DISCHARGE.--28 years (1939-47, 1949-68, 1970-71), 54.2 cfs (39,270 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 3,980 cfs Mar. 12 (gage height, 5.49 ft); no flow at times.

Period of record: Maximum discharge, 24,600 cfs Mar. 21, 1947 (gage height, 13.39 ft); maximum gage height, 15.26 ft Mar. 21, 1947 (ice jam); no flow at times each year.

REMARKS.--Records fair except those for winter period, which are poor. Few small diversions for irrigation of hay meadows above station.

REVISIONS (WATER YEARS).--WSP 1309: 1947(M). WSP 1559: 1944(M), 1947. WSP 1729: Drainage area.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY                                                               | OCT   | NOV   | DEC   | JAN | FEB    | MAR    | APR   | MAY   | JUN   | JUL   | AUG  | SEP   |
|-------------------------------------------------------------------|-------|-------|-------|-----|--------|--------|-------|-------|-------|-------|------|-------|
| 1                                                                 | 3.2   | 3.7   | 3.1   |     | 0      | 200    | 223   | 24    | 13    | 5.1   | .50  | 0     |
| 2                                                                 | 3.1   | 4.3   | 2.9   |     | 0      | 170    | 163   | 22    | 12    | 3.7   | .50  | 0     |
| 3                                                                 | 3.1   | 4.3   | 2.7   |     | 0      | 160    | 151   | 20    | 13    | 3.4   | .40  | 0     |
| 4                                                                 | 2.9   | 4.3   | 2.5   |     | 0      | 350    | 140   | 18    | 12    | 3.7   | .40  | 0     |
| 5                                                                 | 2.9   | 4.3   | 2.2   |     | 0      | 300    | 110   | 17    | 9.8   | 3.4   | .40  | 0     |
| 6                                                                 | 3.7   | 3.9   | 2.0   |     | 0      | 250    | 95    | 16    | 8.9   | 2.6   | .30  | 0     |
| 7                                                                 | 4.5   | 3.7   | 1.9   |     | 0      | 200    | 97    | 15    | 11    | 2.4   | .30  | 0     |
| 8                                                                 | 3.7   | 3.5   | 2.0   |     | 0      | 250    | 75    | 15    | 12    | 2.3   | .30  | 0     |
| 9                                                                 | 3.5   | 3.5   | 2.0   |     | 0      | 300    | 72    | 13    | 13    | 2.2   | .20  | 0     |
| 10                                                                | 3.4   | 3.7   | 1.8   |     | 0      | 400    | 65    | 13    | 10    | 1.7   | .20  | 0     |
| 11                                                                | 3.4   | 3.7   | 1.5   |     | 100    | 2,000  | 52    | 12    | 15    | 1.4   | .20  | 0     |
| 12                                                                | 3.4   | 3.7   | 1.6   |     | 120    | 3,600  | 56    | 11    | 3.1   | 1.7   | .10  | 0     |
| 13                                                                | 3.4   | 3.7   | 1.5   |     | 200    | 3,120  | 51    | 10    | 7.7   | 1.4   | .10  | 0     |
| 14                                                                | 3.5   | 3.7   | 1.5   |     | 600    | 2,100  | 47    | 9.3   | 3.1   | 1.0   | .10  | 0     |
| 15                                                                | 3.5   | 3.7   | 1.5   |     | 1,500  | 1,050  | 46    | 9.9   | 7.7   | 1.0   | 0    | 0     |
| 16                                                                | 3.5   | 3.7   | 1.4   |     | 2,500  | 753    | 46    | 8.5   | 3.5   | .90   | 0    | 0     |
| 17                                                                | 3.4   | 3.5   | 1.2   |     | 2,200  | 520    | 43    | 9.5   | 9.3   | .80   | 0    | 0     |
| 18                                                                | 3.4   | 3.7   | 1.0   |     | 1,800  | 410    | 35    | 10    | 17    | .80   | 0    | 0     |
| 19                                                                | 3.4   | 3.7   | .80   |     | 1,400  | 272    | 34    | 9.8   | 23    | .70   | 0    | 0     |
| 20                                                                | 3.4   | 3.5   | .60   |     | 700    | 432    | 35    | 9.8   | 11    | .70   | 0    | 25    |
| 21                                                                | 3.2   | 3.3   | .40   |     | 200    | 573    | 45    | 12    | 9.1   | .50   | 0    | 7.0   |
| 22                                                                | 3.2   | 3.1   | .20   |     | 130    | 272    | 41    | 13    | 7.0   | .70   | 0    | 3.7   |
| 23                                                                | 3.2   | 2.2   | .10   |     | 200    | 264    | 32    | 12    | 7.0   | .70   | 0    | 2.9   |
| 24                                                                | 3.2   | 2.1   | 0     |     | 250    | 260    | 35    | 12    | 9.1   | .50   | 0    | 2.7   |
| 25                                                                | 3.2   | 3.4   | 0     |     | 700    | 339    | 38    | 11    | 5.6   | .70   | 0    | 2.5   |
| 26                                                                | 3.2   | 3.2   | 0     |     | 600    | 248    | 34    | 8.9   | 6.2   | .50   | 0    | 2.3   |
| 27                                                                | 3.4   | 3.0   | 0     |     | 300    | 572    | 32    | 8.1   | 8.8   | .50   | 0    | 2.1   |
| 28                                                                | 3.4   | 2.9   | 0     |     | 220    | 750    | 29    | 7.7   | 7.4   | .50   | 0    | 1.9   |
| 29                                                                | 3.4   | 2.3   | 0     |     | -----  | 560    | 28    | 7.4   | 7.7   | .50   | 0    | 1.7   |
| 30                                                                | 3.4   | 3.2   | 0     |     | -----  | 410    | 26    | 12    | 6.2   | .50   | 0    | 1.5   |
| 31                                                                | 3.5   | ----- | 0     |     | -----  | 321    | ----- | 15    | ----- | .50   | 0    | ----- |
| TOTAL                                                             | 104.4 | 106.4 | 36.50 | 0   | 13,920 | 21,726 | 1,984 | 389.9 | 303.2 | 47.00 | 4.00 | 53.3  |
| MEAN                                                              | 3.37  | 3.55  | 1.18  | 0   | 454    | 701    | 65.1  | 12.6  | 10.1  | 1.52  | .13  | 1.78  |
| MAX                                                               | 4.5   | 4.3   | 3.1   | 0   | 2,500  | 3,600  | 223   | 24    | 23    | 5.1   | .50  | 25    |
| MIN                                                               | 2.9   | 2.3   | 0     | 0   | 0      | 160    | 25    | 7.4   | 6.2   | .50   | 0    | 0     |
| AC-FT                                                             | 207   | 211   | 72    | 0   | 27,410 | 43,090 | 3,940 | 773   | 601   | 93    | 7.9  | 106   |
| WTR YR 1971 TOTAL 39,574.70 MEAN 106 MAX 3,600 MIN 0 AC-FT 76,510 |       |       |       |     |        |        |       |       |       |       |      |       |

## PEAK DISCHARGE (BASE, 400 CFS)

| DATE | TIME | G.H.T. | DISCHARGE | DATE | TIME | G.H.T. | DISCHARGE |
|------|------|--------|-----------|------|------|--------|-----------|
| 2-11 | --   | --     | 2,700     | 3-21 | 0230 | 3.33   | 907       |
| 3-12 | 0230 | 5.49   | 3,980     | 3-27 | 2400 | 3.47   | 1,030     |

NOTE.--Stage-discharge relation affected by ice Nov. 20 to Mar. 11 (no gage height record Dec. 25 to Feb. 21).

## MISSOURI RIVER MAIN STEM

06131500 Fort Peck Lake at Fort Peck, Mont.  
(Formerly published as Fort Peck Reservoir at Fort Peck, Mont.)

LOCATION.--Lat 48°00'26", long 106°23'49", in sec.14, T.26 N., R.41 E., McCone County, in No. 4 emergency gate shaft of dam on Missouri River at Fort Peck, 2 miles downstream from Bear Creek, 9.5 miles southwest of Nashua, 9.5 miles upstream from Milk River, and at mile 1,771.6.

DRAINAGE AREA.--57,500 sq mi.

PERIOD OF RECORD.--October 1937 to current year (monthend contents only). Monthend contents for October 1937 to August 1938, published only in WSP 1309. Daily elevations and contents for May to June 1964, published in WSP 1840-B.

GAGE.--Water-stage recorder. Datum of gage is at mean sea level. Prior to May 1, 1941, nonrecording gage at same site and datum.

EXTREMES.--Current year: Maximum contents, 17,770,000 acre-ft July 16 (elevation, 2,244.3 ft); minimum, 16,170,000 acre-ft Feb. 10-14 (elevation, 2,237.3 ft).

Period of record: Maximum contents, 18,480,000 acre-ft July 9-14, 1970 (elevation, 2,247.3 ft); minimum since first filling, 5,061,000 acre-ft (5,282,000 acre-ft by capacity table used prior to Jan. 1, 1965) Jan. 25, 26, 1956 (elevation, 2,167.36 ft).

REMARKS.--Reservoir is formed by earthfill dam completed in 1939; storage began in 1937. The following capacity figures are from capacity table effective Jan. 1, 1965; see previous reports for superseded figures. Total capacity, 19,140,000 acre-ft between elevation 2,095 ft (invert of lower ring gates) and 2,250 ft (top of 25-ft gates). Elevation of spillway crest, 2,225 ft. Normal operating level, 18,170,000 acre-ft (elevation, 2,246 ft). Dead storage, 563,900 acre-ft below elevation 2,095 ft. Minimum operating level, 4,346,000 acre-ft, elevation 2,160 ft, for on-site power generation. Figures given herein represent total contents. Usable contents published in previous water-supply papers for October 1950 to September 1955. Water is used for navigation, recreation, flood control and power generation. Elevations materially affected by wind.

COOPERATION.--Elevations and capacity table furnished by Corps of Engineers.

REVISIONS.--WSP 1729: Drainage area.

## MONTHEND ELEVATION AND CONTENTS, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| Date                  | Elevation<br>(feet) | Contents<br>(acre-feet) | Change in contents<br>(acre-feet) |
|-----------------------|---------------------|-------------------------|-----------------------------------|
| Sept. 30 . . . . .    | 2,243.6             | 17,600,000              | -                                 |
| Oct. 31 . . . . .     | 2,242.0             | 17,230,000              | -370,000                          |
| Nov. 30 . . . . .     | 2,240.4             | 16,860,000              | -370,000                          |
| Dec. 31 . . . . .     | 2,239.2             | 16,590,000              | -270,000                          |
| CAL YR 1970 . . . . . |                     |                         | -70,000                           |
| Jan. 31 . . . . .     | 2,237.8             | 16,280,000              | -310,000                          |
| Feb. 28 . . . . .     | 2,238.0             | 16,320,000              | +40,000                           |
| Mar. 31 . . . . .     | 2,239.2             | 16,590,000              | +270,000                          |
| Apr. 30 . . . . .     | 2,239.5             | 16,660,000              | +70,000                           |
| May 31 . . . . .      | 2,241.8             | 17,180,000              | +520,000                          |
| June 30 . . . . .     | 2,243.5             | 17,580,000              | +400,000                          |
| July 31 . . . . .     | 2,243.6             | 17,600,000              | +20,000                           |
| Aug. 31 . . . . .     | 2,242.4             | 17,320,000              | -280,000                          |
| Sept. 30 . . . . .    | 2,241.5             | 17,110,000              | -210,000                          |
| WTR YR 1971 . . . . . |                     |                         | -490,000                          |



## MISSOURI RIVER MAIN STEM

81

06132000 Missouri River below Fort Peck Dam, Mont.

LOCATION.--Lat 48°02'39", long 106°21'21", in NW¼ sec.6, T.26 N., R.42 E., McCone County, on right bank 2 miles upstream from Milk River, 6 miles south of Nashua, 8 miles downstream from Fort Peck Dam, and at mile 1,763.5.

DRAINAGE AREA.--57,556 sq mi.

PERIOD OF RECORD.--March 1934 to current year.

GAGE.--Water-stage recorder. Datum of gage is 2,018.00 ft above mean sea level (Corps of Engineers bench mark). Prior to Apr. 14, 1938, at site 0.7 mile upstream at different datum; Apr. 14, 1938, to Sept. 30, 1963, at present site at datum 2.00 ft higher, all water-stage recorders. Since Oct. 1, 1969, published discharge is determined by flowmeters at Fort Peck Dam.

AVERAGE DISCHARGE.--5 years (1934-39, prior to Fort Peck Lake reaching operational level), 6,347 cfs (4,598,000 acre-ft per year); 28 years (1943-71, after operational level in Fort Peck Lake was reached), 9,512 cfs (6,891,000 acre-ft per year).

EXTREMES.--Current year: Maximum daily discharge, 15,300 cfs Feb. 16, 18; minimum daily discharge, 7,900 cfs Sept. 5.

Period of record: Maximum discharge, 51,000 cfs (includes 32,000 cfs inflow from spillway 1 mile downstream from station), Aug. 8, 1946; maximum gage height observed, 12.30 ft Mar. 10, 1936 (ice jam), site and datum then in use; maximum daily reverse flow, 400 cfs Mar. 29, 1943 (backwater from Milk River).

REMARKS.--Records good. Flow completely regulated by Fort Peck Lake (see preceding page). Diversions for irrigation of about 880,400 acres above station.

COOPERATION.--Records since Oct. 1, 1969 furnished by Corps of Engineers; 4 discharge measurements made and records reviewed by Geological Survey. Records for March 1934 to September 1969 collected and computed by Geological Survey.

REVISIONS.--WSP 1729: Drainage area.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT             | NOV     | DEC     | JAN         | FEB     | MAR        | APR     | MAY       | JUN     | JUL             | AUG     | SEP     |
|-------------|-----------------|---------|---------|-------------|---------|------------|---------|-----------|---------|-----------------|---------|---------|
| 1           | 14,600          | 14,500  | 9,800   | 13,700      | 15,000  | 15,100     | 10,000  | 14,200    | 14,600  | 10,000          | 12,300  | 10,200  |
| 2           | 14,600          | 14,700  | 9,700   | 13,900      | 15,000  | 15,100     | 10,000  | 14,700    | 14,600  | 10,000          | 12,300  | 10,300  |
| 3           | 14,700          | 14,700  | 9,700   | 11,500      | 15,000  | 14,900     | 9,600   | 14,000    | 14,000  | 10,200          | 12,200  | 10,200  |
| 4           | 14,400          | 14,700  | 9,700   | 11,900      | 14,900  | 14,900     | 9,600   | 13,300    | 14,600  | 10,200          | 12,100  | 10,100  |
| 5           | 11,700          | 14,400  | 9,800   | 12,100      | 14,900  | 15,200     | 9,700   | 13,300    | 14,700  | 10,000          | 12,400  | 7,900   |
| 6           | 10,600          | 14,700  | 9,900   | 11,700      | 14,900  | 15,200     | 12,000  | 14,700    | 14,700  | 10,200          | 12,200  | 9,100   |
| 7           | 10,100          | 14,300  | 10,100  | 12,500      | 15,000  | 15,200     | 12,100  | 14,900    | 14,700  | 10,300          | 12,100  | 10,300  |
| 8           | 8,500           | 14,700  | 9,500   | 12,500      | 15,000  | 15,200     | 13,000  | 14,900    | 14,600  | 10,300          | 12,100  | 10,100  |
| 9           | 8,800           | 14,100  | 9,800   | 13,000      | 14,900  | 15,100     | 13,300  | 14,900    | 14,300  | 10,100          | 12,600  | 10,000  |
| 10          | 11,900          | 14,200  | 10,900  | 13,000      | 15,000  | 15,200     | 14,100  | 14,900    | 12,400  | 9,900           | 12,000  | 10,300  |
| 11          | 14,600          | 14,300  | 11,900  | 13,500      | 15,000  | 15,100     | 13,700  | 14,900    | 12,500  | 10,100          | 12,300  | 10,100  |
| 12          | 14,500          | 14,500  | 11,800  | 13,900      | 15,000  | 10,300     | 10,800  | 14,800    | 12,500  | 9,900           | 12,300  | 9,400   |
| 13          | 14,600          | 14,100  | 11,800  | 14,100      | 15,000  | 10,200     | 11,800  | 14,800    | 12,700  | 10,200          | 12,300  | 9,900   |
| 14          | 13,800          | 14,800  | 11,900  | 14,200      | 15,000  | 10,400     | 14,200  | 14,800    | 12,500  | 10,300          | 12,300  | 9,900   |
| 15          | 14,600          | 14,700  | 13,100  | 14,300      | 15,200  | 10,400     | 9,900   | 14,800    | 12,500  | 10,300          | 12,300  | 10,100  |
| 16          | 14,400          | 14,700  | 13,400  | 14,900      | 15,300  | 9,700      | 14,700  | 14,800    | 12,800  | 12,500          | 10,000  | 9,900   |
| 17          | 14,800          | 14,800  | 13,800  | 15,000      | 14,800  | 10,300     | 14,700  | 14,600    | 12,800  | 12,600          | 10,100  | 10,200  |
| 18          | 14,800          | 14,800  | 13,500  | 15,000      | 15,300  | 9,600      | 14,400  | 14,800    | 12,600  | 11,700          | 10,300  | 9,200   |
| 19          | 14,800          | 14,700  | 11,900  | 14,900      | 15,200  | 9,800      | 14,900  | 14,700    | 12,900  | 12,600          | 10,200  | 8,900   |
| 20          | 14,000          | 14,700  | 9,500   | 14,900      | 15,100  | 9,800      | 14,700  | 11,700    | 12,500  | 11,700          | 10,800  | 9,100   |
| 21          | 12,600          | 14,900  | 9,600   | 14,900      | 14,800  | 9,800      | 13,900  | 14,600    | 12,600  | 12,000          | 10,000  | 9,100   |
| 22          | 12,800          | 15,000  | 9,700   | 14,900      | 15,200  | 9,900      | 14,700  | 14,500    | 12,600  | 12,300          | 9,900   | 9,000   |
| 23          | 14,700          | 11,900  | 10,000  | 14,900      | 14,800  | 9,900      | 14,800  | 14,600    | 12,400  | 11,900          | 11,300  | 9,000   |
| 24          | 14,100          | 10,200  | 10,100  | 14,800      | 15,100  | 9,700      | 14,400  | 14,700    | 13,100  | 12,200          | 10,900  | 9,000   |
| 25          | 14,500          | 10,100  | 10,500  | 14,900      | 14,500  | 9,700      | 14,600  | 14,700    | 11,200  | 12,200          | 11,200  | 9,000   |
| 26          | 14,700          | 10,000  | 10,800  | 14,900      | 15,100  | 10,000     | 14,900  | 14,600    | 9,600   | 12,100          | 11,200  | 9,100   |
| 27          | 14,700          | 10,300  | 11,300  | 14,900      | 15,000  | 9,700      | 13,400  | 14,400    | 9,700   | 12,400          | 11,100  | 9,400   |
| 28          | 14,800          | 10,200  | 12,300  | 15,000      | 15,100  | 9,600      | 14,700  | 14,600    | 9,300   | 12,300          | 11,000  | 9,200   |
| 29          | 14,600          | 10,200  | 12,400  | 14,900      | -----   | 9,800      | 14,400  | 14,700    | 10,300  | 12,300          | 10,100  | 8,900   |
| 30          | 14,500          | 10,200  | 13,000  | 15,000      | -----   | 9,900      | 14,600  | 14,600    | 10,900  | 12,500          | 10,100  | 9,000   |
| 31          | 14,800          | -----   | 13,500  | 14,700      | -----   | 9,800      | -----   | 14,700    | -----   | 12,100          | 10,100  | -----   |
| TOTAL       | 421,600         | 404,100 | 344,400 | 434,300     | 420,100 | 364,500    | 391,600 | 449,200   | 381,200 | 347,400         | 352,100 | 285,900 |
| MEAN        | 13,600          | 13,470  | 11,110  | 14,010      | 15,000  | 11,760     | 13,050  | 14,490    | 12,710  | 11,210          | 11,360  | 9,530   |
| MAX         | 14,800          | 15,000  | 13,800  | 15,000      | 15,300  | 15,200     | 14,900  | 14,900    | 14,700  | 12,600          | 12,600  | 10,300  |
| MIN         | 8,500           | 10,000  | 9,500   | 11,500      | 14,500  | 9,600      | 9,600   | 11,700    | 9,300   | 9,900           | 9,900   | 7,900   |
| AC-FT       | 836,200         | 801,500 | 683,100 | 861,400     | 833,300 | 723,000    | 776,700 | 891,000   | 756,100 | 689,100         | 698,400 | 567,100 |
| CAL YR 1970 | TOTAL 4,588,300 |         |         | MEAN 12,570 |         | MAX 15,300 |         | MIN 2,800 |         | AC-FT 9,101,000 |         |         |
| WTR YR 1971 | TOTAL 4,596,400 |         |         | MEAN 12,590 |         | MAX 15,300 |         | MIN 7,900 |         | AC-FT 9,117,000 |         |         |

## MILK RIVER BASIN

06132200 South Fork Milk River near Babb, Mont.

(International gaging station)

LOCATION.--Lat 48°45'14", long 113°10'00", in NE1/4NW1/4 sec. 34, T.35 N., R.12 W., Glacier County, on right bank 300 ft upstream from bridge on FAS 464 ("Duck Lake Road"), 14.4 miles southeast of Babb, and 15.2 miles northwest of Browning.

DRAINAGE AREA.--68.6 sq mi.

PERIOD OF RECORD.--May 1961 to current season (seasonal records only).

GAGE.--Water-stage recorder. Datum of gage is 4,731.6 ft above mean sea level.

EXTREMES.--Current season: Maximum discharge, 311 cfs May 6 (gage height, 4.21 ft); maximum gage height, 4.85 ft Apr. 8 (backwater from ice); minimum daily discharge, 6.0 cfs Mar. 23.

Period of record: Maximum discharge, 12,000 cfs June 8, 1964 (gage height, 6.61 ft), from rating curve extended above 400 cfs on basis of slope-area measurement of peak flow at site 3 miles downstream; minimum, 1.3 cfs Aug. 22, 1961.

REMARKS.--Records fair except those for winter period, which are poor. Several small diversions for irrigation above station.

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

## DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR 1971

| DAY   | JAN | FEB   | MAR   | APR   | MAY    | JUN   | JUL   | AUG   | SEP   | OCT   | NOV   | DEC |
|-------|-----|-------|-------|-------|--------|-------|-------|-------|-------|-------|-------|-----|
| 1     |     | -     | 8.0   | 25    | 143    | 236   | 80    | 29    | 25    | 16    | 18    |     |
| 2     |     | -     | 9.0   | 22    | 160    | 176   | 72    | 27    | 17    | 15    |       |     |
| 3     |     | -     | 11    | 20    | 195    | 151   | 66    | 25    | 15    | 14    |       |     |
| 4     |     | -     | 11    | 20    | 239    | 151   | 61    | 24    | 14    | 13    |       |     |
| 5     |     | -     | 10    | 45    | 252    | 149   | 57    | 22    | 13    | 13    |       |     |
| 6     |     | -     | 9.0   | 55    | 305    | 153   | 56    | 22    | 11    | 13    |       |     |
| 7     |     | -     | 9.0   | 75    | 246    | 160   | 59    | 23    | 10    | 13    |       |     |
| 8     |     | -     | 10    | 90    | 213    | 142   | 55    | 23    | 9.5   | 13    |       |     |
| 9     |     | -     | 12    | 90    | 216    | 136   | 51    | 22    | 9.4   | 13    |       |     |
| 10    |     | -     | 13    | 80    | 181    | 125   | 56    | 19    | 9.7   | 13    |       |     |
| 11    |     | -     | 14    | 75    | 169    | 116   | 61    | 19    | 9.1   | 12    |       |     |
| 12    |     | -     | 13    | 70    | 172    | 110   | 49    | 17    | 8.7   | 12    |       |     |
| 13    |     | -     | 12    | 95    | 176    | 108   | 46    | 16    | 9.1   | 12    |       |     |
| 14    |     | -     | 11    | 123   | 160    | 114   | 43    | 16    | 8.7   | 36    |       |     |
| 15    |     | -     | 11    | 157   | 140    | 114   | 41    | 14    | 9.0   | 32    |       |     |
| 16    |     | -     | 11    | 122   | 147    | 100   | 38    | 13    | 13    | 25    |       |     |
| 17    |     | -     | 12    | 88    | 160    | 94    | 36    | 13    | 18    | 22    |       |     |
| 18    |     | -     | 12    | 69    | 191    | 91    | 35    | 13    | 17    | 23    |       |     |
| 19    |     | -     | 12    | 69    | 156    | 92    | 35    | 13    | 16    | 21    |       |     |
| 20    |     | -     | 14    | 104   | 133    | 88    | 32    | 14    | 23    | 25    |       |     |
| 21    |     | -     | 12    | 151   | 125    | 85    | 33    | 12    | 26    | 27    |       |     |
| 22    |     | -     | 8.0   | 174   | 110    | 81    | 32    | 11    | 28    | 21    |       |     |
| 23    |     | 21    | 6.0   | 198   | 104    | 82    | 32    | 12    | 28    | 19    |       |     |
| 24    |     | 19    | 8.0   | 216   | 102    | 81    | 28    | 12    | 22    | 19    |       |     |
| 25    |     | 16    | 10    | 221   | 106    | 79    | 31    | 11    | 18    | 18    |       |     |
| 26    |     | 13    | 10    | 138   | 112    | 76    | 30    | 10    | 17    | 19    |       |     |
| 27    |     | 12    | 12    | 98    | 121    | 74    | 29    | 9.7   | 16    | 17    |       |     |
| 28    |     | 10    | 15    | 102   | 136    | 78    | 64    | 9.5   | 15    | 16    |       |     |
| 29    |     | ----- | 17    | 149   | 131    | 135   | 62    | 10    | 15    | 15    |       |     |
| 30    |     | ----- | 26    | 140   | 147    | 113   | 39    | 20    | 16    | 16    |       |     |
| 31    |     | ----- | 27    | ----- | 254    | ----- | 32    | 48    | ----- | 17    | ----- |     |
| TOTAL |     | -     | 375.0 | 3,081 | 5,202  | 3,490 | 1,441 | 549.2 | 466.2 | 560   |       |     |
| MEAN  |     | -     | 12.1  | 103   | 168    | 116   | 46.5  | 17.7  | 15.5  | 18.1  |       |     |
| MAX   |     | -     | 27    | 221   | 305    | 236   | 80    | 48    | 28    | 36    |       |     |
| MIN   |     | -     | 6.0   | 20    | 102    | 74    | 28    | 9.5   | 8.7   | 12    |       |     |
| AC-FT |     | -     | 744   | 6,110 | 10,320 | 6,920 | 2,860 | 1,090 | 925   | 1,110 |       |     |

THE SEASON MARCH TO OCTOBER

AC-FT 30,080

## PEAK DISCHARGE (BASE, 120 CFS)

| DATE | TIME | G.HT. | DISCHARGE | DATE | TIME | G.HT. | DISCHARGE |
|------|------|-------|-----------|------|------|-------|-----------|
| 4-15 | 0100 | 3.68  | 165       | 5-31 | 1830 | 4.08  | 293       |
| 4-25 | 0245 | 4.06  | 257       | 6-29 | 1545 | 3.54  | 160       |
| 5-6  | 1715 | 4.21  | 311       |      |      |       |           |

NOTE.--Stage-discharge relation affected by ice Feb. 23 to Apr. 13 (no gage-height record Mar. 1-15, 17-19, 22-28).

## 06133000 Milk River at western crossing of international boundary

(International gaging station)

LOCATION.--Lat 49°00'27", long 112°32'42", in NE $\frac{1}{4}$  sec.1, T.1, R.20 W., fourth meridian, in Alberta on left bank 0.8 mile north of international boundary, 22 miles upstream from North Milk River, 23 miles southwest of Milk River, Alberta, and at mile 680.4.

DRAINAGE AREA.--397 sq mi.

PERIOD OF RECORD.--March 1931 to current season (seasonal records only). Prior to October 1961, published as South Fork Milk River near international boundary.

GAGE.--Water-stage recorder. Altitude of gage is 3,820 ft (from topographic map). Prior to Aug. 9, 1948, and Aug. 9, 1948, to Oct. 31, 1958, water-stage recorders at sites 0.4 and 0.5 mile downstream, respectively, at different datums.

EXTREMES.--Current season: Maximum discharge, 702 cfs May 7 (gage height, 4.64 ft); maximum gage height recorded, 6.29 ft Feb. 21 (backwater from ice); minimum discharge, 3.6 cfs Aug. 22 (gage height, 2.05 ft).

Period of record: Maximum discharge, 7,930 cfs June 9, 1964 (gage height, 9.77 ft); no flow at times.

REMARKS.--Records good except those for winter period, which are poor. Several small diversions for irrigation above station.

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

REVISIONS (WATER YEARS).--WSP 1389: 1934(M), 1935, 1936(M), 1937, 1942(M), 1947-48(M). WSP 1729: Drainage area.

## DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR 1971

| DAY   | JAN | FEB   | MAR   | APR    | MAY    | JUN    | JUL   | AUG   | SEP   | OCT   | NOV   | DEC |
|-------|-----|-------|-------|--------|--------|--------|-------|-------|-------|-------|-------|-----|
| 1     |     | -     | 80    | 500    | 270    | 459    | 187   | 42    | 5.5   | 19    | 30    |     |
| 2     |     | -     | 77    | 451    | 269    | 457    | 123   | 31    | 15    | 19    |       |     |
| 3     |     | -     | 74    | 442    | 304    | 326    | 96    | 25    | 21    | 18    |       |     |
| 4     |     | -     | 71    | 442    | 373    | 255    | 82    | 21    | 16    | 18    |       |     |
| 5     |     | -     | 69    | 442    | 434    | 248    | 73    | 18    | 12    | 16    |       |     |
| 6     |     | -     | 68    | 456    | 484    | 308    | 67    | 15    | 11    | 15    |       |     |
| 7     |     | -     | 65    | 480    | 651    | 354    | 66    | 14    | 9.5   | 15    |       |     |
| 8     |     | -     | 63    | 465    | 498    | 313    | 66    | 13    | 8.4   | 15    |       |     |
| 9     |     | -     | 60    | 438    | 400    | 238    | 65    | 12    | 7.7   | 15    |       |     |
| 10    |     | -     | 58    | 460    | 411    | 205    | 66    | 12    | 7.2   | 15    |       |     |
| 11    |     | -     | 56    | 445    | 322    | 184    | 66    | 12    | 6.5   | 15    |       |     |
| 12    |     | -     | 54    | 316    | 294    | 168    | 73    | 11    | 5.9   | 15    |       |     |
| 13    |     | -     | 52    | 231    | 296    | 158    | 68    | 9.7   | 5.2   | 15    |       |     |
| 14    |     | -     | 50    | 202    | 302    | 152    | 56    | 8.4   | 4.4   | 16    |       |     |
| 15    |     | -     | 48    | 254    | 266    | 149    | 47    | 7.5   | 4.2   | 17    |       |     |
| 16    |     | -     | 47    | 310    | 247    | 152    | 41    | 6.4   | 4.9   | 28    |       |     |
| 17    |     | -     | 45    | 245    | 292    | 137    | 36    | 5.8   | 6.3   | 38    |       |     |
| 18    |     | 134   | 43    | 200    | 445    | 116    | 32    | 5.6   | 7.1   | 31    |       |     |
| 19    |     | 124   | 40    | 162    | 468    | 113    | 28    | 5.4   | 11    | 28    |       |     |
| 20    |     | 113   | 39    | 160    | 431    | 110    | 26    | 4.7   | 21    | 27    |       |     |
| 21    |     | 107   | 37    | 222    | 369    | 105    | 25    | 4.2   | 23    | 26    |       |     |
| 22    |     | 105   | 36    | 329    | 292    | 97     | 29    | 3.8   | 27    | 26    |       |     |
| 23    |     | 101   | 36    | 373    | 235    | 90     | 27    | 4.7   | 31    | 31    |       |     |
| 24    |     | 99    | 37    | 449    | 212    | 89     | 27    | 5.1   | 31    | 30    |       |     |
| 25    |     | 97    | 41    | 462    | 209    | 87     | 25    | 5.3   | 32    | 25    |       |     |
| 26    |     | 93    | 48    | 460    | 198    | 83     | 23    | 5.5   | 26    | 25    |       |     |
| 27    |     | 88    | 60    | 292    | 201    | 78     | 24    | 4.9   | 21    | 19    |       |     |
| 28    |     | 85    | 68    | 207    | 201    | 81     | 29    | 4.1   | 19    | 20    |       |     |
| 29    |     | ----- | 75    | 203    | 212    | 107    | 33    | 3.8   | 18    | 13    |       |     |
| 30    |     | ----- | 88    | 279    | 213    | 166    | 76    | 4.0   | 19    | 15    |       |     |
| 31    |     | ----- | 263   | -----  | 260    | -----  | 61    | 5.5   | ----- | 26    | ----- |     |
| TOTAL |     | -     | 1,948 | 10,377 | 10,059 | 5,585  | 1,743 | 330.4 | 436.8 | 651   |       |     |
| MEAN  |     | -     | 62.8  | 346    | 324    | 186    | 56.2  | 10.7  | 14.6  | 21.0  |       |     |
| MAX   |     | -     | 263   | 500    | 651    | 459    | 187   | 42    | 32    | 38    |       |     |
| MIN   |     | -     | 36    | 160    | 198    | 78     | 23    | 3.8   | 4.2   | 13    |       |     |
| AC-FT |     | -     | 3,860 | 20,580 | 19,950 | 11,080 | 3,460 | 655   | 866   | 1,290 |       |     |

THE SEASON MARCH TO OCTOBER

AC-FT 61,750

## PEAK DISCHARGE (BASE, 430 CFS)

| DATE | TIME | G.HT. | DISCHARGE | DATE | TIME | G.HT. | DISCHARGE |
|------|------|-------|-----------|------|------|-------|-----------|
| 4-7  | --   | --    | a650      | 5-18 | 2100 | 4.27  | 495       |
| 4-26 | 0200 | 4.25  | 485       | 6-1  | 2100 | 4.31  | 515       |
| 5-7  | 1700 | 4.64  | 702       |      |      |       |           |

a About.

NOTE.--Stage-discharge relation affected by ice Feb. 18 to Apr. 10.

## MILK RIVER BASIN

06133500 North Fork Milk River above St. Mary Canal, near Browning, Mont.

(International gaging station)

LOCATION.--Lat 48°58'15", long 113°03'19", in NE $\frac{1}{4}$ NW $\frac{1}{4}$ NE $\frac{1}{4}$  sec.16, T.37 N., R.11 W., Glacier County, on left bank 1.7 miles upstream from outlet of canal, 1.9 miles south of international boundary, and 29 miles north of Browning.

DRAINAGE AREA.--61.8 sq mi.

PERIOD OF RECORD.--May 1911 to July 1912 and June to July 1918 (published as "near Browning"), May 1919 to current season (seasonal records only). Monthly discharge only for some periods, published in WSP 1309. Records usually obtained at this station only when St. Mary Canal is in operation.

GAGE.--Water-stage recorder. Concrete control since 1936. Altitude of gage is 4,220 ft (from topographic map). Prior to June 20, 1921, nonrecording gages at several sites within 1 mile of present site at different datums.

EXTREMES.--Current season: Maximum discharge, about 300 cfs Apr. 5 (gage height, 5.48 ft, ice jam); minimum, 11 cfs Aug. 21, 22, Sept. 12-14; minimum gage height, 1.06 ft Oct. 27.

Period of record: Maximum discharge, 3,090 cfs May 8, 1967 (gage height, 7.95 ft), from rating curve extended above 130 cfs on basis of slope-area measurements at gage heights 7.55 and 7.95 ft; no flow Oct. 29, 1942.

REMARKS.--Records good. Several small diversions for irrigation above station.

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

REVISIONS (WATER YEARS).--WSP 1309: 1926-27(M). WSP 1729: Drainage area.

## DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR 1971

| DAY   | JAN | FEB | MAR | APR   | MAY   | JUN   | JUL  | AUG  | SEP   | OCT  | NOV   | DEC |
|-------|-----|-----|-----|-------|-------|-------|------|------|-------|------|-------|-----|
| 1     |     |     |     | 35    | 31    | 28    | 17   | 13   | 14    | 14   | 13    |     |
| 2     |     |     |     | 30    | 33    | 24    | 16   | 13   | 13    | 14   | 13    |     |
| 3     |     |     |     | 38    | 34    | 22    | 15   | 13   | 12    | 14   | -     |     |
| 4     |     |     |     | 59    | 36    | 21    | 15   | 13   | 13    | 14   | -     |     |
| 5     |     |     |     | 151   | 41    | 28    | 15   | 13   | 12    | 14   | -     |     |
| 6     |     |     |     | 134   | 76    | 38    | 15   | 13   | 12    | 14   | -     |     |
| 7     |     |     |     | 106   | 45    | 34    | 15   | 13   | 12    | 14   | -     |     |
| 8     |     |     |     | 80    | 38    | 25    | 16   | 13   | 12    | 14   | -     |     |
| 9     |     |     |     | 61    | 34    | 23    | 15   | 13   | 12    | 14   | -     |     |
| 10    |     |     |     | 71    | 29    | 21    | 18   | 13   | 12    | 14   | -     |     |
| 11    |     |     |     | 33    | 28    | 20    | 17   | 13   | 12    | 14   | -     |     |
| 12    |     |     |     | 30    | 27    | 19    | 15   | 13   | 11    | 14   | -     |     |
| 13    |     |     |     | 28    | 26    | 19    | 15   | 12   | 11    | 14   | -     |     |
| 14    |     |     |     | 32    | 24    | 19    | 14   | 12   | 11    | 16   | -     |     |
| 15    |     |     |     | 36    | 23    | 18    | 14   | 12   | 12    | 16   | -     |     |
| 16    |     |     |     | 31    | 31    | 18    | 13   | 12   | 14    | 16   | -     |     |
| 17    |     |     |     | 27    | 46    | 18    | 13   | 12   | 16    | 16   | -     |     |
| 18    |     |     |     | 26    | 54    | 18    | 13   | 12   | 15    | 16   | -     |     |
| 19    |     |     |     | 28    | 39    | 18    | 13   | 12   | 14    | 16   | -     |     |
| 20    |     |     |     | 32    | 36    | 18    | 13   | 12   | 22    | 16   | -     |     |
| 21    |     |     |     | 45    | 36    | 17    | 13   | 11   | 18    | 16   | -     |     |
| 22    |     |     |     | 41    | 30    | 17    | 13   | 11   | 16    | 16   | -     |     |
| 23    |     |     |     | 43    | 27    | 17    | 13   | 12   | 16    | 16   | -     |     |
| 24    |     |     |     | 47    | 26    | 16    | 13   | 12   | 14    | 16   | -     |     |
| 25    |     |     |     | 46    | 25    | 16    | 13   | 12   | 13    | 16   | -     |     |
| 26    |     |     |     | 34    | 24    | 16    | 13   | 12   | 14    | 15   | -     |     |
| 27    |     |     |     | 30    | 23    | 16    | 13   | 12   | 14    | 14   | -     |     |
| 28    |     |     |     | 28    | 23    | 17    | 16   | 12   | 14    | 13   | -     |     |
| 29    |     |     |     | 32    | 22    | 34    | 17   | 14   | 14    | 12   | -     |     |
| 30    |     |     |     | 33    | 24    | 23    | 14   | 15   | 15    | 13   | -     |     |
| 31    |     |     |     | ----- | 33    | ----- | 13   | 18   | ----- | 13   | ----- |     |
| TOTAL |     |     |     | 1,447 | 1,024 | 638   | 448  | 393  | 410   | 454  | -     |     |
| MEAN  |     |     |     | 48.2  | 33.0  | 21.3  | 14.5 | 12.7 | 13.7  | 14.6 | -     |     |
| MAX   |     |     |     | 151   | 76    | 38    | 18   | 18   | 22    | 16   | -     |     |
| MIN   |     |     |     | 26    | 22    | 16    | 13   | 11   | 11    | 12   | -     |     |
| AC-FT |     |     |     | 2,870 | 2,030 | 1,270 | 889  | 780  | 813   | 901  | -     |     |

THE SEASON APRIL TO OCTOBER

AC-FT 9,550

06134000 North Milk River near international boundary

(International gaging station)

LOCATION.--Lat 49°01'19", long 112°58'16", in SW¼ sec.11, T.1, R.23 W., fourth meridian, in Alberta, on right bank 0.4 mile upstream from highway bridge, 1.6 miles north of international boundary, 2.8 miles east of Whiskey Gap, Alberta, and 11 miles southeast of Kimball, Alberta.

DRAINAGE AREA.--91.8 sq mi.

PERIOD OF RECORD.--July 1909 to October 1912 (seasonal records only), January 1913 to October 1922, March 1923 to current season (seasonal records only). Records for November and December 1912, published in WSP 1309, have been found to be unreliable and should not be used. Published as "near Kimball, Alberta" 1913-16. Prior to February 1962, published as North Fork Milk River near international boundary.

GAGE.--Water-stage recorder. Datum of gage is 4,112.16 ft above mean sea level (Geodetic Surveys of Canada datum). Prior to May 1913, nonrecording gage at site 2 miles downstream at different datum. May 1, 1913, to Apr. 11, 1930, water-stage recorder 700 ft downstream at different datum. Apr. 12, 1930, to Aug. 15, 1962, water-stage recorder 1,500 ft downstream at different datum.

EXTREMES.--Current season: Maximum discharge, 767 cfs June 29 (gage height, 5.49 ft); minimum daily, 6.6 cfs Mar. 6, 7.

Period of record: Maximum discharge, 2,950 cfs June 17, 1948 (gage height, 6.47 ft, site and datum then in use), from rating curve extended above 1,500 cfs; no flow Mar. 1, 2, 1940.

REMARKS.--Records good except those for winter period, which are fair. Several small diversions for irrigation above station. For recorded diversions from St. Mary River into North Fork Milk River, see p. 20.

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

REVISIONS (WATER YEARS).--WSP 1309: 1909-13, 1915(M), 1920(M), 1937(M). WSP 1559: 1948(M). WSP 1729: 1944(M), drainage area. See also PERIOD OF RECORD.

## DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR 1971

| DAY   | JAN | FEB   | MAR   | APR   | MAY    | JUN    | JUL    | AUG    | SEP    | OCT    | NOV   | DEC |
|-------|-----|-------|-------|-------|--------|--------|--------|--------|--------|--------|-------|-----|
| 1     |     | -     | 8.4   | 55    | 36     | 38     | 668    | 681    | 687    | 668    |       |     |
| 2     |     | -     | 8.0   | 49    | 38     | 29     | 686    | 674    | 687    | 671    |       |     |
| 3     |     | -     | 8.0   | 72    | 38     | 26     | 684    | 678    | 685    | 668    |       |     |
| 4     |     | -     | 7.7   | 74    | 42     | 25     | 679    | 678    | 684    | 625    |       |     |
| 5     |     | -     | 7.5   | 109   | 52     | 34     | 680    | 680    | 684    | 503    |       |     |
| 6     |     | -     | 6.6   | 249   | 101    | 65     | 679    | 681    | 681    | 365    |       |     |
| 7     |     | -     | 6.6   | 238   | 73     | 65     | 679    | 682    | 680    | 332    |       |     |
| 8     |     | -     | 10    | 148   | 50     | 33     | 689    | 682    | 679    | 286    |       |     |
| 9     |     | -     | 13    | 81    | 43     | 27     | 691    | 675    | 675    | 185    |       |     |
| 10    |     | -     | 20    | 94    | 35     | 25     | 697    | 675    | 678    | 159    |       |     |
| 11    |     | -     | 22    | 44    | 33     | 23     | 693    | 674    | 680    | 161    |       |     |
| 12    |     | 24    | 20    | 45    | 171    | 21     | 688    | 671    | 674    | 156    |       |     |
| 13    |     | 566   | 21    | 45    | 385    | 21     | 694    | 667    | 669    | 110    |       |     |
| 14    |     | 243   | 20    | 51    | 511    | 20     | 694    | 667    | 671    | 42     |       |     |
| 15    |     | 155   | 17    | 53    | 585    | 19     | 693    | 668    | 671    | 25     |       |     |
| 16    |     | 67    | 18    | 45    | 635    | 19     | 694    | 669    | 683    | 24     |       |     |
| 17    |     | 59    | 18    | 41    | 691    | 19     | 692    | 673    | 680    | 22     |       |     |
| 18    |     | 52    | 21    | 38    | 731    | 19     | 696    | 677    | 677    | 20     |       |     |
| 19    |     | 45    | 17    | 35    | 712    | 19     | 699    | 673    | 679    | 19     |       |     |
| 20    |     | 30    | 24    | 43    | 731    | 206    | 702    | 673    | 695    | 17     |       |     |
| 21    |     | 22    | 22    | 60    | 735    | 423    | 705    | 672    | 682    | 15     |       |     |
| 22    |     | 22    | 18    | 60    | 647    | 571    | 707    | 673    | 673    | 14     |       |     |
| 23    |     | 25    | 18    | 58    | 446    | 660    | 706    | 674    | 670    | 15     |       |     |
| 24    |     | 21    | 21    | 63    | 169    | 685    | 704    | 672    | 672    | 15     |       |     |
| 25    |     | 20    | 22    | 68    | 50     | 704    | 709    | 673    | 666    | 14     |       |     |
| 26    |     | 18    | 21    | 47    | 41     | 701    | 709    | 674    | 670    | 14     |       |     |
| 27    |     | 12    | 22    | 37    | 37     | 705    | 701    | 675    | 674    | 11     |       |     |
| 28    |     | 9.1   | 23    | 34    | 32     | 711    | 710    | 674    | 672    | 12     |       |     |
| 29    |     | ----- | 46    | 38    | 26     | 754    | 698    | 677    | 674    | 12     |       |     |
| 30    |     | ----- | 156   | 39    | 28     | 676    | 688    | 687    | 674    | 15     |       |     |
| 31    |     | ----- | 91    | ----- | 42     | -----  | 686    | 693    | -----  | 16     | ----- |     |
| TOTAL | -   |       | 753.8 | 2,113 | 7,950  | 7,343  | 21,500 | 20,942 | 20,326 | 5,211  |       |     |
| MEAN  | -   |       | 24.3  | 70.4  | 256    | 245    | 694    | 676    | 678    | 168    |       |     |
| MAX   | -   |       | 156   | 249   | 735    | 754    | 710    | 693    | 695    | 671    |       |     |
| MIN   | -   |       | 6.6   | 34    | 26     | 19     | 668    | 667    | 666    | 11     |       |     |
| AC-FT | -   |       | 1,500 | 4,190 | 15,770 | 14,560 | 42,650 | 41,540 | 40,320 | 10,340 |       |     |

THE SEASON MARCH TO OCTOBER AC-FT 170,900

NOTE.--Stage-discharge relation affected by ice Feb. 12 to Apr. 11 (no gage height record Feb. 15-17).



## MILK RIVER BASIN

06134500 Milk River at Milk River, Alberta

(International gaging station)

LOCATION.--Lat 49°08'45", long 112°04'14", in SE $\frac{1}{4}$  sec.28, T.2, R.16 W., fourth meridian, in Alberta, on left bank 700 ft downstream from highway bridge at Milk River, Alberta, and 22 miles downstream from North Milk River.

DRAINAGE AREA.--1,036 sq mi.

PERIOD OF RECORD.--June 1909 to October 1910 (no winter records), April 1911 to current year. Monthly discharge only for June 1909, published in WSP 1309.

GAGE.--Water-stage recorder. Datum of gage is 3,402.78 ft above mean sea level (Geodetic Surveys of Canada datum). Prior to June 17, 1919, nonrecording gages, and June 17, 1919, to Nov. 2, 1921, water-stage recorder all at several sites 1,000 ft upstream at datum 0.61 ft higher. Nov. 3, 1921, to Aug. 28, 1947, water-stage recorder at site 60 ft upstream at present datum.

AVERAGE DISCHARGE.--55 years (1916-71), 324 cfs (234,700 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, about 1,500 cfs Feb. 15 (gage height, 6.14 ft, backwater from ice); minimum daily, 13 cfs Dec. 22-25.

Period of record: Maximum discharge, 8,730 cfs May 22, 1927 (gage height, 11.41 ft), from rating curve extended above 4,000 cfs on basis of area-velocity study of peak discharge; no flow at times.

REMARKS.--Records good except those for winter period, which are poor. Since 1917, flow increased during irrigation season by water from St. Mary Canal (see p. 20). Several small diversions for irrigation above station.

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

REVISIONS (WATER YEARS).--WSP 1309: 1912. WSP 1559: 1916, 1927(M), 1947(M). WSP 1729: Drainage area.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY   | OCT   | NOV   | DEC   | JAN   | FEB    | MAR   | APR    | MAY    | JUN    | JUL    | AUG    | SEP    |
|-------|-------|-------|-------|-------|--------|-------|--------|--------|--------|--------|--------|--------|
| 1     | 52    | 67    | 23    | 18    | 27     | 94    | 674    | 349    | 356    | 815    | 703    | 673    |
| 2     | 49    | 59    | 22    | 19    | 29     | 94    | 626    | 325    | 498    | 791    | 683    | 660    |
| 3     | 48    | 49    | 22    | 19    | 30     | 92    | 620    | 335    | 410    | 759    | 673    | 661    |
| 4     | 47    | 58    | 19    | 19    | 29     | 92    | 602    | 380    | 318    | 731    | 668    | 679    |
| 5     | 46    | 50    | 19    | 20    | 29     | 94    | 490    | 442    | 275    | 720    | 666    | 679    |
| 6     | 51    | 49    | 17    | 23    | 27     | 94    | 542    | 505    | 334    | 713    | 668    | 671    |
| 7     | 50    | 50    | 17    | 23    | 29     | 96    | 698    | 634    | 411    | 701    | 669    | 664    |
| 8     | 52    | 55    | 17    | 23    | 30     | 96    | 1,100  | 698    | 469    | 707    | 666    | 662    |
| 9     | 55    | 60    | 17    | 20    | 30     | 98    | 847    | 474    | 354    | 716    | 658    | 659    |
| 10    | 59    | 68    | 17    | 19    | 29     | 111   | 747    | 446    | 276    | 730    | 659    | 660    |
| 11    | 60    | 70    | 17    | 17    | 29     | 136   | 742    | 418    | 237    | 730    | 660    | 659    |
| 12    | 62    | 61    | 17    | 16    | 29     | 150   | 498    | 355    | 210    | 712    | 658    | 651    |
| 13    | 63    | 65    | 17    | 16    | 37     | 150   | 405    | 373    | 195    | 721    | 652    | 650    |
| 14    | 65    | 60    | 17    | 16    | 740    | 140   | 348    | 612    | 181    | 718    | 648    | 654    |
| 15    | 66    | 58    | 17    | 18    | 1,190  | 136   | 328    | 751    | 169    | 709    | 647    | 656    |
| 16    | 66    | 65    | 17    | 23    | 896    | 130   | 401    | 844    | 166    | 700    | 644    | 672    |
| 17    | 63    | 65    | 16    | 24    | 770    | 119   | 388    | 887    | 166    | 698    | 649    | 681    |
| 18    | 60    | 63    | 16    | 26    | 548    | 111   | 357    | 1,050  | 156    | 697    | 655    | 666    |
| 19    | 59    | 55    | 15    | 26    | 361    | 98    | 293    | 1,170  | 146    | 696    | 657    | 668    |
| 20    | 58    | 47    | 14    | 26    | 299    | 98    | 256    | 1,110  | 134    | 694    | 654    | 692    |
| 21    | 58    | 47    | 14    | 26    | 272    | 96    | 273    | 1,090  | 154    | 696    | 646    | 696    |
| 22    | 56    | 46    | 13    | 24    | 230    | 94    | 368    | 1,050  | 426    | 704    | 650    | 688    |
| 23    | 56    | 44    | 13    | 24    | 209    | 94    | 452    | 909    | 605    | 697    | 668    | 679    |
| 24    | 55    | 37    | 13    | 24    | 159    | 96    | 492    | 703    | 696    | 693    | 660    | 685    |
| 25    | 52    | 31    | 13    | 26    | 101    | 96    | 516    | 484    | 728    | 693    | 655    | 682    |
| 26    | 44    | 29    | 14    | 27    | 98     | 98    | 568    | 331    | 733    | 698    | 653    | 679    |
| 27    | 50    | 26    | 15    | 29    | 96     | 140   | 472    | 274    | 734    | 701    | 653    | 680    |
| 28    | 40    | 24    | 16    | 29    | 94     | 222   | 348    | 259    | 750    | 703    | 651    | 680    |
| 29    | 56    | 23    | 17    | 29    | -----  | 281   | 280    | 257    | 822    | 714    | 657    | 674    |
| 30    | 63    | 23    | 18    | 27    | -----  | 410   | 292    | 266    | 859    | 694    | 672    | 679    |
| 31    | 68    | ----- | 18    | 27    | -----  | 590   | -----  | 270    | -----  | 720    | 687    | -----  |
| TOTAL | 1,729 | 1,504 | 517   | 703   | 6,447  | 4,446 | 15,023 | 18,051 | 11,968 | 22,171 | 20,489 | 20,139 |
| MEAN  | 55.8  | 50.1  | 16.7  | 22.7  | 230    | 143   | 501    | 582    | 399    | 715    | 661    | 671    |
| MAX   | 68    | 70    | 23    | 29    | 1,190  | 590   | 1,100  | 1,170  | 859    | 815    | 703    | 696    |
| MIN   | 40    | 23    | 13    | 16    | 27     | 92    | 256    | 257    | 134    | 693    | 644    | 650    |
| AC-FT | 3,430 | 2,980 | 1,030 | 1,390 | 12,790 | 8,820 | 29,800 | 35,800 | 23,740 | 43,980 | 40,640 | 39,950 |

CAL YR 1970 TOTAL 124,528.4 MEAN 341 MAX 1,490 MIN 7.2 AC-FT 247,000  
WTR YR 1971 TOTAL 123,187.0 MEAN 337 MAX 1,190 MIN 13 AC-FT 244,300

NOTE.--Stage-discharge relation affected by ice Nov. 3 to Apr. 8.

## 06135000 Milk River at eastern crossing of international boundary

(International gaging station)

LOCATION (revised).--48°59'05", long 110°28'15", in NE¼NW¼ sec.7, T.37 N., R.10 E., Hill County, on right bank 1.1 miles south of international boundary, 6.5 miles upstream from Lost River, 12.5 miles northwest of Simpson, 29.5 miles north of Rudyard, and at mile 466.0.

DRAINAGE AREA.--2,628 sq mi.

PERIOD OF RECORD.--August 1909 to current year (few winter records). Monthly discharge only for April 1912, published in WSP 1309.

GAGE.--Water-stage recorder. Altitude of gage is 2,660 ft (from international boundary map). Prior to Oct. 1, 1970, water-stage recorder or nonrecording gages at several sites within 10.5 miles upstream at different datums.

EXTREMES.--Current year: Maximum daily discharge, 1,800 cfs Feb. 16; maximum gage height, 11.8 ft, from flood mark, Feb. 16 (backwater from ice), minimum daily discharge, 34 cfs Oct. 29, but may have been less during winter period.

Period of record: Maximum discharge, 10,700 cfs Apr. 9, 1965 (gage height, 9.53 ft, site and datum then in use); but may have been higher Mar. 28, 1952; maximum gage height, 13.65 ft, site and datum then in use, Mar. 28, 1952 (backwater from ice); no flow at times.

REMARKS.--Records fair. Since 1917 flow increased during irrigation season by water from St. Mary Canal (see p. 20). Small diversions for irrigation above station.

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

REVISIONS (WATER YEARS).--WSP 1086: 1927, 1935. WSP 1559: 1920(M), 1922(M), 1926, 1928(M), 1929, 1930(M), 1932(M). WSP 1729: 1912-13, 1921-22, 1929(M), drainage area.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY   | OCT   | NOV   | DEC | JAN | FEB   | MAR    | APR    | MAY    | JUN    | JUL    | AUG    | SEP    |
|-------|-------|-------|-----|-----|-------|--------|--------|--------|--------|--------|--------|--------|
| 1     | 80    |       |     |     | -     | 200    | 375    | 410    | 390    | 835    | 740    | 718    |
| 2     | 72    |       |     |     | -     | 190    | 360    | 334    | 385    | 907    | 733    | 718    |
| 3     | 68    |       |     |     | -     | 145    | 595    | 315    | 349    | 844    | 740    | 680    |
| 4     | 64    |       |     |     | -     | 165    | 770    | 367    | 400    | 779    | 710    | 638    |
| 5     | 62    |       |     |     | -     | 145    | 672    | 358    | 597    | 733    | 695    | 666    |
| 6     | 59    |       |     |     | -     | 130    | 547    | 395    | 591    | 733    | 666    | 680    |
| 7     | 59    |       |     |     | -     | 115    | 519    | 463    | 497    | 688    | 680    | 695    |
| 8     | 60    |       |     |     | -     | 120    | 565    | 545    | 367    | 680    | 673    | 680    |
| 9     | 62    |       |     |     | -     | 170    | 1,040  | 652    | 376    | 673    | 666    | 659    |
| 10    | 63    |       |     |     | -     | 225    | 889    | 795    | 410    | 710    | 652    | 652    |
| 11    | 64    |       |     |     | -     | 255    | 763    | 571    | 441    | 680    | 631    | 652    |
| 12    | 65    |       |     |     | -     | 260    | 631    | 497    | 405    | 659    | 638    | 659    |
| 13    | 66    |       |     |     | -     | 335    | 571    | 446    | 371    | 652    | 645    | 645    |
| 14    | 66    |       |     |     | -     | 380    | 458    | 424    | 335    | 673    | 652    | 638    |
| 15    | 68    |       |     |     | 1,000 | 300    | 425    | 384    | 299    | 703    | 638    | 652    |
| 16    | 68    |       |     |     | 1,800 | 280    | 420    | 409    | 258    | 733    | 624    | 652    |
| 17    | 68    |       |     |     | 1,220 | 245    | 400    | 835    | 229    | 733    | 624    | 673    |
| 18    | 63    |       |     |     | 935   | 205    | 420    | 871    | 209    | 718    | 638    | 673    |
| 19    | 66    |       |     |     | 755   | 245    | 491    | 907    | 201    | 695    | 638    | 688    |
| 20    | 66    |       |     |     | 485   | 240    | 458    | 1,140  | 204    | 710    | 638    | 695    |
| 21    | 62    |       |     |     | 400   | 200    | 410    | 1,170  | 192    | 725    | 666    | 710    |
| 22    | 62    |       |     |     | 350   | 170    | 400    | 1,080  | 180    | 740    | 666    | 740    |
| 23    | 58    |       |     |     | 320   | 165    | 367    | 1,020  | 171    | 748    | 666    | 755    |
| 24    | 57    |       |     |     | 320   | 180    | 362    | 898    | 165    | 748    | 673    | 763    |
| 25    | 55    |       |     |     | 300   | 180    | 415    | 827    | 366    | 748    | 645    | 763    |
| 26    | 55    |       |     |     | 250   | 165    | 469    | 733    | 676    | 733    | 652    | 771    |
| 27    | 57    |       |     |     | 230   | 180    | 565    | 617    | 709    | 733    | 631    | 771    |
| 28    | 51    |       |     |     | 210   | 185    | 610    | 497    | 798    | 725    | 638    | 755    |
| 29    | 34    |       |     |     | ----- | 205    | 652    | 436    | 830    | 733    | 645    | 740    |
| 30    | 57    |       |     |     | ----- | 310    | 527    | 425    | 833    | 725    | 666    | 733    |
| 31    | 58    | ----- |     |     | ----- | 390    | -----  | 405    | -----  | 725    | 695    | -----  |
| TOTAL | 1,919 |       |     |     | -     | 6,680  | 16,146 | 19,226 | 12,234 | 22,621 | 20,564 | 20,914 |
| MEAN  | 61.9  |       |     |     | -     | 215    | 538    | 620    | 408    | 730    | 663    | 697    |
| MAX   | 80    |       |     |     | -     | 390    | 1,040  | 1,170  | 833    | 907    | 740    | 771    |
| MIN   | 34    |       |     |     | -     | 115    | 360    | 315    | 165    | 652    | 624    | 638    |
| AC-FT | 3,810 |       |     |     | -     | 13,250 | 32,030 | 38,130 | 24,270 | 44,870 | 40,790 | 41,480 |

CAL YR 1970 TOTAL - MEAN - MAX - MIN - AC-FT -  
 WTR YR 1971 TOTAL - MEAN - MAX - MIN - AC-FT -

NOTE.--Stage-discharge relation affected by ice Feb. 15 to Apr. 4 (no gage-height record Feb. 15, 16, 21-28).

## MILK RIVER BASIN

Wild Horse Lake closed basin

06135500 Sage Creek at Q Ranch, near Wild Horse, Alberta

(International gaging station)

LOCATION.--Lat 49°06'29", long 110°13'23", in NW¼ sec.9, T.2, R.2 W., fourth meridian, in Alberta, on right bank 3.5 miles north of Q Ranch buildings, 7.5 miles north of Wild Horse Port of Entry at international boundary, and 12.5 miles north of Simpson, Mont.

DRAINAGE AREA.--175 sq mi.

PERIOD OF RECORD.--March 1935 to current season (seasonal records only). March 1935 to October 1950 monthly discharge only, published in WSP 1309. March to October 1951 monthly discharge only, published in WSP 1729.

GAGE.--Water-stage recorder. Altitude of gage is 2,900 ft (from topographic map). Prior to Sept. 24, 1935, nonrecording gage at site 2 miles downstream at different datum. Sept. 24, 1935, to Oct. 31, 1951, water-stage recorder at site 100 ft upstream at datum 0.15 ft higher.

EXTREMES.--Current season: Maximum discharge, 361 cfs Apr. 7 (gage height, 9.50 ft, backwater from ice); no flow most of season.

Period of record: Maximum discharge, 3,500 cfs Apr. 11, 1937 (gage height, 15.87 ft, site and datum then in use), caused by failure of Elbow Coulee dam; no flow most of each season.

REMARKS.--Records poor.

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

REVISIONS.--WSP 1729: Drainage area.

## DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR 1971

| DAY   | JAN | FEB   | MAR | APR     | MAY   | JUN   | JUL | AUG | SEP   | OCT | NOV   | DEC |
|-------|-----|-------|-----|---------|-------|-------|-----|-----|-------|-----|-------|-----|
| 1     |     |       |     | 0       | 3.5   | 0     |     |     |       |     |       |     |
| 2     |     |       |     | 0       | 3.5   | 0     |     |     |       |     |       |     |
| 3     |     |       |     | 30      | 3.3   | 0     |     |     |       |     |       |     |
| 4     |     |       |     | 73      | 3.3   | 0     |     |     |       |     |       |     |
| 5     |     |       |     | 141     | 3.7   | 0     |     |     |       |     |       |     |
| 6     |     |       |     | 229     | 3.7   | 0     |     |     |       |     |       |     |
| 7     |     |       |     | 312     | 3.3   | 0     |     |     |       |     |       |     |
| 8     |     |       |     | 312     | 2.7   | 32    |     |     |       |     |       |     |
| 9     |     |       |     | 207     | 2.2   | 21    |     |     |       |     |       |     |
| 10    |     |       |     | 185     | 1.5   | 8.9   |     |     |       |     |       |     |
| 11    |     |       |     | 125     | 1.2   | 4.7   |     |     |       |     |       |     |
| 12    |     |       |     | 97      | .94   | 2.7   |     |     |       |     |       |     |
| 13    |     |       |     | 69      | .61   | 1.8   |     |     |       |     |       |     |
| 14    |     |       |     | 41      | .28   | 1.4   |     |     |       |     |       |     |
| 15    |     |       |     | 57      | .17   | 1.0   |     |     |       |     |       |     |
| 16    |     |       |     | 73      | .09   | .68   |     |     |       |     |       |     |
| 17    |     |       |     | 89      | .05   | .24   |     |     |       |     |       |     |
| 18    |     |       |     | 59      | .03   | .04   |     |     |       |     |       |     |
| 19    |     |       |     | 29      | .01   | 0     |     |     |       |     |       |     |
| 20    |     |       |     | 41      | 0     | 0     |     |     |       |     |       |     |
| 21    |     |       |     | 52      | 0     | 0     |     |     |       |     |       |     |
| 22    |     |       |     | 73      | 0     | 0     |     |     |       |     |       |     |
| 23    |     |       |     | 72      | 0     | 0     |     |     |       |     |       |     |
| 24    |     |       |     | 50      | 0     | 0     |     |     |       |     |       |     |
| 25    |     |       |     | 41      | 0     | 0     |     |     |       |     |       |     |
| 26    |     |       |     | 29      | 0     | 0     |     |     |       |     |       |     |
| 27    |     |       |     | 16      | 0     | 0     |     |     |       |     |       |     |
| 28    |     |       |     | 8.9     | 0     | 0     |     |     |       |     |       |     |
| 29    |     | ----- |     | 5.5     | 0     | 0     |     |     |       |     |       |     |
| 30    |     | ----- |     | 3.8     | 0     | 0     |     |     |       |     |       |     |
| 31    |     | ----- |     | -----   | 0     | ----- |     |     | ----- |     | ----- |     |
| TOTAL |     |       | 0   | 2,520.2 | 34.08 | 74.46 | 0   | 0   | 0     | 0   |       |     |
| MEAN  |     |       | 0   | 84.0    | 1.10  | 2.48  | 0   | 0   | 0     | 0   |       |     |
| MAX   |     |       | 0   | 312     | 3.7   | 32    | 0   | 0   | 0     | 0   |       |     |
| MIN   |     |       | 0   | 0       | 0     | 0     | 0   | 0   | 0     | 0   |       |     |
| AC-FT |     |       | 0   | 5,000   | 68    | 148   | 0   | 0   | 0     | 0   |       |     |

THE SEASON MARCH TO OCTOBER

AC-FT 5,210

## MILK RIVER BASIN

89

Wild Horse Lake closed basin

06136000 Sage Creek at international boundary

(International gaging station)

LOCATION.--Lat 49°00'14", long 110°11'22", in SE¼ sec.3, T.1, R.2 W., fourth meridian, in Alberta, on right bank 0.3 mile north of international boundary, 1.1 mile east of Wild Horse Port of Entry, and 5.2 miles north of Simpson, Mont.

DRAINAGE AREA.--220 sq mi.

PERIOD OF RECORD.--March 1946 to current season (seasonal records only). Monthly discharge only for some periods, published in WSP 1309.

GAGE.--Water-stage recorder and concrete low-water control. Altitude of gage is 2,800 ft (from international boundary map). Prior to Sept. 22, 1950, at site 0.5 mile downstream at different datum.

EXTREMES.--Current season: Maximum discharge, about 15 cfs Apr. 13 (gage height, 4.50 ft, backwater from snow-banks); no flow most of season.

Period of record: Maximum discharge, 52 cfs Sept. 6, 1951 (gage height, 4.72 ft); maximum gage height, 4.93 ft Mar. 21, 1966 (backwater from ice); no flow most of each season.

REMARKS.--Records good. Many diversions for irrigation above station. All of the flow may be diverted at times. During the spring, high-water natural overflow occurs at many points along channel above and below gage.

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

## DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR 1971

| DAY   | JAN | FEB   | MAR | APR   | MAY  | JUN   | JUL | AUG | SEP   | OCT | NOV   | DEC |
|-------|-----|-------|-----|-------|------|-------|-----|-----|-------|-----|-------|-----|
| 1     |     |       |     | 0     | 1.7  | 0     |     |     |       |     |       |     |
| 2     |     |       |     | 0     | 1.2  | 0     |     |     |       |     |       |     |
| 3     |     |       |     | 0     | .74  | 0     |     |     |       |     |       |     |
| 4     |     |       |     | 0     | .90  | 0     |     |     |       |     |       |     |
| 5     |     |       |     | 0     | .50  | 0     |     |     |       |     |       |     |
| 6     |     |       |     | 0     | .45  | 0     |     |     |       |     |       |     |
| 7     |     |       |     | 0     | .50  | 0     |     |     |       |     |       |     |
| 8     |     |       |     | 0     | .50  | 0     |     |     |       |     |       |     |
| 9     |     |       |     | 0     | .35  | 0     |     |     |       |     |       |     |
| 10    |     |       |     | 0     | .30  | 1.4   |     |     |       |     |       |     |
| 11    |     |       |     | 0     | .22  | .90   |     |     |       |     |       |     |
| 12    |     |       |     | 2.1   | .15  | .40   |     |     |       |     |       |     |
| 13    |     |       |     | 13    | .09  | .18   |     |     |       |     |       |     |
| 14    |     |       |     | 12    | .05  | .09   |     |     |       |     |       |     |
| 15    |     |       |     | 12    | .03  | .07   |     |     |       |     |       |     |
| 16    |     |       |     | 12    | .05  | .05   |     |     |       |     |       |     |
| 17    |     |       |     | 12    | .07  | .05   |     |     |       |     |       |     |
| 18    |     |       |     | 12    | .07  | .05   |     |     |       |     |       |     |
| 19    |     |       |     | 11    | .07  | .09   |     |     |       |     |       |     |
| 20    |     |       |     | 10    | .07  | .07   |     |     |       |     |       |     |
| 21    |     |       |     | 9.4   | .03  | .01   |     |     |       |     |       |     |
| 22    |     |       |     | 9.4   | .03  | 0     |     |     |       |     |       |     |
| 23    |     |       |     | 10    | .01  | 0     |     |     |       |     |       |     |
| 24    |     |       |     | 10    | .01  | 0     |     |     |       |     |       |     |
| 25    |     |       |     | 9.8   | 0    | 0     |     |     |       |     |       |     |
| 26    |     |       |     | 9.4   | 0    | 0     |     |     |       |     |       |     |
| 27    |     |       |     | 8.5   | 0    | 0     |     |     |       |     |       |     |
| 28    |     |       |     | 6.4   | 0    | 0     |     |     |       |     |       |     |
| 29    |     | ----- |     | 3.6   | 0    | 0     |     |     |       |     |       |     |
| 30    |     | ----- |     | 3.0   | 0    | 0     |     |     |       |     |       |     |
| 31    |     | ----- |     | 0     | 0    | ----- |     |     | ----- |     | ----- |     |
| TOTAL |     |       | 0   | 175.6 | 8.09 | 3.36  | 0   | 0   | 0     | 0   |       |     |
| MEAN  |     |       | 0   | 5.85  | .26  | .11   | 0   | 0   | 0     | 0   |       |     |
| MAX   |     |       | 0   | 13    | 1.7  | 1.4   | 0   | 0   | 0     | 0   |       |     |
| MIN   |     |       | 0   | 0     | 0    | 0     | 0   | 0   | 0     | 0   |       |     |
| AC-FT |     |       | 0   | 348   | 16   | 6.7   | 0   | 0   | 0     | 0   |       |     |

THE SEASON MARCH TO OCTOBER

AC-FT 371

## MILK RIVER BASIN

06140500 Milk River at Havre, Mont.

LOCATION.--Lat 48°33'23", long 109°40'14", in NE $\frac{1}{4}$ SE $\frac{1}{4}$  sec.5, T.32 N., R.16 E., Hill County, on upstream side of highway bridge on 7th Avenue East in Havre, 30 ft downstream from Bullhook Creek, 9.4 miles downstream from Big Sandy Creek, and 17 miles downstream from Fresno Dam.

DRAINAGE AREA.--5,844 sq mi, of which 670 sq mi is probably noncontributing.

PERIOD OF RECORD.--May to November 1898, April 1899 to November 1922, March, April 1923, March, April 1952 (gage heights only, in WSP 1260-B), June 1953 (in WSP 1320-B), August 1954 to current year. Monthly discharge only for some periods, published in WSP 1309.

GAGE.--Nonrecording gage read once or twice daily. Datum of gage is 2,461.11 ft above mean sea level (levels by Corps of Engineers). Prior to Nov. 4, 1902, nonrecording gage at site 0.5 mile upstream at different datum. Nov. 4, 1902, to Nov. 25, 1910, nonrecording gage at datum 0.47 ft higher, Mar. 9, 1911, to July 13, 1920, nonrecording gage at present datum, and July 14, 1920, to Sept. 30, 1922, nonrecording gage at datum 4.00 ft higher, all at site 30 ft downstream.

AVERAGE DISCHARGE.--17 years (1899-1916), prior to operation of St. Mary Canal, 273 cfs (197,800 acre-ft per year); 23 years (1916-22, 1954-71), 430 cfs (311,500 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, about 3,000 cfs Feb. 14; maximum gage height observed, 10.98 ft Feb. 14 (backwater from ice); minimum daily, 40 cfs Jan. 14.

Period of record: Maximum discharge, about 20,000 cfs Apr. 12, 1899 (gage height, 19.3 ft, present datum, from floodmarks), from rating curve extended above 5,200 cfs; no flow at times in several years.

REMARKS.--Records fair except those for winter period, which are poor. Bullhook Creek flood-control project is designed to bypass damaging floods to Milk River channel several miles downstream. Diversions for irrigation of about 6,000 acres above station. Since 1917, flow increased during irrigation season by water from St. Mary Canal which diverts from the St. Mary River near Babb (see p. 20). Flow regulated by Fresno Reservoir (see p. 184). Records of chemical analyses and water temperatures for the current year are published in Part 2 of this report.

JEVIONS (WATER YEARS).--WSP 1309: 1899-1900, 1902-4, 1907-8, 1909(M), 1912, 1917(M), 1920(M). WSP 1729: Drainage area.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY   | OCT   | NOV   | DEC   | JAN   | FEB    | MAR    | APR    | MAY    | JUN    | JUL    | AUG    | SEP    |
|-------|-------|-------|-------|-------|--------|--------|--------|--------|--------|--------|--------|--------|
| 1     | 143   | 76    | 58    | 62    | 70     | 100    | 215    | 318    | 1,150  | 742    | 1,240  | 988    |
| 2     | 92    | 73    | 56    | 58    | 72     | 120    | 253    | 318    | 1,030  | 738    | 1,240  | 977    |
| 3     | 83    | 71    | 54    | 56    | 74     | 110    | 211    | 369    | 1,030  | 735    | 1,210  | 802    |
| 4     | 82    | 68    | 56    | 54    | 72     | 100    | 203    | 504    | 1,040  | 738    | 1,160  | 795    |
| 5     | 82    | 65    | 58    | 49    | 68     | 100    | 173    | 558    | 1,030  | 735    | 1,100  | 791    |
| 6     | 82    | 82    | 60    | 52    | 62     | 130    | 167    | 522    | 1,100  | 749    | 1,100  | 784    |
| 7     | 79    | 73    | 58    | 56    | 56     | 160    | 167    | 492    | 1,080  | 942    | 1,100  | 774    |
| 8     | 80    | 71    | 56    | 60    | 64     | 170    | 173    | 462    | 1,080  | 1,040  | 1,080  | 718    |
| 9     | 82    | 73    | 54    | 56    | 80     | 170    | 191    | 462    | 1,070  | 1,170  | 1,080  | 672    |
| 10    | 82    | 75    | 52    | 48    | 100    | 170    | 189    | 468    | 1,080  | 1,190  | 1,080  | 596    |
| 11    | 80    | 70    | 54    | 45    | 120    | 180    | 185    | 710    | 1,060  | 1,420  | 1,080  | 580    |
| 12    | 80    | 76    | 56    | 43    | 100    | 200    | 181    | 886    | 1,030  | 1,340  | 875    | 494    |
| 13    | 82    | 75    | 56    | 42    | 200    | 240    | 171    | 1,030  | 992    | 1,300  | 879    | 333    |
| 14    | 73    | 55    | 56    | 40    | 1,500  | 300    | 183    | 1,300  | 980    | 1,290  | 879    | 216    |
| 15    | 72    | 48    | 56    | 50    | 1,000  | 310    | 225    | 1,340  | 977    | 1,260  | 833    | 172    |
| 16    | 73    | 62    | 55    | 49    | 800    | 350    | 225    | 1,460  | 970    | 1,090  | 802    | 170    |
| 17    | 89    | 62    | 54    | 48    | 650    | 363    | 223    | 1,440  | 963    | 1,100  | 879    | 167    |
| 18    | 86    | 62    | 53    | 70    | 500    | 363    | 227    | 1,440  | 963    | 1,100  | 1,080  | 167    |
| 19    | 83    | 62    | 51    | 200   | 400    | 328    | 215    | 1,470  | 1,030  | 1,090  | 1,080  | 165    |
| 20    | 80    | 53    | 50    | 300   | 300    | 285    | 209    | 1,480  | 996    | 1,090  | 1,140  | 163    |
| 21    | 80    | 52    | 52    | 250   | 150    | 223    | 253    | 1,510  | 996    | 1,180  | 1,060  | 161    |
| 22    | 75    | 50    | 50    | 210   | 200    | 183    | 303    | 1,280  | 988    | 1,340  | 1,060  | 159    |
| 23    | 75    | 49    | 46    | 160   | 150    | 152    | 298    | 1,190  | 973    | 1,380  | 1,060  | 158    |
| 24    | 76    | 58    | 47    | 100   | 140    | 133    | 300    | 1,190  | 1,020  | 1,350  | 1,150  | 154    |
| 25    | 73    | 60    | 50    | 90    | 130    | 130    | 303    | 1,190  | 963    | 1,320  | 1,060  | 150    |
| 26    | 70    | 58    | 50    | 88    | 120    | 112    | 310    | 1,190  | 875    | 1,270  | 1,050  | 149    |
| 27    | 72    | 58    | 49    | 84    | 110    | 124    | 300    | 1,160  | 879    | 1,150  | 1,060  | 152    |
| 28    | 65    | 58    | 50    | 86    | 100    | 173    | 280    | 1,140  | 886    | 1,150  | 1,080  | 280    |
| 29    | 80    | 58    | 52    | 82    | -----  | 213    | 265    | 1,120  | 861    | 1,160  | 1,070  | 280    |
| 30    | 76    | 60    | 54    | 78    | -----  | 231    | 280    | 1,110  | 767    | 1,180  | 1,040  | 278    |
| 31    | 75    | ----- | 58    | 74    | -----  | 248    | -----  | 1,170  | -----  | 1,190  | 1,040  | -----  |
| TOTAL | 2,502 | 1,913 | 1,661 | 2,740 | 7,388  | 6,171  | 6,878  | 30,279 | 29,859 | 34,529 | 32,647 | 12,445 |
| MEAN  | 80.7  | 63.8  | 53.6  | 88.4  | 264    | 199    | 229    | 977    | 995    | 1,114  | 1,053  | 415    |
| MAX   | 143   | 82    | 60    | 300   | 1,500  | 363    | 310    | 1,510  | 1,150  | 1,420  | 1,240  | 988    |
| MIN   | 65    | 48    | 46    | 40    | 56     | 100    | 167    | 318    | 767    | 735    | 802    | 149    |
| AC-FT | 4,960 | 3,790 | 3,290 | 5,430 | 14,650 | 12,240 | 13,640 | 60,060 | 59,230 | 68,490 | 64,760 | 24,680 |

CAL YR 1970 TOTAL 140,151 MEAN 384 MAX 1,350 MIN 35 AC-FT 278,000  
WTR YR 1971 TOTAL 169,012 MEAN 463 MAX 1,510 MIN 40 AC-FT 335,200

NOTE.--Stage-discharge relation affected by ice Nov. 21 to Mar. 16.



## MILK RIVER BASIN

91

0614+100 Walburger Coulee below diversions, near Govenlock, Saskatchewan

(International gaging station)

LOCATION.--Lat 49°17'30", long 110°01'20", in SW 1/4 sec.13, T.4, R.1 W., fourth meridian, on right bank 3 miles north of Walburger ranch, and 10 miles northwest of Govenlock.

PERIOD OF RECORD.--March 1963 to current season. July 1960 to current season in reports of Department of the Environment, Canada. Seasonal records only.

GAGE.--Water-stage recorder. Altitude of gage is 3,100 ft (from topographic map).

EXTREMES.--Current season: Maximum discharge, about 30 cfs Apr 9 (gage height, 5.20 ft, backwater from snow); no flow at times.

Period of record: Maximum discharge, 212 cfs June 25, 1965 (gage height, 5.21 ft); maximum gage height, 5.71 ft Apr. 14, 1965 (backwater from ice); no flow most of each season.

REMARKS.--Records fair. Established to measure releases from Middle Creek Reservoir to Lodge Creek. Releases may be stored or diverted for irrigation above the station.

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

## DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR 1971

| DAY   | JAN | FEB | MAR | APR   | MAY  | JUN   | JUL | AUG  | SEP   | OCT   | NOV   | DEC |
|-------|-----|-----|-----|-------|------|-------|-----|------|-------|-------|-------|-----|
| 1     |     |     |     | 0     | .06  | .01   |     | 0    |       | 0     | .46   |     |
| 2     |     |     |     | 0     | .05  | .01   |     | 0    |       | 0     | .07   |     |
| 3     |     |     |     | 0     | .05  | .02   |     | 0    |       | 0     | .01   |     |
| 4     |     |     |     | 0     | .02  | .02   |     | 0    |       | 0     | -     |     |
| 5     |     |     |     | 0     | .02  | .07   |     | 0    |       | 0     | -     |     |
| 6     |     |     |     | 0     | .03  | .25   |     | .93  |       | 0     | -     |     |
| 7     |     |     |     | 0     | .02  | .18   |     | .15  |       | 0     | -     |     |
| 8     |     |     |     | .13   | .02  | 1.7   |     | 0    |       | 0     | -     |     |
| 9     |     |     |     | 19    | .01  | .42   |     | 0    |       | 0     | -     |     |
| 10    |     |     |     | 8.5   | .01  | .06   |     | 0    |       | 0     | -     |     |
| 11    |     |     |     | .17   | .05  | .02   |     | 0    |       | 0     | -     |     |
| 12    |     |     |     | .19   | .18  | .01   |     | 0    |       | 0     | -     |     |
| 13    |     |     |     | .21   | .18  | 0     |     | 0    |       | 0     | -     |     |
| 14    |     |     |     | 1.1   | .05  | .01   |     | 0    |       | 0     | -     |     |
| 15    |     |     |     | 2.2   | .01  | .01   |     | 0    |       | .15   | -     |     |
| 16    |     |     |     | 2.6   | .01  | 0     |     | 0    |       | 9.8   | -     |     |
| 17    |     |     |     | 1.9   | .01  | 0     |     | 0    |       | 11    | -     |     |
| 18    |     |     |     | 7.6   | .01  | 0     |     | 0    |       | 2.4   | -     |     |
| 19    |     |     |     | 4.8   | .01  | .02   |     | 0    |       | .06   | -     |     |
| 20    |     |     |     | 2.9   | .01  | .01   |     | 0    |       | 0     | -     |     |
| 21    |     |     |     | 4.5   | .02  | 0     |     | 0    |       | 0     | -     |     |
| 22    |     |     |     | 5.1   | .02  | 0     |     | 0    |       | 0     | -     |     |
| 23    |     |     |     | 4.7   | .01  | 0     |     | 0    |       | 0     | -     |     |
| 24    |     |     |     | 2.8   | .01  | 0     |     | 0    |       | 0     | -     |     |
| 25    |     |     |     | 1.5   | .01  | 0     |     | 0    |       | 0     | -     |     |
| 26    |     |     |     | 1.0   | 0    | 0     |     | 0    |       | 3.4   | -     |     |
| 27    |     |     |     | .41   | 0    | 0     |     | 0    |       | .39   | -     |     |
| 28    |     |     |     | .28   | 0    | 0     |     | 0    |       | .01   | -     |     |
| 29    |     |     |     | .15   | 0    | .01   |     | 0    |       | 0     | -     |     |
| 30    |     |     |     | .09   | 0    | .01   |     | 0    |       | 0     | -     |     |
| 31    |     |     |     | ----- | .01  | ----- |     | 0    | ----- | 5.8   | ----- |     |
| TOTAL |     |     |     | 71.83 | .94  | 2.84  | 0   | 1.08 | 0     | 33.01 | -     |     |
| MEAN  |     |     |     | 2.39  | .030 | .095  | 0   | .035 | 0     | 1.06  | -     |     |
| MAX   |     |     |     | 19    | .18  | 1.7   | 0   | .93  | 0     | 11    | -     |     |
| MIN   |     |     |     | 0     | 0    | 0     | 0   | 0    | 0     | 0     | -     |     |
| AC-FT |     |     |     | 142   | 1.9  | 5.6   | 0   | 2.1  | 0     | 65    | -     |     |

THE SEASON APRIL TO OCTOBER

AC-FT 218

## MILK RIVER BASIN

06144270 Spangler Ditch near Govenlock, Saskatchewan

(International gaging station)

LOCATION.--Lat 49°09'16", long 109°54'58", in NW¼ sec.26, T.2, R.30 W., third meridian, on right bank 0.9 mile south of Altawan Dam and 6.8 miles southwest of Govenlock.

PERIOD OF RECORD.--March 1966 to current season. 1915 to 1936, March 1950 to current season, in reports of the Department of the Environment, Canada. Seasonal records only. Estimates of seasonal diversion only in most years prior to March 1950.

GAGE.--Water-stage recorder. Altitude of gage is 2,920 ft (from topographic map). Prior to March 1950, non-recording gages at several sites within 2 miles of present site at different datums. March 1950 to July 8, 1960, water-stage recorder at site 350 ft downstream at different datum.

EXTREMES.--Period of record: Maximum daily discharge, 65 cfs Apr. 22, 1950; no flow most of each season.

REMARKS.--Records good. Canal diverts water from right bank of Lodge Creek in SW¼ sec.35, T.2, R.30 W., third meridian, for irrigation of 1,020 acres of land under Spangler irrigation project.

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

## DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR 1971

| DAY   | JAN | FEB   | MAR | APR   | MAY   | JUN    | JUL    | AUG  | SEP   | OCT | NOV   | DEC |
|-------|-----|-------|-----|-------|-------|--------|--------|------|-------|-----|-------|-----|
| 1     |     |       |     | 0     | 24    | .11    | 0      | 32   |       |     |       |     |
| 2     |     |       |     | 0     | 25    |        | 0      | 26   |       |     |       |     |
| 3     |     |       |     | 0     | 25    | 0      | 0      | 18   |       |     |       |     |
| 4     |     |       |     | 0     | 25    | 0      | 0      | 4.7  |       |     |       |     |
| 5     |     |       |     | 0     | 25    | 0      | 0      | 0    |       |     |       |     |
| 6     |     |       |     | 0     | 25    | 0      | 0      | 0    |       |     |       |     |
| 7     |     |       |     | 0     | 12    | 0      | 0      | 0    |       |     |       |     |
| 8     |     |       |     | 0     | 0     | 0      | 0      | 0    |       |     |       |     |
| 9     |     |       |     | 0     | 0     | 0      | 0      | 0    |       |     |       |     |
| 10    |     |       |     | 0     | 0     | 0      | 0      | 0    |       |     |       |     |
| 11    |     |       |     | 0     | 0     | 0      | 0      | 0    |       |     |       |     |
| 12    |     |       |     | 0     | 0     | 0      | 0      | 0    |       |     |       |     |
| 13    |     |       |     | 0     | 0     | 0      | .86    | 0    |       |     |       |     |
| 14    |     |       |     | 0     | 0     | 0      | 29     | 0    |       |     |       |     |
| 15    |     |       |     | 0     | 0     | 0      | 39     | 0    |       |     |       |     |
| 16    |     |       |     | 0     | 1.1   | 0      | 39     | 0    |       |     |       |     |
| 17    |     |       |     | 0     | 24    | 0      | 5.5    | 0    |       |     |       |     |
| 18    |     |       |     | 0     | 34    | 0      | 12     | 0    |       |     |       |     |
| 19    |     |       |     | 0     | 36    | 0      | 5.4    | 0    |       |     |       |     |
| 20    |     |       |     | 0     | 40    | 0      | .25    | 0    |       |     |       |     |
| 21    |     |       |     | 0     | 41    | 2.2    | 0      | 0    |       |     |       |     |
| 22    |     |       |     | 0     | 41    | 38     | 17     | 0    |       |     |       |     |
| 23    |     |       |     | 0     | 41    | 42     | 36     | 0    |       |     |       |     |
| 24    |     |       |     | 0     | 41    | 32     | 44     | 0    |       |     |       |     |
| 25    |     |       |     | 0     | 41    | 18     | 45     | 0    |       |     |       |     |
| 26    |     |       |     | 10    | 39    | 1.7    | 47     | 0    |       |     |       |     |
| 27    |     |       |     | 20    | 34    | 0      | 47     | 0    |       |     |       |     |
| 28    |     |       |     | 22    | 26    | 0      | 47     | 0    |       |     |       |     |
| 29    |     | ----- |     | 24    | 17    | 0      | 47     | 0    |       |     |       |     |
| 30    |     | ----- |     | 24    | 9.4   | 0      | 47     | 0    |       |     |       |     |
| 31    |     | ----- |     | ----- | 7.8   | -----  | 42     | 0    | ----- |     | ----- |     |
| TOTAL |     |       | 0   | 100   | 634.3 | 134.01 | 550.01 | 80.7 | 0     | 0   |       |     |
| MEAN  |     |       | 0   | 3.33  | 20.5  | 4.47   | 17.7   | 2.60 | 0     | 0   |       |     |
| MAX   |     |       | 0   | 24    | 41    | 42     | 47     | 32   | 0     | 0   |       |     |
| MIN   |     |       | 0   | 0     | 0     | 0      | 0      | 0    | 0     | 0   |       |     |
| AC-FT |     |       | 0   | 198   | 1,260 | 266    | 1,090  | 160  | 0     | 0   |       |     |

THE SEASON MARCH TO OCTOBER

AC-FT 2,970

## MILK RIVER BASIN

93

06144350 Middle Creek near Alberta Boundary

(International gaging station)

LOCATION.--Lat 49°25'30", long 110°03'08", in SE 1/4 sec. 34, T. 5, R. 1 W., fourth meridian, on left bank 2 miles upstream from Middle Creek Reservoir and 18 miles northwest of Govenlock, Saskatchewan.

DRAINAGE AREA.--116 sq mi.

PERIOD OF RECORD.--March 1963 to current season. June 1910 to April 1915 and September 1949 to current season in reports of Department of the Environment, Canada. Seasonal records only. Published as "at McKinnon's Ranch" 1910-15.

GAGE.--Water-stage recorder. Datum of gage is 3,381.13 ft above mean sea level (Geodetic Surveys of Canada datum). Prior to Mar. 1, 1951, nonrecording gages, and Mar. 1, 1951, to July 5, 1961, water-stage recorder at site 0.3 mile downstream at different datums.

EXTREMES.--Current season: Maximum discharge, 562 cfs Apr. 16 (gage height, 7.31 ft); minimum, 0.35 cfs Oct. 27 (gage height, 2.93 ft).

Period of record: Maximum discharge, 4,980 cfs Apr. 15, 1952 (gage height, 10.27 ft, site and datum then in use), from rating curve extended above 600 cfs on basis of slope-area measurement of peak flow; no flow at times.

REMARKS.--Records good. Minor diversions for irrigation above station.

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

## DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR 1971

| DAY   | JAN | FEB   | MAR   | APR      | MAY   | JUN   | JUL   | AUG   | SEP   | OCT   | NOV   | DEC |
|-------|-----|-------|-------|----------|-------|-------|-------|-------|-------|-------|-------|-----|
| 1     |     |       | .50   | .73      | 1.7   | 1.8   | .90   | .67   | .66   | .52   | .51   |     |
| 2     |     |       | .50   | .72      | 1.6   | 1.7   | .86   | .63   | .59   | .52   | .50   |     |
| 3     |     |       | .53   | .76      | 2.1   | 1.6   | .81   | .64   | .58   | .51   | .48   |     |
| 4     |     |       | .52   | .88      | 2.5   | 1.7   | .76   | .65   | .57   | .52   | -     |     |
| 5     |     |       | .52   | 1.1      | 2.3   | 1.6   | .75   | .64   | .55   | .51   | -     |     |
| 6     |     |       | .53   | 1.6      | 2.1   | 1.9   | .75   | .64   | .53   | .52   | -     |     |
| 7     |     |       | .53   | 3.7      | 2.1   | 1.9   | .75   | .66   | .52   | .49   | -     |     |
| 8     |     |       | .56   | 14       | 2.3   | 1.8   | .74   | .65   | .51   | .51   | -     |     |
| 9     |     |       | .58   | 8.0      | 1.5   | 1.7   | .74   | .61   | .51   | .52   | -     |     |
| 10    |     |       | .59   | 4.5      | 1.1   | 5.9   | .77   | .63   | .52   | .50   | -     |     |
| 11    |     |       | .62   | 3.5      | 7.3   | 5.2   | .69   | .64   | .50   | .50   | -     |     |
| 12    |     |       | .64   | 4.9      | 4.4   | 3.0   | .62   | .64   | .46   | .42   | -     |     |
| 13    |     |       | .66   | 5.7      | 3.0   | 2.2   | .67   | .64   | .48   | .46   | -     |     |
| 14    |     |       | .68   | 8.2      | 2.4   | 1.8   | .64   | .66   | .49   | .45   | -     |     |
| 15    |     |       | .72   | 126      | 2.1   | 1.5   | .64   | .63   | .50   | .49   | -     |     |
| 16    |     |       | .73   | 323      | 2.0   | 1.4   | .63   | .60   | .54   | .55   | -     |     |
| 17    |     |       | .71   | 221      | 2.1   | 1.3   | .60   | .57   | .58   | .57   | -     |     |
| 18    |     |       | .70   | 70       | 2.2   | 1.3   | .66   | .58   | .56   | .55   | -     |     |
| 19    |     |       | .67   | 52       | 2.1   | 1.4   | .68   | .59   | .56   | .54   | -     |     |
| 20    |     |       | .67   | 75       | 2.2   | 1.3   | .71   | .62   | .59   | .53   | -     |     |
| 21    |     |       | .65   | 130      | 4.4   | 1.2   | .71   | .59   | .57   | .50   | -     |     |
| 22    |     |       | .64   | 201      | 3.6   | 1.2   | .72   | .59   | .54   | .50   | -     |     |
| 23    |     |       | .61   | 212      | 2.8   | 1.2   | .72   | .64   | .49   | .49   | -     |     |
| 24    |     |       | .60   | 195      | 2.3   | 1.2   | .67   | .63   | .53   | .49   | -     |     |
| 25    |     |       | .61   | 145      | 2.1   | 1.1   | .70   | .62   | .50   | .48   | -     |     |
| 26    |     |       | .60   | 88       | 2.0   | 1.0   | .72   | .59   | .49   | .46   | -     |     |
| 27    |     |       | .58   | 44       | 1.9   | .98   | .73   | .57   | .51   | .45   | -     |     |
| 28    |     |       | .60   | 25       | 1.7   | 1.0   | .71   | .55   | .53   | .48   | -     |     |
| 29    |     | ----- | .62   | 15       | 1.7   | 1.2   | .71   | .54   | .52   | .48   | -     |     |
| 30    |     | ----- | .73   | 19       | 1.8   | .99   | .70   | .59   | .52   | .48   | -     |     |
| 31    |     | ----- | .83   | -----    | 1.9   | ----- | .67   | .70   | ----- | .53   | ----- |     |
| TOTAL |     |       | 19.23 | 2,003.69 | 249.0 | 72.37 | 22.13 | 15.20 | 16.03 | 15.52 | -     |     |
| MEAN  |     |       | .62   | 66.8     | 8.03  | 2.41  | .71   | .62   | .53   | .50   | -     |     |
| MAX   |     |       | .83   | 323      | 2.5   | 1.7   | .90   | .70   | .66   | .57   | -     |     |
| MIN   |     |       | .50   | .72      | 1.7   | .98   | .60   | .54   | .48   | .42   | -     |     |
| AC-FT |     |       | 38    | 3,970    | 494   | 144   | 44    | 38    | 32    | 31    | -     |     |

THE SEASON MARCH TO OCTOBER

AC-FT 4,790

## MILK RIVER BASIN

06144400 Middle Creek near Battle Creek, Saskatchewan

(International gaging station)

LOCATION.--Lat 49°24'20", long 109°52'22", in NE¼ sec.20, T.5, R.29 W., third meridian, on left bank about 2.1 miles southwest of Battle Creek, 12.9 miles north of Govenlock, and 14 miles downstream from Middle Creek reservoir.

DRAINAGE AREA.--177 sq mi.

PERIOD OF RECORD.--March 1963 to current season. July 1960 to current season in reports of Department of the Environment, Canada. Seasonal records only.

GAGE.--Water-stage recorder. Altitude of gage is 3,270 ft (from topographic map).

EXTREMES.--Current season: Maximum discharge, 48 cfs July 23 (gage height, 4.72 ft); maximum gage height, 6.52 ft, Apr. 16 (backwater from ice); minimum daily discharge, 0.49 cfs July 31, Aug. 2.

Period of record: Maximum discharge, 750 cfs July 4, 1963 (gage height, 6.79 ft), on basis of step-backwater measurements of discharges at 200, 400 and 1,000 cfs; no flow at times.

REMARKS.--Records good. Flow regulated by Middle Creek Reservoir (see p. 181). Minor diversions for irrigation above station. Flow may be diverted to Lodge Creek through Middle Creek Reservoir.

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

## DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR 1971

| DAY   | JAN | FEB | MAR | APR    | MAY   | JUN   | JUL   | AUG    | SEP   | OCT   | NOV   | DEC |
|-------|-----|-----|-----|--------|-------|-------|-------|--------|-------|-------|-------|-----|
| 1     |     |     |     | .70    | 2.2   | .98   | 2.1   | .51    | 1.0   | .99   | 1.3   |     |
| 2     |     |     |     | .70    | 2.4   | .94   | 1.8   | .49    | .88   | .98   | 1.0   |     |
| 3     |     |     |     | .80    | 2.3   | .83   | 1.4   | .50    | 3.6   | 1.0   | 1.0   |     |
| 4     |     |     |     | .90    | 2.1   | .89   | .93   | .59    | 3.3   | .99   | -     |     |
| 5     |     |     |     | 1.0    | 1.8   | .89   | .70   | .54    | 1.8   | .97   | -     |     |
| 6     |     |     |     | 1.1    | 1.7   | 1.2   | .61   | 18     | 1.3   | .93   | -     |     |
| 7     |     |     |     | 1.3    | 1.9   | 1.6   | .72   | 36     | 1.1   | .81   | -     |     |
| 8     |     |     |     | 1.5    | 1.3   | 1.1   | .71   | 38     | .96   | .79   | -     |     |
| 9     |     |     |     | 1.9    | 1.1   | .89   | .63   | 38     | .96   | .83   | -     |     |
| 10    |     |     |     | 2.1    | 1.0   | .69   | .71   | 37     | .93   | .82   | -     |     |
| 11    |     |     |     | 5.1    | .96   | .66   | .75   | 38     | 1.0   | .81   | -     |     |
| 12    |     |     |     | 2.5    | .93   | .60   | .64   | 37     | .92   | .64   | -     |     |
| 13    |     |     |     | 3.5    | .94   | .60   | .68   | 30     | .90   | .65   | -     |     |
| 14    |     |     |     | 5.0    | .91   | .71   | .62   | 29     | 1.0   | .81   | -     |     |
| 15    |     |     |     | 10     | .82   | .59   | .60   | 27     | .99   | .69   | -     |     |
| 16    |     |     |     | 15     | .97   | 2.3   | .58   | 17     | 1.1   | .81   | -     |     |
| 17    |     |     |     | 13     | 1.1   | 3.0   | .54   | 14     | 3.9   | 1.0   | -     |     |
| 18    |     |     |     | 8.6    | 1.2   | 1.6   | .53   | 14     | 2.4   | 1.0   | -     |     |
| 19    |     |     |     | 8.5    | 1.1   | 7.9   | .56   | 14     | 1.6   | .84   | -     |     |
| 20    |     |     |     | 16     | 1.2   | 3.9   | .60   | 15     | 1.6   | .79   | -     |     |
| 21    |     |     |     | 38     | 1.4   | 2.9   | .53   | 13     | 1.2   | .70   | -     |     |
| 22    |     |     |     | 22     | 1.4   | 2.2   | .55   | 5.9    | 1.2   | .71   | -     |     |
| 23    |     |     |     | 14     | 1.1   | 2.8   | 10    | 2.9    | 1.1   | .72   | -     |     |
| 24    |     |     |     | 13     | .95   | 4.1   | 11    | 1.6    | 1.1   | .75   | -     |     |
| 25    |     |     |     | 8.9    | .91   | 3.5   | 4.1   | 1.3    | .99   | .73   | -     |     |
| 26    |     |     |     | 4.0    | .87   | 2.5   | 2.3   | 1.2    | .98   | .67   | -     |     |
| 27    |     |     |     | 2.6    | .84   | 9.0   | 1.2   | 1.0    | 1.0   | .90   | -     |     |
| 28    |     |     |     | 2.1    | .79   | 4.7   | .78   | .92    | 1.1   | 1.1   | -     |     |
| 29    |     |     |     | 2.5    | .76   | 3.3   | .61   | .93    | 1.0   | 1.6   | -     |     |
| 30    |     |     |     | 2.3    | .81   | 2.8   | .53   | .90    | .99   | 1.5   | -     |     |
| 31    |     |     |     | -----  | .96   | ----- | .49   | .97    | ----- | 1.5   | ----- |     |
| TOTAL |     |     |     | 208.60 | 38.72 | 69.67 | 48.50 | 435.25 | 41.90 | 28.03 | -     |     |
| MEAN  |     |     |     | 6.95   | 1.25  | 2.32  | 1.56  | 14.0   | 1.40  | .90   | -     |     |
| MAX   |     |     |     | 38     | 2.4   | 9.0   | 11    | 38     | 3.9   | 1.6   | -     |     |
| MIN   |     |     |     | .70    | .76   | .59   | .49   | .49    | .88   | .64   | -     |     |
| AC-FT |     |     |     | 414    | 77    | 138   | 96    | 863    | 83    | 56    | -     |     |

THE SEASON APRIL TO OCTOBER

AC-FT 1,730

## MILK RIVER BASIN

95

06145500 Lodge Creek below McRae Creek, at international boundary

(International gaging station)

LOCATION.--Lat 49°00'20", long 109°43'05", in SW $\frac{1}{4}$  sec. 5, T.1, R.28 W., third meridian, in Saskatchewan, on right bank 0.3 mile downstream from McRae Creek, 0.4 mile north of international boundary, 0.8 mile northeast of Willow Creek Port of Entry, and 31 miles north of Havre, Mont.

DRAINAGE AREA.--818 sq mi.

PERIOD OF RECORD.--October 1951 to current season (seasonal records only). Prior to October 1951, records were collected on both McRae Coulee (1927-51) and Lodge Creek above McRae Coulee (1910-51). Summations are equivalent to records at this site. Prior to March 1965, published as "below McRae Coulee".

GAGE.--Water-stage recorder. Datum of gage is 2,731.0 ft above mean sea level (International Boundary Survey datum).

EXTREMES.--Current season: Maximum discharge, 458 cfs Apr. 17 (gage height, 5.25 ft); no flow at times.

Period of record: Maximum discharge, 7,760 cfs June 14, 1962 (gage height, 14.40 ft); no flow at times each season.

Flood of June 14, 1962, is probably the highest since 1910.

REMARKS.--Records fair. Natural flow affected by numerous storage reservoirs, diversions for irrigation, and return flow from irrigated areas.

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

## DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR 1971

| DAY   | JAN | FEB   | MAR | APR     | MAY   | JUN    | JUL | AUG  | SEP   | OCT | NOV   | DEC |
|-------|-----|-------|-----|---------|-------|--------|-----|------|-------|-----|-------|-----|
| 1     |     |       | 0   | 14      | 45    | 5.2    |     | 0    | 22    |     |       |     |
| 2     |     |       | 0   | 2.5     | 35    | 3.1    |     | 0    | 50    |     |       |     |
| 3     |     |       | 0   | 2.2     | 28    | 2.2    |     | 0    | 5.2   |     |       |     |
| 4     |     |       | 0   | 2.3     | 25    | 2.1    |     | 0    | 2.5   |     |       |     |
| 5     |     |       | 0   | 2.3     | 22    | 1.5    |     | 0    | 1.4   |     |       |     |
| 6     |     |       | 0   | 2.4     | 22    | 1.5    |     | 0    | .92   |     |       |     |
| 7     |     |       | 0   | 16      | 23    | 1.5    |     | 0    | .63   |     |       |     |
| 8     |     |       | 0   | 54      | 19    | 1.5    |     | 0    | .36   |     |       |     |
| 9     |     |       | 0   | 32      | 14    | 1.4    |     | 0    | .32   |     |       |     |
| 10    |     |       | 0   | 214     | 14    | 4.6    |     | 0    | .26   |     |       |     |
| 11    |     |       | 0   | 98      | 16    | 151    |     | 0    | .20   |     |       |     |
| 12    |     |       | 0   | 63      | 14    | 103    |     | 0    | .13   |     |       |     |
| 13    |     |       | 0   | 42      | 16    | 17     |     | 0    | .01   |     |       |     |
| 14    |     |       | 0   | 55      | 14    | 6.1    |     | 0    | 0     |     |       |     |
| 15    |     |       | 0   | 133     | 99    | 2.9    |     | 0    | 0     |     |       |     |
| 16    |     |       | 0   | 265     | 57    | 1.9    |     | 0    | 0     |     |       |     |
| 17    |     |       | 0   | 416     | 126   | 1.4    |     | 0    | 0     |     |       |     |
| 18    |     |       | 0   | 389     | 87    | 1.1    |     | 0    | 0     |     |       |     |
| 19    |     |       | 0   | 258     | 46    | 1.0    |     | 0    | 0     |     |       |     |
| 20    |     |       | 0   | 112     | 26    | .82    |     | 0    | 0     |     |       |     |
| 21    |     |       | 0   | 55      | 19    | .72    |     | 0    | 0     |     |       |     |
| 22    |     |       | 0   | 144     | 14    | .54    |     | 0    | 0     |     |       |     |
| 23    |     |       | 0   | 285     | 7.4   | .36    |     | 0    | 0     |     |       |     |
| 24    |     |       | 0   | 350     | 5.0   | .29    |     | 0    | 0     |     |       |     |
| 25    |     |       | 0   | 305     | 4.3   | .26    |     | 0    | 0     |     |       |     |
| 26    |     |       | 0   | 258     | 6.1   | .16    |     | 0    | 0     |     |       |     |
| 27    |     |       | 0   | 196     | 5.2   | .04    |     | 1.2  | 0     |     |       |     |
| 28    |     |       | 0   | 132     | 5.0   | .01    |     | 5.0  | 0     |     |       |     |
| 29    |     | ----- | 0   | 93      | 6.1   | .10    |     | 2.6  | 0     |     |       |     |
| 30    |     | ----- | 0   | 64      | 4.8   | .07    |     | 1.7  | 0     |     |       |     |
| 31    |     | ----- | 6.2 | -----   | 4.8   | -----  |     | 1.3  | ----- |     | ----- |     |
| TOTAL |     |       | 6.2 | 4,054.7 | 869.7 | 313.37 | 0   | 11.8 | 87.93 | 0   |       |     |
| MEAN  |     |       | .20 | 135     | 28.1  | 10.4   | 0   | .38  | 2.93  | 0   |       |     |
| MAX   |     |       | 6.2 | 416     | 126   | 151    | 0   | 5.0  | 50    | 0   |       |     |
| MIN   |     |       | 0   | 2.2     | 4.3   | .01    | 0   | 0    | 0     | 0   |       |     |
| AC-FT |     |       | 12  | 8,040   | 1,730 | 622    | 0   | 23   | 174   | 0   |       |     |

THE SEASON MARCH TO OCTOBER AC-FT 10,600





## MILK RIVER BASIN

97

06148500 Cypress Lake west inflow canal near West Plains, Saskatchewan

(International gaging station)

LOCATION.--Lat 49°28'18", long 109°37'08", in SE¼ sec.18, T.6, R.27 W., third meridian, on left bank 2.5 miles downstream from canal headgates, 5.5 miles northeast of West Plains, and 13 miles northwest of Consul.

PERIOD OF RECORD.--March 1939 to current season (seasonal records only). Monthly discharge only for some periods, published in WSP 1309.

GAGE.--Water-stage recorder. Altitude of gage is 3,210 ft (from topographic map). Prior to Oct. 16, 1956, at site 2.3 miles upstream at different datum.

EXTREMES.--Period of record: Maximum daily discharge, 884 cfs Apr. 27, 1965: no flow at times each season.

REMARKS.--Records fair. Canal diverts water from Battle Creek in NW¼ sec.1, T.6, R.28 W., third meridian, for storage in Cypress Lake. Part or all of flow may be returned to Battle Creek via wasteway and drain canal 0.4 mile downstream.

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

## DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR 1971

| DAY   | JAN | FEB   | MAR | APR      | MAY  | JUN     | JUL | AUG | SEP   | OCT | NOV   | DEC |
|-------|-----|-------|-----|----------|------|---------|-----|-----|-------|-----|-------|-----|
| 1     |     |       |     | 0        | 1.2  | 0       | 4.3 |     |       |     |       |     |
| 2     |     |       |     | 0        | 1.3  | 0       | 0   |     |       |     |       |     |
| 3     |     |       |     | 0        | 1.4  | 0       | 0   |     |       |     |       |     |
| 4     |     |       |     | 0        | 1.4  | 0       | 0   |     |       |     |       |     |
| 5     |     |       |     | 0        | 1.2  | 0       | 0   |     |       |     |       |     |
| 6     |     |       |     | .02      | 1.2  | 0       | 0   |     |       |     |       |     |
| 7     |     |       |     | 0        | .73  | 54      | 0   |     |       |     |       |     |
| 8     |     |       |     | 1.1      | .46  | 241     | 0   |     |       |     |       |     |
| 9     |     |       |     | 14       | .37  | 169     | 0   |     |       |     |       |     |
| 10    |     |       |     | 116      | .16  | 140     | 0   |     |       |     |       |     |
| 11    |     |       |     | 100      | .05  | 101     | 0   |     |       |     |       |     |
| 12    |     |       |     | 73       | 0    | 85      | 0   |     |       |     |       |     |
| 13    |     |       |     | 99       | 0    | 70      | 0   |     |       |     |       |     |
| 14    |     |       |     | 88       | 0    | 18      | 0   |     |       |     |       |     |
| 15    |     |       |     | 116      | 0    | 39      | 0   |     |       |     |       |     |
| 16    |     |       |     | 168      | 0    | 0       | 0   |     |       |     |       |     |
| 17    |     |       |     | 220      | 0    | 0       | 0   |     |       |     |       |     |
| 18    |     |       |     | 270      | 0    | 0       | 0   |     |       |     |       |     |
| 19    |     |       |     | 154      | 0    | 0       | 0   |     |       |     |       |     |
| 20    |     |       |     | 89       | 0    | 0       | 0   |     |       |     |       |     |
| 21    |     |       |     | 125      | 0    | 0       | 0   |     |       |     |       |     |
| 22    |     |       |     | 202      | 0    | 0       | 0   |     |       |     |       |     |
| 23    |     |       |     | 296      | 0    | 0       | 0   |     |       |     |       |     |
| 24    |     |       |     | 325      | 0    | 0       | 0   |     |       |     |       |     |
| 25    |     |       |     | 193      | 0    | 0       | 0   |     |       |     |       |     |
| 26    |     |       |     | 68       | 0    | 0       | 0   |     |       |     |       |     |
| 27    |     |       |     | 1.3      | 0    | 0       | 0   |     |       |     |       |     |
| 28    |     |       |     | 1.2      | 0    | 9.1     | 0   |     |       |     |       |     |
| 29    |     | ----- |     | 1.2      | 0    | 45      | 0   |     |       |     |       |     |
| 30    |     | ----- |     | 1.2      | 0    | 45      | 0   |     |       |     |       |     |
| 31    |     | ----- |     | -----    | 0    | -----   | 0   |     | ----- |     | ----- |     |
| TOTAL |     |       | 0   | 2,722.02 | 9.47 | 1,016.1 | 4.3 | 0   | 0     | 0   |       |     |
| MEAN  |     |       | 0   | 90.7     | .31  | 33.9    | .14 | 0   | 0     | 0   |       |     |
| MAX   |     |       | 0   | 325      | 1.4  | 241     | 4.3 | 0   | 0     | 0   |       |     |
| MIN   |     |       | 0   | 0        | 0    | 0       | 0   | 0   | 0     | 0   |       |     |
| AC-FT |     |       | 0   | 5,400    | 19   | 2,020   | 8.5 | 0   | 0     | 0   |       |     |

THE SEASON MARCH TO OCTOBER AC-FT 7,440

## MILK RIVER BASIN

06148700 Cypress Lake west inflow canal drain near Oxarat, Saskatchewan

(International gaging station)

LOCATION.--Lat 49°28'26", long 109°36'41", in NW $\frac{1}{4}$  sec.17, T.6, R.27 W., third meridian, on left bank about 500 ft downstream from drain gate on Cypress Lake west inflow canal, 0.5 mile upstream from Battle Creek, and 4 miles northwest of Oxarat Post Office.

PERIOD OF RECORD.--March 1963 to current season. March 1955 to current season in reports of Department of the Environment, Canada. Seasonal records only.

GAGE.--Water-stage recorder. Altitude of gage is 3,200 ft (from topographic map).

EXTREMES.--Period of record: Maximum daily discharge, 450 cfs Apr. 20, 1955; no flow at times each season.

REMARKS.--Records fair. Drain used as an emergency bypass to return diverted water to Battle Creek. It may also be used to return stored water from Cypress Lake when lake stage is high.

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

## DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR 1971

| DAY   | JAN | FEB   | MAR | APR   | MAY    | JUN   | JUL    | AUG  | SEP   | OCT | NOV   | DEC |
|-------|-----|-------|-----|-------|--------|-------|--------|------|-------|-----|-------|-----|
| 1     |     |       |     | 0     | .02    | .07   | .01    | .07  | .01   |     |       |     |
| 2     |     |       |     | 0     | .02    | .04   | .01    | .06  | 0     |     |       |     |
| 3     |     |       |     | 0     | .01    | .02   | .01    | .05  | 0     |     |       |     |
| 4     |     |       |     | 0     | .01    | .01   | .01    | .04  | 0     |     |       |     |
| 5     |     |       |     | 0     | .01    | .01   | .01    | .03  | 0     |     |       |     |
| 6     |     |       |     | .10   | .01    | .01   | .01    | .03  | 0     |     |       |     |
| 7     |     |       |     | .20   | .01    | .01   | .01    | .03  | 0     |     |       |     |
| 8     |     |       |     | .20   | .01    | .04   | .01    | .04  | 0     |     |       |     |
| 9     |     |       |     | .20   | .01    | .03   | .01    | .03  | 0     |     |       |     |
| 10    |     |       |     | .20   | .01    | .03   | .02    | .03  | 0     |     |       |     |
| 11    |     |       |     | .20   | .01    | .02   | .01    | .03  | 0     |     |       |     |
| 12    |     |       |     | .18   | .01    | .01   | .01    | .03  | 0     |     |       |     |
| 13    |     |       |     | .15   | .01    | .01   | .05    | .03  | 0     |     |       |     |
| 14    |     |       |     | .12   | .01    | .01   | 3.1    | .03  | 0     |     |       |     |
| 15    |     |       |     | .10   | .01    | .01   | 10     | .03  | 0     |     |       |     |
| 16    |     |       |     | .10   | 23     | .01   | 17     | .03  | 0     |     |       |     |
| 17    |     |       |     | .09   | 65     | .01   | 17     | .04  | 0     |     |       |     |
| 18    |     |       |     | .09   | 63     | .01   | 17     | .04  | 0     |     |       |     |
| 19    |     |       |     | .08   | 61     | .01   | 30     | .04  | 0     |     |       |     |
| 20    |     |       |     | .08   | 59     | .01   | 28     | .04  | .01   |     |       |     |
| 21    |     |       |     | .07   | 60     | .01   | 25     | .04  | 0     |     |       |     |
| 22    |     |       |     | .07   | 48     | .01   | 24     | .05  | 0     |     |       |     |
| 23    |     |       |     | .06   | 35     | .01   | 20     | .05  | 0     |     |       |     |
| 24    |     |       |     | .06   | 37     | .01   | 10     | .04  | 0     |     |       |     |
| 25    |     |       |     | .05   | 38     | .01   | 13     | .02  | 0     |     |       |     |
| 26    |     |       |     | .05   | 39     | .01   | 11     | .01  | 0     |     |       |     |
| 27    |     |       |     | .04   | 39     | .01   | 8.1    | .01  | 0     |     |       |     |
| 28    |     |       |     | .04   | 39     | .01   | 6.8    | 0    | 0     |     |       |     |
| 29    |     | ----- |     | .03   | 41     | .02   | 5.3    | 0    | 0     |     |       |     |
| 30    |     | ----- |     | .03   | 27     | .01   | 3.1    | 0    | 0     |     |       |     |
| 31    |     | ----- |     | ----- | .12    | ----- | .12    | 0    | ----- |     | ----- |     |
| TOTAL |     |       | 0   | 2.59  | 674.29 | .49   | 248.70 | .97  | .02   | 0   |       |     |
| MEAN  |     |       | 0   | .086  | 21.8   | .016  | 8.02   | .031 | .0007 | 0   |       |     |
| MAX   |     |       | 0   | .20   | 65     | .07   | 30     | .07  | .01   | 0   |       |     |
| MIN   |     |       | 0   | 0     | .01    | .01   | .01    | 0    | 0     | 0   |       |     |
| AC-FT |     |       | 0   | 5.1   | 1,340  | 1.0   | 493    | 1.9  | .04   | 0   |       |     |

THE SEASON MARCH TO OCTOBER

AC-FT 1,840

06149000 Cypress Lake west outflow canal near West Plains, Saskatchewan

(International gaging station)

LOCATION.--Lat 49°28'12", long 109°35'18", in SW $\frac{1}{4}$  sec.16, T.6, R.27 W., third meridian, on left bank 1.1 mile downstream from Cypress Lake West Dam, 6 miles northeast of West Plains, and 12.6 miles north of Consul.

PERIOD OF RECORD.--March 1940 to current season (seasonal records only). Monthly discharge only for some periods, published in WSP 1309.

GAGE.--Water-stage recorder. Altitude of gage is 3,180 ft (from topographic map). Prior to Sept. 18, 1952, at site 1 mile upstream and 300 ft downstream from Cypress Lake West Dam at different datum.

EXTREMES.--Period of record: Maximum daily discharge, 304 cfs May 4, 1951; no flow at times each season.

REMARKS.--Records good. Canal diverts water from Cypress Lake in NW $\frac{1}{4}$  sec.15, T.6, R.27 W., third meridian, for irrigation of 5,500 acres of land in Battle Creek basin in Saskatchewan. Water may be delivered to Battle Creek or diverted into Vidora Ditch at gate structure near lower end of canal.

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

## DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR 1971

| DAY   | JAN | FEB   | MAR | APR    | MAY      | JUN    | JUL      | AUG    | SEP   | OCT  | NOV   | DEC |
|-------|-----|-------|-----|--------|----------|--------|----------|--------|-------|------|-------|-----|
| 1     |     |       |     | 0      | 18       | .44    | 10       | 129    | .13   | .10  | 0     |     |
| 2     |     |       |     | 0      | 18       | .33    | 9.2      | 123    | .09   | .10  | .02   |     |
| 3     |     |       |     | 0      | 18       | .21    | 9.1      | 108    | .06   | .09  | -     |     |
| 4     |     |       |     | 0      | 20       | .19    | 8.2      | 86     | .04   | .09  | -     |     |
| 5     |     |       |     | 0      | 20       | .41    | 7.9      | 88     | .04   | .10  | -     |     |
| 6     |     |       |     | .20    | 21       | 71     | 7.7      | 68     | .03   | .10  | -     |     |
| 7     |     |       |     | .40    | 20       | 74     | 8.1      | 23     | 0     | .09  | -     |     |
| 8     |     |       |     | .60    | 17       | 76     | 5.4      | .56    | 0     | .07  | -     |     |
| 9     |     |       |     | .80    | 16       | 76     | 2.6      | .17    | .01   | .10  | -     |     |
| 10    |     |       |     | 1.0    | 13       | 75     | 1.5      | .15    | .02   | .12  | -     |     |
| 11    |     |       |     | 1.0    | 11       | 69     | 1.2      | .11    | .02   | .12  | -     |     |
| 12    |     |       |     | 1.0    | 10       | 38     | .75      | .09    | .01   | .12  | -     |     |
| 13    |     |       |     | 1.0    | 9.4      | 37     | .42      | .09    | 0     | .13  | -     |     |
| 14    |     |       |     | 1.0    | 9.2      | 38     | .22      | .08    | 0     | .16  | -     |     |
| 15    |     |       |     | 1.0    | 7.9      | 25     | .16      | .06    | 0     | .14  | -     |     |
| 16    |     |       |     | 1.0    | 7.3      | .19    | .12      | .04    | .10   | .15  | -     |     |
| 17    |     |       |     | 1.0    | 8.0      | .14    | .08      | .01    | .16   | .16  | -     |     |
| 18    |     |       |     | 1.0    | 62       | .12    | 18       | 0      | .14   | .14  | -     |     |
| 19    |     |       |     | 1.0    | 111      | .15    | 113      | 0      | .16   | .12  | -     |     |
| 20    |     |       |     | 1.0    | 108      | .19    | 135      | 0      | .19   | .11  | -     |     |
| 21    |     |       |     | 25     | 107      | 1.5    | 136      | 0      | .13   | .10  | -     |     |
| 22    |     |       |     | 99     | 107      | 25     | 143      | 0      | .12   | .08  | -     |     |
| 23    |     |       |     | 97     | 103      | 29     | 143      | 0      | .09   | .10  | -     |     |
| 24    |     |       |     | 91     | 101      | 31     | 140      | .01    | .09   | .11  | -     |     |
| 25    |     |       |     | 71     | 100      | 18     | 141      | .03    | .09   | .10  | -     |     |
| 26    |     |       |     | 46     | 98       | 9.1    | 141      | .02    | .10   | .11  | -     |     |
| 27    |     |       |     | 37     | 97       | 9.2    | 138      | .01    | .11   | .08  | -     |     |
| 28    |     |       |     | 23     | 76       | 10     | 139      | 0      | .14   | .04  | -     |     |
| 29    |     | ----- |     | 19     | 36       | 12     | 139      | .01    | .13   | 0    | -     |     |
| 30    |     | ----- |     | 20     | .56      | 11     | 130      | .03    | .11   | 0    | -     |     |
| 31    |     | ----- |     | -----  | .45      | -----  | 116      | .07    | ----- | 0    | ----- |     |
| TOTAL |     |       | 0   | 541.00 | 1,350.81 | 777.76 | 1,844.65 | 626.54 | 2.31  | 3.03 | -     |     |
| MEAN  |     |       | 0   | 18.0   | 43.6     | 25.9   | 59.5     | 20.2   | .077  | .098 | -     |     |
| MAX   |     |       | 0   | 99     | 111      | 76     | 143      | 129    | .19   | .16  | -     |     |
| MIN   |     |       | 0   | 0      | .45      | .12    | .08      | 0      | 0     | 0    | -     |     |
| AC-FT |     |       | 0   | 1,070  | 2,680    | 1,540  | 3,660    | 1,240  | 4.6   | 6.0  | -     |     |

THE SEASON MARCH TO OCTOBER AC-FT 10,210

## MILK RIVER BASIN

06149100 Vidora Ditch near Consul, Saskatchewan

(International gaging station)

LOCATION.--Lat 49°27'20", long 109°35'20", in SW $\frac{1}{4}$  sec.9, T.6, R.27 W., third meridian, on left bank 0.5 mile downstream from headgate near lower end of Cypress Lake west outflow canal and 11.7 miles north of Consul.

PERIOD OF RECORD.--March 1963 to current season. March 1952 to current season in reports of Department of the Environment, Canada. Seasonal records only.

GAGE.--Water-stage recorder. Altitude of gage is 3,200 ft (from topographic map). Prior to Aug. 1, 1963, at datum 1.0 ft higher.

EXTREMES.--Period of record: Maximum daily discharge, 76 cfs May 24, 1966, June 8, 9, 1971; no flow at times each season.

REMARKS.--Records good. Water may be delivered either to this canal or returned to Battle Creek from Cypress Lake. Canal diverts water from Cypress Lake west outflow canal in NE $\frac{1}{4}$  sec.8, T.6, R.27 W., third meridian for irrigation of about 2,500 acres of land in the Battle Creek basin.

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

## DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR 1971

| DAY   | JAN | FEB   | MAR | APR   | MAY    | JUN    | JUL   | AUG  | SEP   | OCT | NOV   | DEC |
|-------|-----|-------|-----|-------|--------|--------|-------|------|-------|-----|-------|-----|
| 1     |     |       |     |       | 0      | 0      | 0     | 56   |       |     |       |     |
| 2     |     |       |     |       | 0      | 0      | 0     | 56   |       |     |       |     |
| 3     |     |       |     |       | 0      | 0      | 0     | 56   |       |     |       |     |
| 4     |     |       |     |       | 0      | 0      | 0     | 60   |       |     |       |     |
| 5     |     |       |     |       | 0      | 34     | 0     | 60   |       |     |       |     |
| 6     |     |       |     |       | 0      | 65     | 0     | 52   |       |     |       |     |
| 7     |     |       |     |       | 0      | 70     | 0     | 25   |       |     |       |     |
| 8     |     |       |     |       | 0      | 76     | 0     | 0    |       |     |       |     |
| 9     |     |       |     |       | 0      | 76     | 0     | 0    |       |     |       |     |
| 10    |     |       |     |       | 0      | 73     | 0     | 0    |       |     |       |     |
| 11    |     |       |     |       | 0      | 69     | 0     | 0    |       |     |       |     |
| 12    |     |       |     |       | 0      | 41     | 0     | 0    |       |     |       |     |
| 13    |     |       |     |       | 0      | 42     | 0     | 0    |       |     |       |     |
| 14    |     |       |     |       | 0      | 42     | 0     | 0    |       |     |       |     |
| 15    |     |       |     |       | 0      | 29     | 0     | 0    |       |     |       |     |
| 16    |     |       |     |       | 0      | .11    | 0     | 0    |       |     |       |     |
| 17    |     |       |     |       | 0      | 0      | 0     | 0    |       |     |       |     |
| 18    |     |       |     |       | 33     | 0      | 0     | 0    |       |     |       |     |
| 19    |     |       |     |       | 67     | 0      | 32    | 0    |       |     |       |     |
| 20    |     |       |     |       | 72     | 0      | 54    | 0    |       |     |       |     |
| 21    |     |       |     |       | 69     | 0      | 51    | 0    |       |     |       |     |
| 22    |     |       |     |       | 70     | 0      | 51    | 0    |       |     |       |     |
| 23    |     |       |     |       | 72     | 0      | 53    | 0    |       |     |       |     |
| 24    |     |       |     |       | 72     | 0      | 52    | 0    |       |     |       |     |
| 25    |     |       |     |       | 72     | 0      | 52    | 0    |       |     |       |     |
| 26    |     |       |     |       | 71     | 0      | 52    | 0    |       |     |       |     |
| 27    |     |       |     |       | 72     | 0      | 52    | 0    |       |     |       |     |
| 28    |     |       |     |       | 58     | 0      | 52    | 0    |       |     |       |     |
| 29    |     | ----- |     |       | 30     | 0      | 53    | 0    |       |     |       |     |
| 30    |     | ----- |     |       | .08    | 0      | 53    | 0    |       |     |       |     |
| 31    |     | ----- |     | ----- | 0      | -----  | 53    | 0    | ----- |     | ----- |     |
| TOTAL |     |       | 0   | 0     | 758.08 | 617.11 | 660   | 365  | 0     | 0   |       |     |
| MEAN  |     |       | 0   | 0     | 24.5   | 20.6   | 21.3  | 11.8 | 0     | 0   |       |     |
| MAX   |     |       | 0   | 0     | 72     | 76     | 54    | 60   | 0     | 0   |       |     |
| MIN   |     |       | 0   | 0     | 0      | 0      | 0     | 0    | 0     | 0   |       |     |
| AC-FT |     |       | 0   | 0     | 1,500  | 1,220  | 1,310 | 724  | 0     | 0   |       |     |

THE SEASON MARCH TO OCTOBER

AC-FT 4,760



## MILK RIVER BASIN

101

06149200 Richardson Ditch near Consul, Saskatchewan

(International gaging station)

LOCATION.--Lat 49°21'49", long 109°32'14", near center of south line of sec.11, T.5, R.27 W., third meridian, on left bank 420 ft downstream from headgate and 4.8 miles north of Consul.

PERIOD OF RECORD.--March 1963 to current season. 1910 to 1912, 1914, 1916 to 1920, 1922 to 1933, 1935, July 1946 to current season in reports of Department of the Environment, Canada. Seasonal records only. Estimates of seasonal diversion only in most seasons prior to 1946.

GAGE.--Water-stage recorder. Prior to June 26, 1949, nonrecording gages at different sites and datums. June 26, 1949, to Aug. 28, 1963, water-stage recorder at present site at datum 1.00 ft higher.

EXTREMES.--Period of record: Maximum daily discharge, 70 cfs July 20, 1971; no flow at times each season.

REMARKS.--Records good. Ditch diverts from left bank of Battle Creek in SW $\frac{1}{4}$  sec.11, T.5, R.27 W., third meridian, for irrigation of about 1,000 acres along Battle Creek.

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

## DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR 1971

| DAY   | JAN | FEB   | MAR | APR   | MAY    | JUN   | JUL   | AUG   | SEP   | OCT  | NOV   | DEC |
|-------|-----|-------|-----|-------|--------|-------|-------|-------|-------|------|-------|-----|
| 1     |     |       |     | 0     | .74    | .03   | 0     | 13    | .01   | 0    |       |     |
| 2     |     |       |     | 0     | .07    | .03   | 0     | 9.3   | .01   | 0    |       |     |
| 3     |     |       |     | 0     | .00    | .12   | 0     | .01   | .01   | 0    |       |     |
| 4     |     |       |     | 0     | .09    | .01   | 0     | .01   | .01   | 0    |       |     |
| 5     |     |       |     | 0     | .11    | 0     | 0     | .01   | .01   | 0    |       |     |
| 6     |     |       |     | 0     | .06    | 0     | 0     | .01   | .01   | 0    |       |     |
| 7     |     |       |     | 0     | .04    | 0     | 0     | 0     | 0     | 0    |       |     |
| 8     |     |       |     | 0     | .04    | 0     | 0     | 0     | 0     | .01  |       |     |
| 9     |     |       |     | 0     | 0      | 0     | 0     | 0     | 0     | .01  |       |     |
| 10    |     |       |     | 0     | 0      | 0     | 0     | 0     | 0     | .01  |       |     |
| 11    |     |       |     | 0     | 0      | 0     | 0     | 0     | 0     | .01  |       |     |
| 12    |     |       |     | 0     | 0      | 0     | 0     | 0     | 0     | .01  |       |     |
| 13    |     |       |     | 0     | 0      | 0     | 0     | 0     | 0     | .01  |       |     |
| 14    |     |       |     | 0     | 0      | 0     | 0     | .01   | 0     | .02  |       |     |
| 15    |     |       |     | 0     | 0      | 0     | 0     | .01   | 0     | .01  |       |     |
| 16    |     |       |     | 0     | 0      | 0     | 0     | .01   | 0     | .01  |       |     |
| 17    |     |       |     | 0     | .39    | 0     | 0     | 0     | 0     | .01  |       |     |
| 18    |     |       |     | 0     | .56    | 0     | 0     | 0     | 0     | .01  |       |     |
| 19    |     |       |     | 0     | .57    | 0     | .55   | 0     | 0     | .01  |       |     |
| 20    |     |       |     | 0     | .58    | 0     | .70   | 0     | 0     | .01  |       |     |
| 21    |     |       |     | 0     | .58    | 0     | .57   | 0     | 0     | .01  |       |     |
| 22    |     |       |     | 0     | .54    | 0     | .67   | 0     | 0     | .01  |       |     |
| 23    |     |       |     | 0     | .50    | 0     | .57   | 0     | 0     | .01  |       |     |
| 24    |     |       |     | 0     | .49    | 0     | .66   | 0     | 0     | .01  |       |     |
| 25    |     |       |     | 0     | .45    | 0     | .65   | 0     | 0     | .01  |       |     |
| 26    |     |       |     | 0     | .43    | 0     | .52   | 0     | 0     | 0    |       |     |
| 27    |     |       |     | 0     | .20    | 0     | .50   | 0     | 0     | 0    |       |     |
| 28    |     |       |     | 0     | .20    | 0     | .50   | 0     | .01   | 0    |       |     |
| 29    |     | ----- |     | .02   | .12    | 0     | .47   | 0     | .01   | 0    |       |     |
| 30    |     | ----- |     | .03   | .5.3   | 0     | .39   | 0     | 0     | 0    |       |     |
| 31    |     | ----- |     | ----- | .03    | ----- | .19   | 0     | ----- | 0    | ----- |     |
| TOTAL |     |       | 0   | .05   | 576.87 | .09   | 733   | 22.37 | .09   | .19  |       |     |
| MEAN  |     |       | 0   | .002  | 18.6   | .003  | 23.6  | .77   | .003  | .006 |       |     |
| MAX   |     |       | 0   | .03   | .58    | .03   | .70   | .13   | .01   | .02  |       |     |
| MIN   |     |       | 0   | 0     | 0      | 0     | 0     | 0     | 0     | 0    |       |     |
| AC-FT |     |       | 0   | .1    | 1,140  | .2    | 1,450 | .44   | .2    | .4   |       |     |

THE SEASON MARCH TO OCTOBER

AC-FT 2,640

## MILK RIVER BASIN

06149300 McKinnon Ditch near Consul, Saskatchewan

(International gaging station)

LOCATION.--Lat 49°19'47", long 109°29'24", in NE¼ sec.30, T.4, R.26 W., third meridian, on right bank 1.0 mile downstream from headgate on Battle Creek and 2.7 miles northeast of Consul.

PERIOD OF RECORD.--March 1963 to current season. 1911 to 1926, 1929 to 1931, and March 1938 to current season in reports of Department of the Environment, Canada. Seasonal records only. Estimates of seasonal diversion only in many years prior to 1947.

GAGE.--Water-stage recorder. Prior to September 1949, nonrecording gages at various sites and datums. Sept. 4, 1949, to Aug. 29, 1963, water-stage recorder at present site at datum 1.00 ft higher.

EXTREMES.--Period of record: Maximum daily discharge, 59 cfs July 30, 1952; no flow for most of each season.

REMARKS.--Records good. Ditch diverts from the right bank of Battle Creek in NE¼ sec.30, T.4, R.26 W., third meridian, for the irrigation of about 1,000 acres along Battle Creek.

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

## DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR 1971

| DAY   | JAN | FEB   | MAR | APR   | MAY   | JUN   | JUL   | AUG    | SEP   | OCT | NOV   | DEC |
|-------|-----|-------|-----|-------|-------|-------|-------|--------|-------|-----|-------|-----|
| 1     |     |       |     | 0     | 0     | 5.9   | 0     | 46     |       |     |       |     |
| 2     |     |       |     | 0     | 0     | .07   | 0     | 43     |       |     |       |     |
| 3     |     |       |     | 0     | 0     | 0     | 0     | 32     |       |     |       |     |
| 4     |     |       |     | 0     | 0     | 0     | 0     | 31     |       |     |       |     |
| 5     |     |       |     | 0     | 0     | 0     | 0     | 24     |       |     |       |     |
| 6     |     |       |     | 0     | 0     | 0     | 0     | 6.2    |       |     |       |     |
| 7     |     |       |     | 0     | 0     | 0     | 0     | .66    |       |     |       |     |
| 8     |     |       |     | 0     | 0     | 0     | 0     | 0      |       |     |       |     |
| 9     |     |       |     | 0     | 0     | 0     | 0     | 0      |       |     |       |     |
| 10    |     |       |     | 0     | 0     | 0     | 0     | 0      |       |     |       |     |
| 11    |     |       |     | 0     | 0     | 0     | 0     | 0      |       |     |       |     |
| 12    |     |       |     | 0     | 0     | 0     | 0     | 0      |       |     |       |     |
| 13    |     |       |     | 0     | 0     | 0     | 0     | 0      |       |     |       |     |
| 14    |     |       |     | 0     | 0     | 0     | 0     | 0      |       |     |       |     |
| 15    |     |       |     | 0     | 0     | 0     | 0     | 0      |       |     |       |     |
| 16    |     |       |     | 0     | 0     | 0     | 0     | 0      |       |     |       |     |
| 17    |     |       |     | 0     | 0     | 0     | 0     | 0      |       |     |       |     |
| 18    |     |       |     | 0     | 30    | 0     | 0     | 0      |       |     |       |     |
| 19    |     |       |     | 0     | 47    | 0     | 0     | 0      |       |     |       |     |
| 20    |     |       |     | 0     | 46    | 0     | 29    | 0      |       |     |       |     |
| 21    |     |       |     | 0     | 46    | 0     | 42    | 0      |       |     |       |     |
| 22    |     |       |     | 0     | 45    | 0     | 43    | 0      |       |     |       |     |
| 23    |     |       |     | 0     | 44    | 0     | 44    | 0      |       |     |       |     |
| 24    |     |       |     | 0     | 44    | 0     | 43    | 0      |       |     |       |     |
| 25    |     |       |     | 0     | 43    | 0     | 42    | 0      |       |     |       |     |
| 26    |     |       |     | .04   | 42    | 0     | 46    | 0      |       |     |       |     |
| 27    |     |       |     | 0     | 46    | 0     | 46    | 0      |       |     |       |     |
| 28    |     |       |     | 0     | 43    | 0     | 47    | 0      |       |     |       |     |
| 29    |     | ----- |     | 0     | 23    | 0     | 49    | 0      |       |     |       |     |
| 30    |     | ----- |     | 0     | 17    | 0     | 50    | 0      |       |     |       |     |
| 31    |     | ----- |     | ----- | 10    | ----- | 48    | 0      | ----- |     | ----- |     |
| TOTAL |     |       | 0   | .04   | 526   | 5.97  | 529   | 182.86 | 0     | 0   |       |     |
| MEAN  |     |       | 0   | .001  | 17.0  | .20   | 17.1  | 5.90   | 0     | 0   |       |     |
| MAX   |     |       | 0   | .04   | 47    | 5.9   | 50    | 46     | 0     | 0   |       |     |
| MIN   |     |       | 0   | 0     | 0     | 0     | 0     | 0      | 0     | 0   |       |     |
| AC-FT |     |       | 0   | .08   | 1,040 | 12    | 1,050 | 363    | 0     | 0   |       |     |

THE SEASON MARCH TO OCTOBER

AC-FT 2,470

## MILK RIVER BASIN

103

06149400 Nashlyn Canal near Consul, Saskatchewan

(International gaging station)

LOCATION.--Lat 49°13'57", long 109°33'27", in NE¼ sec.22, T.3, R.27 W., third meridian, on left bank 0.8 mile downstream from headgate on Battle Creek, 5.9 miles south of Consul.

PERIOD OF RECORD.--March 1963 to current season. 1912, 1914-35, 1938 to current season in reports of Department of the Environment, Canada. Seasonal records only. Estimates of seasonal diversion only in many years prior to March 1950. Prior to Mar. 1, 1971, published as "Stirling and Nash Ditch".

GAGE.--Water-stage recorder. Prior to Sept. 21, 1949, water-stage recorder at present site or nonrecording gages at site 0.5 mile downstream at different datums.

EXTREMES.--Period of record: Maximum daily discharge, 85 cfs Apr. 14, 1952; no flow at times each season.

REMARKS.--Records good. Ditch diverts water from left bank of Battle Creek in SW¼ sec.27, T.3, R.27 W., third meridian, for irrigation of about 1,000 acres along Battle Creek.

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

## DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR 1971

| DAY   | JAN | FEB   | MAR | APR    | MAY    | JUN   | JUL    | AUG | SEP   | OCT | NOV   | DEC |
|-------|-----|-------|-----|--------|--------|-------|--------|-----|-------|-----|-------|-----|
| 1     |     |       |     | 0      | 27     |       | 0      |     |       |     |       |     |
| 2     |     |       |     | 0      | 27     |       | 0      |     |       |     |       |     |
| 3     |     |       |     | 0      | 27     |       | 0      |     |       |     |       |     |
| 4     |     |       |     | 0      | 27     |       | 0      |     |       |     |       |     |
| 5     |     |       |     | 0      | 28     |       | 0      |     |       |     |       |     |
| 6     |     |       |     | 0      | 28     |       | 0      |     |       |     |       |     |
| 7     |     |       |     | 0      | 27     |       | 0      |     |       |     |       |     |
| 8     |     |       |     | 0      | 27     |       | 0      |     |       |     |       |     |
| 9     |     |       |     | 0      | 28     |       | 0      |     |       |     |       |     |
| 10    |     |       |     | 0      | 27     |       | 0      |     |       |     |       |     |
| 11    |     |       |     | 0      | 13     |       | 0      |     |       |     |       |     |
| 12    |     |       |     | 0      | 13     |       | 0      |     |       |     |       |     |
| 13    |     |       |     | 0      | 17     |       | 0      |     |       |     |       |     |
| 14    |     |       |     | .45    | 16     |       | 0      |     |       |     |       |     |
| 15    |     |       |     | 12     | 16     |       | 3.3    |     |       |     |       |     |
| 16    |     |       |     | 12     | 16     |       | 14     |     |       |     |       |     |
| 17    |     |       |     | 11     | 16     |       | 16     |     |       |     |       |     |
| 18    |     |       |     | 11     | 17     |       | 19     |     |       |     |       |     |
| 19    |     |       |     | 11     | 21     |       | 20     |     |       |     |       |     |
| 20    |     |       |     | 11     | 23     |       | 20     |     |       |     |       |     |
| 21    |     |       |     | 11     | 24     |       | 18     |     |       |     |       |     |
| 22    |     |       |     | 13     | 22     |       | 7.1    |     |       |     |       |     |
| 23    |     |       |     | 13     | 11     |       | 4.2    |     |       |     |       |     |
| 24    |     |       |     | 17     | .33    |       | 10     |     |       |     |       |     |
| 25    |     |       |     | 20     | .13    |       | 18     |     |       |     |       |     |
| 26    |     |       |     | 27     | .04    |       | 19     |     |       |     |       |     |
| 27    |     |       |     | 28     | 0      |       | 18     |     |       |     |       |     |
| 28    |     |       |     | 30     | 0      |       | 18     |     |       |     |       |     |
| 29    |     |       |     | 29     | 0      |       | 19     |     |       |     |       |     |
| 30    |     | ----- |     | 27     | 0      |       | 11     |     |       |     |       |     |
| 31    |     | ----- |     | -----  | 0      | ----- | .58    |     | ----- |     | ----- |     |
| TOTAL |     |       | 0   | 283.49 | 498.50 | 0     | 235.18 | 0   | 0     | 0   |       |     |
| MEAN  |     |       | 0   | 9.45   | 16.1   | 0     | 7.59   | 0   | 0     | 0   |       |     |
| MAX   |     |       | 0   | 30     | 28     | 0     | 20     | 0   | 0     | 0   |       |     |
| MIN   |     |       | 0   | 0      | 0      | 0     | 0      | 0   | 0     | 0   |       |     |
| AC-FT |     |       | 0   | 562    | 985    | 0     | 466    | 0   | 0     | 0   |       |     |

THE SEASON MARCH TO OCTOBER

AC-FT 2,020

## MILK RIVER BASIN

06149500 Battle Creek at international boundary

(International gaging station)

LOCATION.--Lat 49°00'08", long 109°25'20", in SE¼ sec.4, T.1, R.26 W., third meridian, on left bank 600 ft north of international boundary in Saskatchewan, 8 miles upstream from Woodpile Coulee, and 30 miles north of Chinook, Mont.

DRAINAGE AREA.--931 sq mi.

PERIOD OF RECORD.--April 1917 to current season (seasonal records only most years). Monthly discharge only for March 1918 and March 1928, published in WSP 1309.

GAGE.--Water-stage recorder. Datum of gage is 2,729.8 ft above mean sea level (International Boundary Survey datum, adjustment of 1928).

EXTREMES.--Current season: Maximum discharge, about 320 cfs Apr. 14; maximum gage-height, 4.82 ft Apr. 8 (backwater from ice); no flow Aug. 30-31, Sept. 2 to Oct. 11.

Period of record: Maximum discharge, 5,820 cfs Apr. 15, 1952 (gage height, 10.56 ft), reduced by over-flow into Lodge Creek basin; no flow at times most years.

REMARKS.--Records good. Natural flow of stream affected by storage reservoirs, diversions for irrigation and return flow from irrigated areas. Water may be diverted into or from Frenchman River basin through Cypress Lake.

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

REVISIONS (WATER YEARS).--WSP 1389: 1935(M), 1936, 1937-38(M). WSP 1729: 1924, 1926, 1932 (monthly figures only), drainage area.

## DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR 1971

| DAY   | JAN | FEB   | MAR   | APR     | MAY   | JUN   | JUL    | AUG    | SEP   | OCT    | NOV   | DEC |
|-------|-----|-------|-------|---------|-------|-------|--------|--------|-------|--------|-------|-----|
| 1     |     |       | 8.0   | 9.5     | 90    | 61    | 33     | 4.9    | .01   | 0      | 9.4   |     |
| 2     |     |       | 8.0   | 9.5     | 82    | 53    | 23     | 25     | 0     | 0      |       |     |
| 3     |     |       | 8.0   | 12      | 76    | 27    | 16     | 25     | 0     | 0      |       |     |
| 4     |     |       | 8.0   | 15      | 71    | 20    | 14     | 14     | 0     | 0      |       |     |
| 5     |     |       | 7.9   | 17      | 68    | 19    | 25     | 36     | 0     | 0      |       |     |
| 6     |     |       | 7.6   | 56      | 71    | 26    | 26     | 39     | 0     | 0      |       |     |
| 7     |     |       | 7.3   | 42      | 69    | 23    | 24     | 27     | 0     | 0      |       |     |
| 8     |     |       | 7.3   | 102     | 64    | 21    | 24     | 26     | 0     | 0      |       |     |
| 9     |     |       | 7.0   | 120     | 68    | 21    | 23     | 27     | 0     | 0      |       |     |
| 10    |     |       | 6.5   | 110     | 72    | 19    | 23     | 27     | 0     | 0      |       |     |
| 11    |     |       | 6.9   | 67      | 68    | 25    | 23     | 19     | 0     | 0      |       |     |
| 12    |     |       | 7.5   | 59      | 75    | 27    | 21     | 21     | 0     | .04    |       |     |
| 13    |     |       | 7.9   | 61      | 67    | 26    | 19     | 14     | 0     | 3.4    |       |     |
| 14    |     |       | 8.3   | 276     | 53    | 27    | 18     | 10     | 0     | 5.7    |       |     |
| 15    |     |       | 8.7   | 159     | 45    | 29    | 17     | 7.5    | 0     | 7.8    |       |     |
| 16    |     |       | 7.9   | 133     | 39    | 29    | 15     | 5.9    | 0     | 9.7    |       |     |
| 17    |     |       | 7.2   | 87      | 33    | 25    | 14     | 4.6    | 0     | 10     |       |     |
| 18    |     |       | 7.2   | 87      | 28    | 22    | 9.5    | 3.6    | 0     | 11     |       |     |
| 19    |     |       | 7.5   | 50      | 33    | 23    | 5.9    | 2.6    | 0     | 11     |       |     |
| 20    |     |       | 7.5   | 46      | 28    | 30    | 4.2    | 1.9    | 0     | 11     |       |     |
| 21    |     |       | 10    | 82      | 15    | 28    | 2.6    | .82    | 0     | 13     |       |     |
| 22    |     |       | 14    | 45      | 23    | 27    | 1.7    | .32    | 0     | 13     |       |     |
| 23    |     |       | 15    | 34      | 75    | 24    | .75    | .20    | 0     | 13     |       |     |
| 24    |     |       | 14    | 30      | 85    | 23    | .29    | .19    | 0     | 13     |       |     |
| 25    |     |       | 11    | 157     | 55    | 23    | .19    | .15    | 0     | 13     |       |     |
| 26    |     |       | 11    | 218     | 39    | 25    | .14    | .11    | 0     | 13     |       |     |
| 27    |     |       | 10    | 115     | 29    | 25    | .10    | .09    | 0     | 12     |       |     |
| 28    |     |       | 11    | 127     | 31    | 33    | .07    | .06    | 0     | 6.9    |       |     |
| 29    |     | ----- | 12    | 139     | 36    | 36    | 2.4    | .02    | 0     | 10     |       |     |
| 30    |     | ----- | 13    | 113     | 35    | 33    | 6.5    | 0      | 0     | 10     |       |     |
| 31    |     | ----- | 13    | -----   | 49    | ----- | 6.2    | 0      | ----- | 10     | ----- |     |
| TOTAL |     |       | 286.2 | 2,578.0 | 1,672 | 830   | 398.54 | 342.96 | .01   | 196.54 |       |     |
| MEAN  |     |       | 9.23  | 85.9    | 53.9  | 27.7  | 12.9   | 11.1   | .0003 | 6.34   |       |     |
| MAX   |     |       | 15    | 276     | 90    | 61    | 33     | 39     | .01   | 13     |       |     |
| MIN   |     |       | 6.5   | 9.5     | 15    | 19    | .07    | 0      | 0     | 0      |       |     |
| AC-FT |     |       | 568   | 5,110   | 3,320 | 1,650 | 791    | 680    | .02   | 390    |       |     |

THE SEASON MARCH TO OCTOBER AC-FT 12,500

NOTE.--Stage-discharge relation affected by ice Mar. 1 to Apr. 20 (no gage height record Mar. 1-4).

## MILK RIVER BASIN

105

06150000 Woodpile Coulee near international boundary

(International gaging station)

LOCATION.--Lat 48°59'00", long 109°31'50", in NW¼ sec.8, T.37 N., R.17 E., Hill County, on right bank 600 ft downstream from Antelope Coulee, 1.3 miles south of international boundary, 7 miles upstream from mouth, and 30 miles north of Havre, Mont.

DRAINAGE AREA.--60.2 sq mi.

PERIOD OF RECORD.--March 1927 to current season (seasonal records only in most years). Monthly discharge only for May 1951, published in WSP 1729.

GAGE.--Water-stage recorder. Altitude of gage is 2,740 ft (from topographic map). Prior to Aug. 27, 1927, nonrecording gage at site 4 miles downstream at different datum.

EXTREMES.--Current season: Maximum discharge, 17 cfs Apr. 8 (gage height, 2.91 ft); no flow for most of season.

Period of record: Maximum discharge, 3,090 cfs Mar. 30, 1943 (gage height, 8.6 ft, from floodmark), from rating curve extended above 330 cfs on basis of slope-area measurement at gage height 8.50 ft; no flow most of each year.

REMARKS.--Records good. Stock-water reservoir constructed in summer of 1947 0.2 mile upstream; capacity not more than 30 acre-ft. Seepage from reservoir sometimes produces long periods of flow below 0.05 cfs.

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

REVISIONS (WATER YEARS).--WSP 1209: 1943(M). WSP 1389: 1935(M), 1936, 1937(M), 1939, 1940-41(M), 1943-44, 1947, 1950(M). WSP 1729: 1951, drainage area.

## DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR 1971

| DAY   | JAN | FEB   | MAR | APR   | MAY | JUN   | JUL | AUG   | SEP | OCT   | NOV | DEC |
|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-----|
| 1     |     |       |     | 0     |     |       |     |       |     |       |     |     |
| 2     |     |       |     | 0     |     |       |     |       |     |       |     |     |
| 3     |     |       |     | 0     |     |       |     |       |     |       |     |     |
| 4     |     |       |     | 0     |     |       |     |       |     |       |     |     |
| 5     |     |       |     | 0     |     |       |     |       |     |       |     |     |
| 6     |     |       |     | .43   |     |       |     |       |     |       |     |     |
| 7     |     |       |     | 2.9   |     |       |     |       |     |       |     |     |
| 8     |     |       |     | 9.8   |     |       |     |       |     |       |     |     |
| 9     |     |       |     | 6.9   |     |       |     |       |     |       |     |     |
| 10    |     |       |     | 8.2   |     |       |     |       |     |       |     |     |
| 11    |     |       |     | 2.9   |     |       |     |       |     |       |     |     |
| 12    |     |       |     | 1.7   |     |       |     |       |     |       |     |     |
| 13    |     |       |     | 4.4   |     |       |     |       |     |       |     |     |
| 14    |     |       |     | 1.7   |     |       |     |       |     |       |     |     |
| 15    |     |       |     | .93   |     |       |     |       |     |       |     |     |
| 16    |     |       |     | .55   |     |       |     |       |     |       |     |     |
| 17    |     |       |     | .33   |     |       |     |       |     |       |     |     |
| 18    |     |       |     | 0     |     |       |     |       |     |       |     |     |
| 19    |     |       |     | 0     |     |       |     |       |     |       |     |     |
| 20    |     |       |     | 0     |     |       |     |       |     |       |     |     |
| 21    |     |       |     | 0     |     |       |     |       |     |       |     |     |
| 22    |     |       |     | 0     |     |       |     |       |     |       |     |     |
| 23    |     |       |     | 0     |     |       |     |       |     |       |     |     |
| 24    |     |       |     | 0     |     |       |     |       |     |       |     |     |
| 25    |     |       |     | 0     |     |       |     |       |     |       |     |     |
| 26    |     |       |     | 0     |     |       |     |       |     |       |     |     |
| 27    |     |       |     | 0     |     |       |     |       |     |       |     |     |
| 28    |     |       |     | 0     |     |       |     |       |     |       |     |     |
| 29    |     | ----- |     | 0     |     |       |     |       |     |       |     |     |
| 30    |     | ----- |     | 0     |     |       |     |       |     |       |     |     |
| 31    |     | ----- |     | ----- |     | ----- |     | ----- |     | ----- |     |     |
| TOTAL |     |       | 0   | 40.74 | 0   | 0     | 0   | 0     | 0   | 0     |     |     |
| MEAN  |     |       | 0   | 1.36  | 0   | 0     | 0   | 0     | 0   | 0     |     |     |
| MAX   |     |       | 0   | 9.8   | 0   | 0     | 0   | 0     | 0   | 0     |     |     |
| MIN   |     |       | 0   | 0     | 0   | 0     | 0   | 0     | 0   | 0     |     |     |
| AC-FT |     |       | 0   | 81    | 0   | 0     | 0   | 0     | 0   | 0     |     |     |

THE SEASON MARCH TO OCTOBER

AC-FT 81



## MILK RIVER BASIN

06150500 East Fork Battle Creek near international boundary

(International gaging station)

LOCATION.--Lat 48°58'18", long 109°07'45", in NW¼ sec.17, T.37 N., R.20 E., Blaine County, on right bank 2 miles south of international boundary, 5.5 miles upstream from Lyons Creek, and 26 miles north of Chinook, Mont.

DRAINAGE AREA.--89.5 sq mi.

PERIOD OF RECORD.--March 1927 to current season (seasonal records only in most years). Monthly discharge only for June; July 1931, published in WSP 1309.

GAGE.--Water-stage recorder. Altitude of gage is 2,760 ft (from topographic map). Prior to Sept. 3, 1927, nonrecording gage at site 0.5 mile downstream at different datum. Sept. 3, 1927, to Oct. 18, 1952, water-stage recorder at site 300 ft downstream from former gage at different datum.

EXTREMES.--Current season: Maximum discharge, 20 cfs Apr. 10 (gage height, 3.10 ft); no flow for most of season.

Period of record: Maximum discharge, 2,300 cfs July 12, 1955 (gage height, 11.24 ft), from rating curve extended above 230 cfs on basis of slope-area measurement made in 1952 at former site converted to present site and datum; no flow most of each year.

REMARKS.--Records good. Numerous stockwater dams above station.

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

REVISIONS (WATER YEARS).--WSP 1176: 1939-40. WSP 1389: 1927, 1937(M), 1941(M), 1943-44. WSP 1729: 1927 (mean and acre feet), 1957(M), drainage area.

## DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR 1971

| DAY   | JAN | FEB   | MAR | APR   | MAY | JUN   | JUL | AUG   | SEP | OCT   | NOV | DEC |
|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-----|
| 1     |     |       |     | 0     |     |       |     |       |     |       |     |     |
| 2     |     |       |     | 0     |     |       |     |       |     |       |     |     |
| 3     |     |       |     | 0     |     |       |     |       |     |       |     |     |
| 4     |     |       |     | 0     |     |       |     |       |     |       |     |     |
| 5     |     |       |     | 0     |     |       |     |       |     |       |     |     |
| 6     |     |       |     | 0     |     |       |     |       |     |       |     |     |
| 7     |     |       |     | 1.8   |     |       |     |       |     |       |     |     |
| 8     |     |       |     | 1.1   |     |       |     |       |     |       |     |     |
| 9     |     |       |     | 1.2   |     |       |     |       |     |       |     |     |
| 10    |     |       |     | 3.1   |     |       |     |       |     |       |     |     |
| 11    |     |       |     | 6.9   |     |       |     |       |     |       |     |     |
| 12    |     |       |     | 1.2   |     |       |     |       |     |       |     |     |
| 13    |     |       |     | .32   |     |       |     |       |     |       |     |     |
| 14    |     |       |     | .06   |     |       |     |       |     |       |     |     |
| 15    |     |       |     | 0     |     |       |     |       |     |       |     |     |
| 16    |     |       |     | 0     |     |       |     |       |     |       |     |     |
| 17    |     |       |     | 0     |     |       |     |       |     |       |     |     |
| 18    |     |       |     | 0     |     |       |     |       |     |       |     |     |
| 19    |     |       |     | 0     |     |       |     |       |     |       |     |     |
| 20    |     |       |     | 0     |     |       |     |       |     |       |     |     |
| 21    |     |       |     | 0     |     |       |     |       |     |       |     |     |
| 22    |     |       |     | 0     |     |       |     |       |     |       |     |     |
| 23    |     |       |     | 0     |     |       |     |       |     |       |     |     |
| 24    |     |       |     | 0     |     |       |     |       |     |       |     |     |
| 25    |     |       |     | 0     |     |       |     |       |     |       |     |     |
| 26    |     |       |     | 0     |     |       |     |       |     |       |     |     |
| 27    |     |       |     | 0     |     |       |     |       |     |       |     |     |
| 28    |     |       |     | 0     |     |       |     |       |     |       |     |     |
| 29    |     | ----- |     | 0     |     |       |     |       |     |       |     |     |
| 30    |     | ----- |     | 0     |     |       |     |       |     |       |     |     |
| 31    |     | ----- |     | ----- |     | ----- |     | ----- |     | ----- |     |     |
| TOTAL |     |       | 0   | 15.68 | 0   | 0     | 0   | 0     | 0   | 0     |     |     |
| MEAN  |     |       | 0   | .52   | 0   | 0     | 0   | 0     | 0   | 0     |     |     |
| MAX   |     |       | 0   | 6.9   | 0   | 0     | 0   | 0     | 0   | 0     |     |     |
| MIN   |     |       | 0   | 0     | 0   | 0     | 0   | 0     | 0   | 0     |     |     |
| AC-FT |     |       | 0   | 31    | 0   | 0     | 0   | 0     | 0   | 0     |     |     |

THE SEASON MARCH TO OCTOBER

AC-FT 31

## MILK RIVER BASIN

107

06151000 Lyons Creek at international boundary

(International gaging station)

LOCATION.--Lat 49°00'20", long 109°13'50", in SW¼ sec.1, T.1, R.25 W., third meridian, on right bank 0.3 mile north of international boundary, 8 miles south of Arena, Saskatchewan, and 28 miles north of Chinook, Mont.

DRAINAGE AREA.--66.7 sq mi.

PERIOD OF RECORD.--March 1927 to current season (seasonal records only in most years). Monthly discharge only for February, March 1934, published in WSP 1309. Prior to March 1962, published as Lyons Coulee at international boundary.

GAGE.--Water-stage recorder. Altitude of gage is 2,800 ft (from international boundary map). Prior to Oct. 19, 1935, nonrecording gages at site 0.5 mile south of international boundary at different datum. Oct. 19, 1935, to Oct. 31, 1940, nonrecording gage at site 1.2 miles north of international boundary at different datum. Nov. 1, 1940, to Aug. 4, 1958, nonrecording gages at sites within 300 ft of present site at present datum.

EXTREMES.--Current season: Maximum discharge, 6.4 cfs Apr. 9 (gage height, 2.42 ft); no flow for most of season.

Period of record: Maximum discharge, 1,200 cfs July 6, 1955 (gage height, 8.38 ft, from floodmark), from rating curve extended above 600 cfs; no flow for most of each year.

REMARKS.--Records good. Natural flow of stream affected by small stock-water and irrigation dams above station.

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

REVISIONS (WATER YEARS).--WSP 1389: 1929(M), 1936, 1937(M), 1939, 1940-41(M), 1946(M). WSP 1629: Drainage area.

## DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR 1971

| DAY   | JAN | FEB | MAR | APR  | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC |
|-------|-----|-----|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|
| 1     |     |     |     | 0    |     |     |     |     |     |     |     |     |
| 2     |     |     |     | 0    |     |     |     |     |     |     |     |     |
| 3     |     |     |     | 0    |     |     |     |     |     |     |     |     |
| 4     |     |     |     | 0    |     |     |     |     |     |     |     |     |
| 5     |     |     |     | 0    |     |     |     |     |     |     |     |     |
| 6     |     |     |     | 0    |     |     |     |     |     |     |     |     |
| 7     |     |     |     | 0    |     |     |     |     |     |     |     |     |
| 8     |     |     |     | 0    |     |     |     |     |     |     |     |     |
| 9     |     |     |     | .75  |     |     |     |     |     |     |     |     |
| 10    |     |     |     | .90  |     |     |     |     |     |     |     |     |
| 11    |     |     |     | .04  |     |     |     |     |     |     |     |     |
| 12    |     |     |     | 0    |     |     |     |     |     |     |     |     |
| 13    |     |     |     | 0    |     |     |     |     |     |     |     |     |
| 14    |     |     |     | 0    |     |     |     |     |     |     |     |     |
| 15    |     |     |     | 0    |     |     |     |     |     |     |     |     |
| 16    |     |     |     | 0    |     |     |     |     |     |     |     |     |
| 17    |     |     |     | 0    |     |     |     |     |     |     |     |     |
| 18    |     |     |     | 0    |     |     |     |     |     |     |     |     |
| 19    |     |     |     | 0    |     |     |     |     |     |     |     |     |
| 20    |     |     |     | 0    |     |     |     |     |     |     |     |     |
| 21    |     |     |     | 0    |     |     |     |     |     |     |     |     |
| 22    |     |     |     | 0    |     |     |     |     |     |     |     |     |
| 23    |     |     |     | 0    |     |     |     |     |     |     |     |     |
| 24    |     |     |     | 0    |     |     |     |     |     |     |     |     |
| 25    |     |     |     | 0    |     |     |     |     |     |     |     |     |
| 26    |     |     |     | 0    |     |     |     |     |     |     |     |     |
| 27    |     |     |     | 0    |     |     |     |     |     |     |     |     |
| 28    |     |     |     | 0    |     |     |     |     |     |     |     |     |
| 29    |     |     |     | 0    |     |     |     |     |     |     |     |     |
| 30    |     |     |     | 0    |     |     |     |     |     |     |     |     |
| 31    |     |     |     | 0    |     |     |     |     |     |     |     |     |
| TOTAL |     |     | 0   | 1.69 | 0   | 0   | 0   | 0   | 0   | 0   |     |     |
| MEAN  |     |     | 0   | .056 | 0   | 0   | 0   | 0   | 0   | 0   |     |     |
| MAX   |     |     | 0   | .90  | 0   | 0   | 0   | 0   | 0   | 0   |     |     |
| MIN   |     |     | 0   | 0    | 0   | 0   | 0   | 0   | 0   | 0   |     |     |
| AC-FT |     |     | 0   | 3.4  | 0   | 0   | 0   | 0   | 0   | 0   |     |     |

THE SEASON MARCH TO OCTOBER

AC-FT 3.4

## MILK RIVER BASIN

06154400 Peoples Creek near Hays, Mont.

LOCATION.--Lat 48°13'35", long 108°42'40", in SW¼ sec.35, T.29 N., R.23 E., Blaine County, on right bank 4.5 ft downstream from bridge on State Highway 376, 2.5 miles downstream from Myrtle Creek, and 16.4 miles north of Hays.

DRAINAGE AREA.--220 sq mi.

PERIOD OF RECORD.--December 1966 to current year.

GAGE.--Water-stage recorder. Datum of gage is 2,714.10 ft above mean sea level.

EXTREMES.--Current year: Maximum discharge, about 300 cfs Feb. 14 (gage height, 13.80 ft, backwater from ice); no flow at times.

Period of record: Maximum discharge, about 450 cfs Mar. 18, 1969; maximum gage height, 13.80 ft Feb. 14, 1971 (backwater from ice); no flow at times each year.

REMARKS.--Records good except those for winter period, which are poor. Some storage in numerous stock ponds and diversions for irrigation of about 1,300 acres above station.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY   | OCT   | NOV   | DEC   | JAN   | FEB   | MAR   | APR   | MAY   | JUN   | JUL   | AUG | SEP   |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-----|-------|
| 1     | 4.2   | 7.3   | 6.2   | 4.8   | 49    | 19    | 42    | 34    | 6.6   | 6.6   |     |       |
| 2     | 4.0   | 8.3   | 6.1   | 4.4   | 46    | 17    | 40    | 32    | 8.6   | 5.3   |     |       |
| 3     | 3.7   | 8.3   | 6.0   | 4.0   | 43    | 15    | 37    | 30    | 6.6   | 4.5   |     |       |
| 4     | 3.7   | 9.0   | 6.0   | 3.6   | 40    | 26    | 35    | 26    | 6.6   | 3.4   |     |       |
| 5     | 3.4   | 9.2   | 6.0   | 3.3   | 38    | 20    | 30    | 23    | 7.0   | 3.1   |     |       |
| 6     | 4.0   | 9.2   | 6.0   | 2.9   | 36    | 21    | 22    | 19    | 9.4   | 3.1   |     |       |
| 7     | 4.5   | 9.0   | 6.6   | 2.8   | 34    | 24    | 32    | 17    | 19    | 2.5   |     |       |
| 8     | 4.8   | 8.9   | 6.8   | 2.8   | 32    | 27    | 41    | 13    | 20    | 2.5   |     |       |
| 9     | 5.0   | 8.8   | 6.2   | 2.7   | 33    | 30    | 50    | 11    | 26    | 2.9   |     |       |
| 10    | 5.6   | 8.6   | 6.2   | 2.5   | 150   | 34    | 49    | 9.8   | 19    | 2.9   |     |       |
| 11    | 6.0   | 8.5   | 7.0   | 2.3   | 135   | 37    | 44    | 10    | 14    | 2.6   |     |       |
| 12    | 6.0   | 8.3   | 6.2   | 1.9   | 180   | 40    | 45    | 7.9   | 10    | 3.1   |     |       |
| 13    | 6.3   | 8.2   | 6.0   | 1.7   | 250   | 42    | 34    | 6.6   | 10    | 2.5   |     |       |
| 14    | 6.3   | 8.0   | 5.8   | 1.5   | 280   | 45    | 31    | 6.3   | 13    | 2.0   |     |       |
| 15    | 6.6   | 8.1   | 5.5   | 1.4   | 200   | 41    | 29    | 6.0   | 8.3   | 1.8   |     |       |
| 16    | 6.6   | 8.2   | 5.3   | 1.5   | 155   | 37    | 32    | 6.3   | 6.3   | 1.3   |     |       |
| 17    | 6.6   | 8.2   | 5.1   | 7.0   | 95    | 33    | 35    | 6.0   | 6.0   | .9C   |     |       |
| 18    | 6.6   | 7.8   | 4.9   | 49    | 54    | 31    | 38    | 8.6   | 6.0   | .50   |     |       |
| 19    | 6.6   | 7.7   | 4.6   | 44    | 29    | 32    | 33    | 9.8   | 6.6   | .35   |     |       |
| 20    | 6.6   | 7.6   | 4.4   | 68    | 22    | 24    | 33    | 12    | 6.6   | .20   |     |       |
| 21    | 6.3   | 7.4   | 4.3   | 90    | 21    | 21    | 33    | 16    | 5.6   | 0     |     |       |
| 22    | 6.3   | 7.2   | 4.2   | 88    | 21    | 19    | 34    | 13    | 5.0   | 0     |     |       |
| 23    | 7.3   | 7.0   | 4.1   | 76    | 22    | 18    | 36    | 14    | 4.2   | 0     |     |       |
| 24    | 7.3   | 7.2   | 3.9   | 68    | 25    | 17    | 37    | 14    | 3.7   | 0     |     |       |
| 25    | 7.3   | 7.6   | 3.7   | 64    | 28    | 19    | 33    | 12    | 2.5   | 0     |     |       |
| 26    | 7.0   | 7.2   | 3.6   | 71    | 29    | 23    | 35    | 10    | 2.2   | 0     |     |       |
| 27    | 6.3   | 6.8   | 3.6   | 56    | 26    | 18    | 39    | 8.3   | 2.0   | 0     |     |       |
| 28    | 6.6   | 6.4   | 3.6   | 51    | 23    | 25    | 39    | 8.3   | 3.1   | 0     |     |       |
| 29    | 6.6   | 6.6   | 3.9   | 47    | ----- | 32    | 37    | 7.3   | 9.8   | 0     |     |       |
| 30    | 6.8   | 6.4   | 4.3   | 54    | ----- | 37    | 32    | 6.0   | 9.4   | 0     |     |       |
| 31    | 7.0   | ----- | 4.9   | 52    | ----- | 39    | ----- | 6.0   | ----- | 0     |     | ----- |
| TOTAL | 181.9 | 237.0 | 161.0 | 929.1 | 2,096 | 863   | 1,087 | 409.2 | 263.1 | 52.05 | 0   | 0     |
| MEAN  | 5.87  | 7.90  | 5.19  | 30.0  | 74.9  | 27.8  | 36.2  | 13.2  | 8.77  | 1.68  | 0   | 0     |
| MAX   | 7.3   | 9.2   | 7.0   | 90    | 280   | 45    | 50    | 34    | 26    | 6.6   | 0   | 0     |
| MIN   | 3.4   | 6.4   | 3.6   | 1.4   | 21    | 15    | 22    | 6.0   | 2.0   | 0     | 0   | 0     |
| AC-FT | 361   | 470   | 319   | 1,840 | 4,160 | 1,710 | 2,160 | 812   | 522   | 103   | 0   | 0     |

CAL YR 1970 TOTAL 11,106.91 MEAN 30.4 MAX 331 MIN 0 AC-FT 22,030  
WTR YR 1971 TOTAL 6,279.35 MEAN 17.2 MAX 280 MIN 0 AC-FT 12,460

## PEAK DISCHARGE (BASE, 100 CFS)

DATE TIME G.H.T. DISCHARGE DATE TIME G.H.T. DISCHARGE

2-14 -- a13.80 b300

a Backwater from ice.  
b About.

NOTE.--Stage-discharge relation affected by ice Nov. 4 to Apr. 4 (no gage height record Jan. 30 to Feb. 11).

06154500 Peoples Creek near Dodson, Mont.

LOCATION.--Lat 48°20'34", long 108°21'32", in SE1/4 sec.21, T.30 N., R.26 E., Phillips County, on right bank 0.8 mile upstream from Indian Service diversions, 6.5 miles southwest of Dodson, and 10.5 miles upstream from mouth.

DRAINAGE AREA.--670 sq mi.

PERIOD OF RECORD.--April 1918 to November 1921 (fragmentary), June 1951 to current year. Monthly discharge only for some periods, published in WSP 1309.

GAGE.--Water-stage recorder. Altitude of gage is 2,310 ft (by barometer). Prior to June 1, 1951, nonrecording gage at site 2 miles downstream at different datum. June 1, 1951, to Aug. 11, 1956, water-stage recorder at site 300 ft downstream at present datum.

AVERAGE DISCHARGE.--20 years (1951-71), 34.3 cfs (24,850 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, about 2,800 cfs Feb. 14; maximum gage height, 14.80 ft Feb. 14 (backwater from ice); no flow for many days.

Period of record: Maximum daily discharge, 3,500 cfs Mar. 30, 1952; maximum gage height, 17.05 ft Mar. 29, 1952 (ice jam), from floodmark in gage house; no flow at times.

REMARKS.--Records good except those for winter period, which are poor. Diversions for irrigation of about 3,300 acres above station.

REVISIONS.--WSP 1729: Drainage area.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT             | NOV       | DEC       | JAN     | FEB          | MAR   | APR   | MAY   | JUN   | JUL   | AUG  | SEP   |
|-------------|-----------------|-----------|-----------|---------|--------------|-------|-------|-------|-------|-------|------|-------|
| 1           | 9.4             | 16        | 5.5       | 7.0     | 6.0          | 25    | 270   | 57    | 14    | 16    | .12  |       |
| 2           | 9.0             | 15        | 5.5       | 6.5     | 5.0          | 25    | 259   | 55    | 15    | 14    | .05  |       |
| 3           | 9.0             | 15        | 6.0       | 6.0     | 4.5          | 25    | 153   | 52    | 14    | 10    | .03  |       |
| 4           | 9.7             | 13        | 6.0       | 5.5     | 4.5          | 30    | 103   | 51    | 13    | 8.1   | .01  |       |
| 5           | 9.0             | 13        | 6.5       | 5.0     | 4.5          | 30    | 89    | 46    | 13    | 6.8   | 0    |       |
| 6           | 9.7             | 15        | 7.0       | 4.7     | 4.0          | 25    | 79    | 43    | 14    | 5.6   | 0    |       |
| 7           | 11              | 16        | 9.0       | 4.5     | 4.0          | 30    | 73    | 39    | 30    | 5.0   | 0    |       |
| 8           | 11              | 17        | 8.0       | 4.0     | 4.0          | 35    | 73    | 36    | 34    | 4.0   | 0    |       |
| 9           | 12              | 16        | 8.0       | 3.5     | 15           | 40    | 86    | 30    | 33    | 3.4   | 0    |       |
| 10          | 13              | 15        | 8.0       | 3.5     | 150          | 45    | 91    | 25    | 32    | 3.3   | 0    |       |
| 11          | 13              | 15        | 9.0       | 3.0     | 200          | 50    | 80    | 22    | 25    | 3.4   | 0    |       |
| 12          | 15              | 14        | 9.0       | 3.0     | 300          | 70    | 82    | 20    | 20    | 2.4   | 0    |       |
| 13          | 15              | 14        | 8.0       | 3.0     | 450          | 80    | 71    | 18    | 16    | 1.7   | 0    |       |
| 14          | 15              | 16        | 7.5       | 2.5     | 2,500        | 90    | 61    | 17    | 15    | 1.2   | 0    |       |
| 15          | 15              | 17        | 7.0       | 3.0     | 2,300        | 100   | 56    | 13    | 16    | 1.0   | 0    |       |
| 16          | 15              | 16        | 6.5       | 6.0     | 1,800        | 110   | 54    | 13    | 13    | .69   | 0    |       |
| 17          | 15              | 16        | 6.5       | 15      | 1,100        | 130   | 55    | 13    | 11    | .50   | 0    |       |
| 18          | 15              | 13        | 6.5       | 50      | 650          | 140   | 60    | 17    | 9.6   | .38   | 0    |       |
| 19          | 15              | 12        | 6.0       | 70      | 350          | 160   | 60    | 17    | 11    | .35   | 0    |       |
| 20          | 15              | 10        | 6.0       | 150     | 150          | 130   | 58    | 19    | 11    | .26   | 0    |       |
| 21          | 15              | 9.0       | 6.0       | 600     | 30           | 100   | 58    | 24    | 11    | .26   | 0    |       |
| 22          | 15              | 8.5       | 6.0       | 350     | 35           | 90    | 56    | 28    | 8.9   | .31   | 0    |       |
| 23          | 16              | 8.5       | 5.0       | 200     | 40           | 80    | 56    | 23    | 7.6   | .24   | 0    |       |
| 24          | 17              | 9.0       | 5.0       | 100     | 50           | 85    | 57    | 22    | 6.7   | .22   | 0    |       |
| 25          | 18              | 9.5       | 5.0       | 70      | 60           | 200   | 58    | 21    | 5.6   | .18   | 0    |       |
| 26          | 17              | 8.5       | 5.0       | 70      | 45           | 300   | 58    | 17    | 4.4   | .14   | 0    |       |
| 27          | 17              | 7.5       | 5.0       | 70      | 35           | 400   | 61    | 14    | 3.5   | .14   | 0    |       |
| 28          | 18              | 6.5       | 6.0       | 70      | 30           | 450   | 65    | 13    | 4.0   | .15   | 0    |       |
| 29          | 16              | 7.0       | 7.0       | 70      | -----        | 500   | 65    | 13    | 12    | .13   | 0    |       |
| 30          | 18              | 5.5       | 7.5       | 20      | -----        | 550   | 61    | 12    | 12    | .19   | 0    |       |
| 31          | 19              | -----     | 7.5       | 10      | -----        | 300   | ----- | 13    | ----- | .15   | 0    | ----- |
| TOTAL       | 436.8           | 373.5     | 206.5     | 1,985.7 | 10,326.5     | 4,425 | 2,508 | 803   | 435.3 | 90.19 | .21  | 0     |
| MEAN        | 14.1            | 12.5      | 6.66      | 64.1    | 369          | 143   | 83.6  | 25.9  | 14.5  | 2.91  | .007 | 0     |
| MAX         | 19              | 17        | 9.0       | 600     | 2,500        | 550   | 270   | 57    | 34    | 16    | .12  | 0     |
| MIN         | 9.0             | 5.5       | 5.0       | 2.5     | 4.0          | 25    | 54    | 12    | 3.5   | .13   | 0    | 0     |
| AC-FT       | 866             | 741       | 410       | 3,940   | 20,480       | 8,780 | 4,970 | 1,590 | 863   | 179   | .4   | 0     |
| CAL YR 1970 | TOTAL 27,671.70 | MEAN 75.8 | MAX 852   | MIN .73 | AC-FT 54,890 |       |       |       |       |       |      |       |
| WTR YR 1971 | TOTAL 21,590.70 | MEAN 59.2 | MAX 2,500 | MIN 0   | AC-FT 42,830 |       |       |       |       |       |      |       |

## PEAK DISCHARGE (BASE, 500 CFS)

| DATE | TIME | G.HT.  | DISCHARGE | DATE | TIME | G.HT. | DISCHARGE |
|------|------|--------|-----------|------|------|-------|-----------|
| 1-21 | 0815 | a8.29  | b800      | 3-30 | 0445 | a9.02 | b600      |
| 2-14 | 0615 | a14.80 | b2,800    |      |      |       |           |

a Backwater from ice.  
b About.

NOTE.--Stage-discharge relation affected by ice Nov. 4 to Mar. 31 (no gage-height record Dec. 23-30, Jan. 5, Jan. 22 to Feb. 4, Feb. 19-23).

## MILK RIVER BASIN

06156000 Whitewater Creek near international boundary

(International gaging station)

LOCATION.--Lat 48°57'10", long 107°51'40", in NW¼ sec.24, T.37 N., R.29 E., Phillips County, on left bank 500 ft downstream from North Fork, 3.3 miles south of international boundary, 11 miles north of Loring, Mont., and 14 miles south of Orkney, Saskatchewan.

DRAINAGE AREA.--458 sq mi.

PERIOD OF RECORD.--March 1927 to current season (seasonal records only in most seasons).

GAGE.--Water-stage recorder. V-notch sharp-crested weir in concrete control since October 1938. Altitude of gage is 2,500 ft (from international boundary map). Prior to Aug. 31, 1927, nonrecording gage, and Aug. 31, 1927 to Aug. 31, 1948, water-stage recorder, at site 300 ft upstream at present datum.

EXTREMES.--Current season: Maximum discharge, 59 cfs Apr. 5 (gage height, 2.35 ft); no flow at times.

Period of record: Maximum discharge, 3,500 cfs Apr. 14, 1952 (gage height, 6.15 ft) from rating curve extended above 2,100 cfs on basis of conveyance study; no flow at times most seasons.

REMARKS.--Records poor.

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

REVISIONS (WATER YEARS).--WSP 1389: 1928, 1931(M), 1936, 1939-41(M), 1943, 1950(M). WSP 1729: Drainage area.

## DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR 1971

| DAY   | JAN | FEB   | MAR  | APR    | MAY   | JUN   | JUL  | AUG   | SEP   | OCT  | NOV   | DEC |
|-------|-----|-------|------|--------|-------|-------|------|-------|-------|------|-------|-----|
| 1     |     |       | .10  | .20    | 1.1   | .39   | .18  | .01   | 0     | .10  |       |     |
| 2     |     |       | .10  | .30    | .94   | .39   | .19  | .01   | 0     | .07  |       |     |
| 3     |     |       | .10  | .46    | .84   | .37   | .22  | 0     | 0     | .06  |       |     |
| 4     |     |       | .10  | .50    | .74   | .39   | .19  | 0     | 0     | .06  |       |     |
| 5     |     |       | .10  | 17     | .69   | .35   | .19  | 0     | 0     | .05  |       |     |
| 6     |     |       | .10  | 33     | .63   | .33   | .20  | 0     | 0     | .07  |       |     |
| 7     |     |       | .10  | 18     | .55   | .35   | .15  | 0     | 0     | .10  |       |     |
| 8     |     |       | .10  | 7.0    | .53   | .37   | .07  | 0     | 0     | .10  |       |     |
| 9     |     |       | .10  | 4.3    | .48   | .35   | .06  | 0     | 0     | .13  |       |     |
| 10    |     |       | .10  | 3.8    | .41   | .30   | .05  | 0     | 0     | .16  |       |     |
| 11    |     |       | .10  | 2.5    | .37   | .28   | .09  | 0     | 0     | .20  |       |     |
| 12    |     |       | .10  | 2.2    | .33   | .28   | .08  | 0     | 0     | .22  |       |     |
| 13    |     |       | .10  | 1.5    | .30   | .28   | .05  | 0     | 0     | .20  |       |     |
| 14    |     |       | .10  | 1.4    | .26   | .28   | .05  | 0     | 0     | .20  |       |     |
| 15    |     |       | .10  | 1.4    | .22   | .23   | .04  | 0     | 0     | .20  |       |     |
| 16    |     |       | .10  | 1.2    | .22   | .20   | .04  | 0     | 0     | .23  |       |     |
| 17    |     |       | .10  | 1.3    | .28   | .18   | .03  | 0     | .01   | .25  |       |     |
| 18    |     |       | .10  | 3.6    | .41   | .16   | .02  | 0     | .01   | .26  |       |     |
| 19    |     |       | .10  | 2.9    | .53   | .18   | .02  | 0     | .01   | .25  |       |     |
| 20    |     |       | .10  | 1.9    | .58   | .19   | .02  | 0     | .03   | .25  |       |     |
| 21    |     |       | .10  | 1.9    | .71   | .16   | .02  | 0     | .03   | .28  |       |     |
| 22    |     |       | .10  | 1.8    | .87   | .10   | .04  | 0     | .04   | .28  |       |     |
| 23    |     |       | .10  | 1.5    | .84   | .07   | .04  | 0     | .04   | .28  |       |     |
| 24    |     |       | .10  | 1.2    | .77   | .11   | .03  | 0     | .04   | .28  |       |     |
| 25    |     |       | .10  | 1.0    | .71   | .12   | .02  | 0     | .05   | .28  |       |     |
| 26    |     |       | .10  | 1.2    | .63   | .12   | .02  | 0     | .07   | .28  |       |     |
| 27    |     |       | .10  | 2.3    | .58   | .13   | .02  | 0     | .09   | .28  |       |     |
| 28    |     |       | .20  | 2.6    | .46   | .15   | .01  | 0     | .11   | .28  |       |     |
| 29    |     | ----- | .30  | 2.0    | .35   | .41   | .01  | 0     | .15   | .26  |       |     |
| 30    |     | ----- | .35  | 1.4    | .30   | .26   | .01  | 0     | .16   | .26  |       |     |
| 31    |     | ----- | .40  | -----  | .31   | ----- | .01  | 0     | ----- | .26  | ----- |     |
| TOTAL |     |       | 3.95 | 121.36 | 16.94 | 7.48  | 2.17 | .02   | .84   | 6.18 |       |     |
| MEAN  |     |       | .13  | 4.05   | .55   | .25   | .070 | .0006 | .028  | .20  |       |     |
| MAX   |     |       | .40  | .33    | 1.1   | .41   | .22  | .01   | .16   | .28  |       |     |
| MIN   |     |       | .10  | .20    | .22   | .07   | .01  | 0     | 0     | .05  |       |     |
| AC-FT |     |       | 7.8  | 241    | 34    | 15    | 4.3  | .04   | 1.7   | 12   |       |     |

THE SEASON MARCH TO OCTOBER

AC-FT 315

NOTE.--No gage-height record Mar. 1 to Apr. 2.



## MILK RIVER BASIN

111

06156500 Belanger Creek diversion canal near Vidora, Saskatchewan

(International gaging station)

LOCATION.--Lat 49°29'39", long 109°21'50", in NW¼ sec.19, T.6, R.25 W., third meridian, on left bank 0.3 mile downstream from diversion weir and 12 miles north of Vidora.

PERIOD OF RECORD.--March 1946 to current season (seasonal records only). Monthly discharge only for some periods, published in WSP 1309.

GAGE.--Water-stage recorder. Altitude of gage is 3,200 ft (from Cypress Lake elevation).

EXTREMES.--Period of record: Maximum daily discharge, 555 cfs Apr. 29, 1951; no flow at times each season.

REMARKS.--Records good. Canal diverts water from right bank of Belanger Creek in SW¼ sec.30, T.6, R.25 W., third meridian, for storage in Cypress Lake.

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

## DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR 1971

| DAY   | JAN | FEB | MAR | APR      | MAY  | JUN   | JUL  | AUG | SEP   | OCT | NOV   | DEC |
|-------|-----|-----|-----|----------|------|-------|------|-----|-------|-----|-------|-----|
| 1     |     |     |     | 0        | 0    |       | 0    |     |       |     |       |     |
| 2     |     |     |     | 0        | .04  |       | 0    |     |       |     |       |     |
| 3     |     |     |     | 0        | .28  |       | 0    |     |       |     |       |     |
| 4     |     |     |     | 0        | 0    |       | 0    |     |       |     |       |     |
| 5     |     |     |     | 0        | 0    |       | 0    |     |       |     |       |     |
| 6     |     |     |     | 0        | 0    |       | 1.9  |     |       |     |       |     |
| 7     |     |     |     | 0        | 0    |       | 4.6  |     |       |     |       |     |
| 8     |     |     |     | 0        | 0    |       | 3.7  |     |       |     |       |     |
| 9     |     |     |     | 0        | 0    |       | 2.6  |     |       |     |       |     |
| 10    |     |     |     | 0        | 0    |       | 1.6  |     |       |     |       |     |
| 11    |     |     |     | 0        | 0    |       | 0    |     |       |     |       |     |
| 12    |     |     |     | .18      | 0    |       | 0    |     |       |     |       |     |
| 13    |     |     |     | 20       | 0    |       | 0    |     |       |     |       |     |
| 14    |     |     |     | 45       | 0    |       | 0    |     |       |     |       |     |
| 15    |     |     |     | 107      | 0    |       | 0    |     |       |     |       |     |
| 16    |     |     |     | 119      | 0    |       | 0    |     |       |     |       |     |
| 17    |     |     |     | 89       | 0    |       | 0    |     |       |     |       |     |
| 18    |     |     |     | 74       | 0    |       | 0    |     |       |     |       |     |
| 19    |     |     |     | 63       | 0    |       | 0    |     |       |     |       |     |
| 20    |     |     |     | 98       | 0    |       | 0    |     |       |     |       |     |
| 21    |     |     |     | 124      | 0    |       | 0    |     |       |     |       |     |
| 22    |     |     |     | 193      | 0    |       | 0    |     |       |     |       |     |
| 23    |     |     |     | 222      | 0    |       | 0    |     |       |     |       |     |
| 24    |     |     |     | 272      | 0    |       | 0    |     |       |     |       |     |
| 25    |     |     |     | 91       | 0    |       | 0    |     |       |     |       |     |
| 26    |     |     |     | 27       | 0    |       | 0    |     |       |     |       |     |
| 27    |     |     |     | 7.9      | 0    |       | 0    |     |       |     |       |     |
| 28    |     |     |     | 5.5      | 0    |       | 0    |     |       |     |       |     |
| 29    |     |     |     | 4.3      | 0    |       | 0    |     |       |     |       |     |
| 30    |     |     |     | .01      | 0    |       | 0    |     |       |     |       |     |
| 31    |     |     |     | -----    | 0    | ----- | 0    |     | ----- |     | ----- |     |
| TOTAL |     |     | 0   | 1,561.89 | .32  | 0     | 14.4 | 0   | 0     | 0   |       |     |
| MEAN  |     |     | 0   | 52.1     | .010 | 0     | .46  | 0   | 0     | 0   |       |     |
| MAX   |     |     | 0   | 272      | .28  | 0     | 4.6  | 0   | 0     | 0   |       |     |
| MIN   |     |     | 0   | 0        | 0    | 0     | 0    | 0   | 0     | 0   |       |     |
| AC-FT |     |     | 0   | 3,100    | .6   | 0     | 29   | 0   | 0     | 0   |       |     |

THE SEASON MARCH TO OCTOBER

AC-FT 3,130

## MILK RIVER BASIN

06157500 Cypress Lake east outflow canal near Vidora, Saskatchewan

(International gaging station)

LOCATION.--Lat 49°29'12", long 109°21'08", in SE¼ sec.19, T.6, R.25 W., third meridian, on right bank 500 ft upstream from Belanger Creek and 12.3 miles north of Vidora.

PERIOD OF RECORD.--April to October 1940, April 1943 to current season (seasonal records only). Monthly discharge only for some periods, published in WSP 1309.

GAGE.--Water-stage recorder. Altitude of gage is 3,180 ft (from topographic map). Prior to Sept. 26, 1946, at datum 2.24 ft higher and Sept. 26, 1946, to May 18, 1950, at datum 1.54 ft higher

EXTREMES.--Period of record: Maximum daily discharge, 202 cfs Apr. 19, 1952; no flow at times each season.

REMARKS.--Records good except those for period of no gage-height record, which are fair. Canal diverts water from Cypress Lake for irrigation of lands in Frenchman River basin in Saskatchewan.

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

## DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR 1971

| DAY   | JAN | FEB   | MAR   | APR    | MAY   | JUN   | JUL    | AUG    | SEP    | OCT    | NOV   | DEC |
|-------|-----|-------|-------|--------|-------|-------|--------|--------|--------|--------|-------|-----|
| 1     |     | -     | .90   | 1.4    | 31    | 2.1   | 1.5    | 34     | 0      | .82    | 1.7   |     |
| 2     |     | -     | 1.0   | 1.4    | 29    | 1.9   | 1.4    | 34     | 0      | 1.4    | 1.7   |     |
| 3     |     | -     | 1.0   | 1.4    | 30    | 1.5   | 1.4    | 34     | 0      | .80    | 1.5   |     |
| 4     |     | -     | 1.0   | 1.4    | 30    | 1.3   | .54    | 34     | 0      | .60    | -     |     |
| 5     |     | -     | 1.1   | 1.4    | 27    | 1.2   | .23    | 35     | 0      | .30    | -     |     |
| 6     |     | -     | 1.1   | 1.4    | 25    | 1.5   | .02    | 36     | 0      | .34    | -     |     |
| 7     |     | -     | 1.2   | 1.4    | 24    | 2.1   | .05    | 36     | 0      | .23    | -     |     |
| 8     |     | -     | 1.2   | 1.4    | 22    | 4.2   | .24    | 35     | 0      | .39    | -     |     |
| 9     |     | -     | 1.3   | 1.4    | 19    | 3.7   | .43    | 35     | 0      | .41    | -     |     |
| 10    |     | -     | 1.3   | .70    | 15    | 2.5   | .48    | 35     | 0      | .46    | -     |     |
| 11    |     | -     | 1.3   | 0      | 11    | 1.7   | .84    | 36     | 0      | .49    | -     |     |
| 12    |     | -     | 1.4   | 0      | 7.6   | 1.7   | .50    | 36     | 0      | .54    | -     |     |
| 13    |     | -     | 1.4   | 0      | 6.7   | 1.5   | .37    | 35     | 0      | .60    | -     |     |
| 14    |     | -     | 1.5   | 1.1    | 5.9   | 1.5   | .30    | 36     | 0      | .75    | -     |     |
| 15    |     | -     | 1.5   | 2.2    | 5.2   | 1.3   | .26    | 34     | 0      | .76    | -     |     |
| 16    |     | -     | 1.5   | 6.4    | 4.7   | 1.2   | .19    | 33     | 0      | .89    | -     |     |
| 17    |     | -     | 1.5   | 11     | 5.8   | 1.1   | .13    | 32     | 0      | 1.1    | -     |     |
| 18    |     | -     | 1.5   | 15     | 9.7   | 1.1   | .13    | 20     | 0      | 1.2    | -     |     |
| 19    |     | -     | 1.5   | 19     | 14    | 1.2   | .15    | .50    | 0      | .95    | -     |     |
| 20    |     | -     | 1.4   | 23     | 13    | 1.3   | .15    | 0      | 0      | .85    | -     |     |
| 21    |     | -     | 1.4   | 21     | 11    | 1.0   | .15    | 0      | 0      | .80    | -     |     |
| 22    |     | -     | 1.4   | 22     | 11    | .70   | .24    | 0      | .86    | .80    | -     |     |
| 23    |     | -     | 1.4   | 40     | 9.2   | 1.0   | 6.8    | 0      | 44     | .74    | -     |     |
| 24    |     | -     | 1.4   | 136    | 7.1   | .46   | 31     | 0      | 123    | .82    | -     |     |
| 25    |     | -     | 1.4   | 133    | 5.8   | .55   | 33     | 0      | 130    | .84    | -     |     |
| 26    |     | .80   | 1.4   | 115    | 4.6   | .89   | 34     | 0      | 127    | .75    | -     |     |
| 27    |     | .80   | 1.4   | 31     | 3.8   | .97   | 34     | 0      | 126    | .87    | -     |     |
| 28    |     | .90   | 1.4   | 36     | 2.5   | 1.5   | 33     | 0      | 124    | 1.7    | -     |     |
| 29    |     | ----- | 1.4   | 57     | 2.1   | 1.7   | 34     | 0      | 122    | 1.4    | -     |     |
| 30    |     | ----- | 1.4   | 45     | 1.9   | 1.7   | 33     | 0      | 121    | 1.4    | -     |     |
| 31    |     | ----- | 1.4   | -----  | 2.1   | ----- | 33     | 0      | -----  | 1.8    | ----- |     |
| TOTAL |     |       | 41.00 | 727.00 | 396.7 | 46.16 | 281.50 | 610.50 | 917.86 | 106.98 | -     |     |
| MEAN  |     |       | 1.32  | 24.2   | 12.8  | 1.54  | 9.08   | 19.7   | 30.6   | 3.45   | -     |     |
| MAX   |     |       | 1.5   | 136    | 31    | 4.2   | 34     | 36     | 130    | .82    | -     |     |
| MIN   |     |       | .90   | 0      | 1.9   | .46   | .02    | 0      | 0      | .23    | -     |     |
| AC-FT |     |       | 81    | 1,440  | 787   | 92    | 558    | 1,210  | 1,820  | 212    | -     |     |

THE SEASON MARCH TO OCTOBER AC-FT 6,200

NOTE.--No gage-height record Feb. 26 to Apr. 14.

## MILK RIVER BASIN

113

06158500 Eastend Canal at Eastend, Saskatchewan

(International gaging station)

LOCATION.--Lat 49°30'20", long 108°51'05", in NW¼ sec.25, T.6, R.22 W., third meridian, on left bank 100 ft downstream from headgates and 1.5 miles west of Eastend.

PERIOD OF RECORD.--March 1937 to current season (seasonal records only). Monthly discharge only for some periods, published in WSP 1309.

GAGE.--Water-stage recorder. Datum of gage is 2,999.24 ft above mean sea level (Geodetic Surveys of Canada datum). Prior to Sept. 19, 1949, at sites within 1 mile downstream at different datums.

EXTREMES.--Period of record: Maximum daily discharge, 71 cfs July 24, 1968, May 30, 1971; no flow at times each season.

REMARKS.--Records good except those below 0.1 cfs, which are poor. Canal diverts water from Eastend Reservoir in NW¼ sec.25, T.6, R.22 W., third meridian, on right bank for irrigation of about 3,100 acres of land in the Frenchman River basin in Saskatchewan.

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

## DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR 1971

| DAY   | JAN | FEB | MAR | APR   | MAY    | JUN    | JUL    | AUG    | SEP   | OCT  | NOV   | DEC |
|-------|-----|-----|-----|-------|--------|--------|--------|--------|-------|------|-------|-----|
| 1     |     |     |     | 0     | .01    | 60     | .01    | 48     | .04   | .01  |       |     |
| 2     |     |     |     | 0     | .01    | 67     | .01    | 47     | .04   | .01  |       |     |
| 3     |     |     |     | 0     | .01    | 63     | .01    | 47     | .04   | .01  |       |     |
| 4     |     |     |     | 0     | .01    | 59     | .01    | 45     | .04   | .01  |       |     |
| 5     |     |     |     | 0     | .01    | 60     | .01    | 44     | .04   | .01  |       |     |
| 6     |     |     |     | 0     | .01    | 50     | .01    | 42     | .03   | .01  |       |     |
| 7     |     |     |     | 0     | .01    | 54     | .01    | 41     | .03   | .01  |       |     |
| 8     |     |     |     | 0     | .01    | 53     | .01    | 40     | .03   | .01  |       |     |
| 9     |     |     |     | 0     | .01    | 48     | .01    | 39     | .03   | .01  |       |     |
| 10    |     |     |     | 0     | .01    | 47     | .01    | 30     | .03   | .01  |       |     |
| 11    |     |     |     | 0     | .01    | 45     | .01    | 37     | .02   | .01  |       |     |
| 12    |     |     |     | 0     | .01    | 45     | .01    | 35     | .02   | .01  |       |     |
| 13    |     |     |     | 0     | .01    | 41     | .01    | 33     | .02   | .01  |       |     |
| 14    |     |     |     | 0     | .01    | 31     | .01    | 31     | .02   | .01  |       |     |
| 15    |     |     |     | 0     | .01    | 23     | .01    | 13     | .02   | .01  |       |     |
| 16    |     |     |     | 0     | .01    | 19     | .01    | 8.4    | .01   | .01  |       |     |
| 17    |     |     |     | 0     | .01    | 19     | .01    | 3.0    | .01   | .01  |       |     |
| 18    |     |     |     | 0     | .01    | 18     | .01    | .05    | .01   | .01  |       |     |
| 19    |     |     |     | 0     | .01    | 17     | .47    | .05    | .01   | .01  |       |     |
| 20    |     |     |     | 0     | .01    | 15     | .60    | .05    | .01   | .01  |       |     |
| 21    |     |     |     | 0     | .14    | 4.4    | .59    | .05    | 0     | .01  |       |     |
| 22    |     |     |     | 0     | .42    | .01    | .58    | .05    | 0     | .01  |       |     |
| 23    |     |     |     | 0     | .51    | .01    | .59    | .05    | 0     | .01  |       |     |
| 24    |     |     |     | 0     | .57    | .01    | .57    | .05    | 0     | .01  |       |     |
| 25    |     |     |     | 0     | .62    | .01    | .56    | .05    | 0     | .01  |       |     |
| 26    |     |     |     | 0     | .62    | .01    | .54    | .05    | .01   | .01  |       |     |
| 27    |     |     |     | .01   | .65    | .01    | .54    | .05    | .01   | .01  |       |     |
| 28    |     |     |     | .01   | .66    | .01    | .53    | .05    | .01   | .01  |       |     |
| 29    |     |     |     | .01   | .67    | .01    | .52    | .05    | .01   | .01  |       |     |
| 30    |     |     |     | .01   | .71    | .01    | .51    | .05    | .01   | .01  |       |     |
| 31    |     |     |     | ----- | .70    | -----  | .49    | .05    | ----- | .01  | ----- |     |
| TOTAL |     |     | 0   | .04   | 627.20 | 863.49 | 709.18 | 593.10 | .55   | .31  |       |     |
| MEAN  |     |     | 0   | .001  | 20.2   | 28.8   | 22.9   | 19.1   | .018  | .010 |       |     |
| MAX   |     |     | 0   | .01   | .71    | .69    | .60    | .48    | .04   | .01  |       |     |
| MIN   |     |     | 0   | 0     | .01    | .01    | .01    | .05    | 0     | .01  |       |     |
| AC-FT |     |     | 0   | .09   | 1,240  | 1,710  | 1,410  | 1,180  | 1.1   | .6   |       |     |

THE SEASON MARCH TO OCTOBER AC-FT 5,540

NOTE.--No gage-height record Aug. 18 to Sept. 20, Sept. 26 to Oct. 31.

## MILK RIVER BASIN

06159500 Frenchman River below Eastend Reservoir, near Eastend, Saskatchewan

(International gaging station)

LOCATION.--Lat 49°30'54", long 108°50'16", in SE¼ sec.36, T.6, R.22 W., third meridian, on left bank 0.8 mile west of Eastend, 1.7 miles downstream from Eastend Reservoir, and 100 miles upstream from international boundary.

DRAINAGE AREA.--637 sq mi, of which 159 sq mi in Cypress Lake basin is generally noncontributing.

PERIOD OF RECORD.--April 1909 to October 1916, March 1918 to May 1931, September 1935, March to July 1936, and April 1939 to current season (seasonal records only). Monthly discharge only for some periods, published in WSP 1309. Published as "at East End" 1909-16. Records prior to April 1939, not equivalent owing to diversion in Eastend Canal since 1937.

GAGE.--Water-stage recorder. Altitude of gage is 2,960 ft (from topographic map). Prior to July 1941, non-recording gages at several sites within 1.5 miles of present site at various datums.

EXTREMES.--Current season: Maximum discharge, 885 cfs Apr. 16 (gage height, 7.02 ft), minimum daily, 3.6 cfs Aug. 28.

Period of record: Maximum discharge, 11,500 cfs Apr. 16, 1952 (gage height, 19.10 ft, from floodmark in gage house); no flow at times.

REMARKS.--Records fair. Natural flow of stream affected by storage reservoirs, diversions for irrigation, and return flow from irrigated areas. Water may be diverted into or from Battle Creek basin through Cypress Lake.

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

REVISIONS (WATER YEARS).--WSP 1729: 1919, 1941 (monthly figures only), drainage area.

## DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR 1971

| DAY   | JAN | FEB   | MAR   | APR    | MAY   | JUN   | JUL   | AUG   | SEP   | OCT   | NOV   | DEC |
|-------|-----|-------|-------|--------|-------|-------|-------|-------|-------|-------|-------|-----|
| 1     |     |       | 16    | 17     | 52    | 11    | 7.0   | 5.3   | 4.2   | 71    | 12    |     |
| 2     |     |       | 16    | 21     | 53    | 11    | 6.8   | 5.3   | 4.0   | 64    |       |     |
| 3     |     |       | 16    | 19     | 114   | 11    | 6.7   | 5.3   | 3.9   | 104   |       |     |
| 4     |     |       | 16    | 23     | 240   | 11    | 6.9   | 5.5   | 4.0   | 97    |       |     |
| 5     |     |       | 17    | 23     | 255   | 11    | 7.2   | 5.7   | 4.1   | 87    |       |     |
| 6     |     |       | 17    | 31     | 237   | 11    | 7.2   | 5.5   | 4.2   | 66    |       |     |
| 7     |     |       | 17    | 38     | 227   | 10    | 6.9   | 5.4   | 4.3   | 41    |       |     |
| 8     |     |       | 17    | 38     | 221   | 10    | 6.8   | 5.1   | 4.4   | 29    |       |     |
| 9     |     |       | 17    | 24     | 213   | 9.7   | 6.8   | 4.9   | 4.4   | 23    |       |     |
| 10    |     |       | 18    | 49     | 161   | 9.4   | 6.8   | 6.1   | 4.6   | 15    |       |     |
| 11    |     |       | 18    | 83     | 93    | 9.4   | 6.9   | 5.8   | 4.5   | 13    |       |     |
| 12    |     |       | 18    | 84     | 79    | 9.2   | 6.4   | 5.4   | 4.2   | 12    |       |     |
| 13    |     |       | 18    | 62     | 47    | 9.0   | 6.3   | 5.0   | 3.9   | 12    |       |     |
| 14    |     |       | 18    | 88     | 29    | 8.8   | 5.9   | 4.7   | 4.0   | 13    |       |     |
| 15    |     |       | 19    | 177    | 29    | 8.7   | 5.9   | 4.5   | 3.9   | 13    |       |     |
| 16    |     |       | 19    | 587    | 28    | 9.0   | 5.8   | 4.5   | 3.9   | 14    |       |     |
| 17    |     |       | 19    | 726    | 28    | 8.8   | 5.7   | 4.4   | 4.0   | 15    |       |     |
| 18    |     |       | 19    | 556    | 27    | 8.5   | 5.9   | 4.4   | 4.0   | 15    |       |     |
| 19    |     |       | 20    | 350    | 27    | 8.3   | 5.9   | 5.0   | 4.1   | 15    |       |     |
| 20    |     |       | 20    | 290    | 44    | 8.2   | 5.9   | 6.0   | 4.3   | 15    |       |     |
| 21    |     |       | 20    | 293    | 89    | 8.0   | 5.9   | 5.2   | 4.2   | 15    |       |     |
| 22    |     |       | 20    | 351    | 66    | 7.9   | 5.9   | 4.9   | 4.2   | 14    |       |     |
| 23    |     |       | 20    | 497    | 20    | 7.8   | 5.8   | 4.7   | 4.2   | 14    |       |     |
| 24    |     |       | 21    | 526    | 14    | 7.9   | 5.8   | 4.2   | 4.2   | 14    |       |     |
| 25    |     |       | 21    | 474    | 13    | 7.6   | 5.7   | 4.1   | 4.2   | 14    |       |     |
| 26    |     |       | 21    | 338    | 12    | 7.4   | 5.5   | 4.1   | 4.2   | 13    |       |     |
| 27    |     |       | 21    | 485    | 11    | 7.5   | 5.4   | 4.1   | 4.2   | 13    |       |     |
| 28    |     |       | 22    | 163    | 11    | 7.5   | 5.5   | 3.6   | 4.2   | 13    |       |     |
| 29    |     | ----- | 22    | 61     | 10    | 7.3   | 5.3   | 4.1   | 204   | 13    |       |     |
| 30    |     | ----- | 34    | 50     | 10    | 7.3   | 5.2   | 4.1   | 210   | 12    |       |     |
| 31    |     | ----- | 33    | -----  | 10    | ----- | 5.2   | 4.1   | ----- | 12    | ----- |     |
| TOTAL |     |       | 610   | 6,524  | 2,470 | 269.2 | 190.9 | 151.0 | 530.5 | 881   |       |     |
| MEAN  |     |       | 19.7  | 217    | 79.7  | 8.97  | 6.16  | 4.87  | 17.7  | 28.4  |       |     |
| MAX   |     |       | 34    | 726    | 255   | 11    | 7.2   | 6.1   | 210   | 104   |       |     |
| MIN   |     |       | 16    | 17     | 10    | 7.3   | 5.2   | 3.6   | 3.9   | 12    |       |     |
| AC-FT |     |       | 1,210 | 12,940 | 4,900 | 534   | 379   | 300   | 1,050 | 1,750 |       |     |

THE SEASON MARCH TO OCTOBER

AC-FT 23,060

## MILK RIVER BASIN

115

06160600 Frenchman River below Eastend Irrigation Project, near Eastend, Saskatchewan

(International gaging station)

LOCATION.--Lat 49°24'34", long 108°36'01", in SW $\frac{1}{4}$  sec.26, T.5, R.20 W., third meridian, on right bank 2,000 ft downstream from road bridge and 12.3 miles southeast of Eastend.

DRAINAGE AREA.--835 sq mi, of which 159 sq mi in the Cypress Lake basin is generally noncontributing. Area at site used prior to July 1, 1962, 800 sq mi; at site used July 1, 1962, to Sept. 8, 1965, 832 sq mi.

PERIOD OF RECORD.--June 1937 to September 1955, July 1962 to current season (seasonal records only). Monthly discharge only for some periods, published in WSP 1309, 1729. Prior to July 1962, published as "at Morrisons, near Eastend."

GAGE.--Water-stage recorder. Altitude of gage is 2,930 ft (from topographic map). Prior to Apr. 1, 1942, non-recording gage, and Apr. 1, 1942, to Sept. 30, 1955, water-stage recorder at site 8 miles upstream at different datum. July 1, 1962, to Sept. 8, 1965, water-stage recorder 2,000 ft upstream from present site at different datum.

EXTREMES.--Current season: Maximum discharge recorded, about 400 cfs Apr. 28 (gage height, 5.50 ft); minimum daily, 2.1 cfs Sept. 13.

Period of record: Maximum discharge, about 12,000 cfs Apr. 16, 1952 (gage height, 17.77 ft, site and datum then in use, from floodmark in gage house), from rating curve extended above 2,300 cfs; no flow at times.

REMARKS.--Records good except those for May 15 to July 30, which are poor. Natural flow of stream affected by storage reservoirs, diversions for irrigation and return flow from irrigated areas. Water may be diverted into or from Battle Creek basin through Cypress Lake.

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

REVISIONS (WATER YEARS).--WSP 1309: 1938, 1940, 1942, 1943(M), 1945. WSP 1729: Drainage area.

## DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR 1971

| DAY   | JAN | FEB   | MAR | APR   | MAY   | JUN   | JUL   | AUG   | SEP   | OCT   | NOV   | DEC |
|-------|-----|-------|-----|-------|-------|-------|-------|-------|-------|-------|-------|-----|
| 1     |     |       |     | -     | 57    | 18    | 5.7   | 13    | 10    | 216   |       |     |
| 2     |     |       |     | -     | 57    | 19    | 5.7   | 11    | 10    | 88    |       |     |
| 3     |     |       |     | -     | 61    | 17    | 6.5   | 12    | 9.4   | 87    |       |     |
| 4     |     |       |     | -     | 117   | 10    | 6.7   | 14    | 4.3   | 104   |       |     |
| 5     |     |       |     | -     | 247   | 15    | 6.7   | 14    | 6.9   | 93    |       |     |
| 6     |     |       |     | -     | 237   | 15    | 7.2   | 15    | 6.8   | 91    |       |     |
| 7     |     |       |     | -     | 221   | 16    | 7.3   | 17    | 6.4   | 63    |       |     |
| 8     |     |       |     | -     | 211   | 17    | 7.5   | 17    | 4.9   | 45    |       |     |
| 9     |     |       |     | -     | 235   | 17    | 7.3   | 14    | 4.0   | 35    |       |     |
| 10    |     |       |     | -     | 154   | 17    | 7.5   | 13    | 4.0   | 29    |       |     |
| 11    |     |       |     | -     | 154   | 15    | 7.0   | 15    | 3.4   | 20    |       |     |
| 12    |     |       |     | -     | 97    | 15    | 6.6   | 18    | 3.4   | 16    |       |     |
| 13    |     |       |     | -     | 94    | 15    | 6.6   | 17    | 2.1   | 15    |       |     |
| 14    |     |       |     | -     | 92    | 15    | 6.7   | 14    | 2.3   | 14    |       |     |
| 15    |     |       |     | -     | 75    | 16    | 6.6   | 15    | 2.3   | 14    |       |     |
| 16    |     |       |     | -     | 44    | 15    | 5.9   | 14    | 3.1   | 15    |       |     |
| 17    |     |       |     | -     | 24    | 13    | 5.6   | 11    | 3.9   | 14    |       |     |
| 18    |     |       |     | -     | 32    | 12    | 5.5   | 6.8   | 4.1   | 16    |       |     |
| 19    |     |       |     | -     | 32    | 12    | 5.5   | 8.2   | 5.7   | 16    |       |     |
| 20    |     |       |     | -     | 33    | 12    | 5.6   | 9.5   | 7.8   | 16    |       |     |
| 21    |     |       |     | -     | 37    | 12    | 5.1   | 9.0   | 6.5   | 16    |       |     |
| 22    |     |       |     | -     | 63    | 10    | 5.8   | 11    | 5.9   | 16    |       |     |
| 23    |     |       |     | -     | 63    | 8.6   | 3.9   | 12    | 5.6   | 16    |       |     |
| 24    |     |       |     | -     | 40    | 8.2   | 11    | 11    | 4.1   | 16    |       |     |
| 25    |     |       |     | -     | 27    | 7.5   | 12    | 12    | 3.5   | 16    |       |     |
| 26    |     |       |     | -     | 21    | 6.6   | 13    | 12    | 3.2   | 16    |       |     |
| 27    |     |       |     | -     | 20    | 5.8   | 13    | 12    | 3.5   | 19    |       |     |
| 28    |     |       |     | -     | 19    | 5.4   | 13    | 13    | 5.0   | 16    |       |     |
| 29    |     | ----- |     |       | 125   | 18    | 6.6   | 11    | 7.8   | 5.4   |       |     |
| 30    |     | ----- |     |       | 68    | 17    | 6.1   | 13    | 7.4   | 239   |       |     |
| 31    |     | ----- |     | ----- |       | 17    | ----- | 13    | 8.5   | ----- | ----- |     |
| TOTAL |     |       |     | -     | 2,624 | 384.8 | 253.9 | 384.2 | 390.5 | 1,174 |       |     |
| MEAN  |     |       |     | -     | 84.6  | 12.8  | 8.19  | 12.4  | 13.0  | 37.9  |       |     |
| MAX   |     |       |     | -     | 247   | 19    | 13    | 18    | 239   | 216   |       |     |
| MIN   |     |       |     | -     | 17    | 5.4   | 5.1   | 6.8   | 2.1   | 14    |       |     |
| AC-FT |     |       |     | -     | 5,200 | 763   | 504   | 762   | 775   | 2,330 |       |     |

THE SEASON MAY TO OCTOBER AC -FT 10,340



## MILK RIVER BASIN

06161300 Val Marie west pumping canal near Val Marie, Saskatchewan

(International gaging station)

LOCATION.--Lat 49°22'19", long 107°53'02", in NW¼ sec.7, T.5, R.14 W., third meridian, on right bank 50 ft downstream from pump discharge outlet, 11 miles northwest of Val Marie.

PERIOD OF RECORD.--March 1963 to current season. July 1950 to current season in reports of Department of the Environment, Canada. Seasonal records only.

GAGE.--Water-stage recorder. Prior to 1956 and subsequent to 1960, records obtained from occasional discharge measurements and records of pump operation.

EXTREMES.--Period of record: Maximum daily discharge, 27 cfs May 28, 1964; no flow at times.

REMARKS.--Records fair. Canal diverts water from Val Marie West Reservoir for irrigation in the Frenchman River basin in Saskatchewan.

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

## DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR 1971

| DAY   | JAN | FEB   | MAR | APR   | MAY   | JUN   | JUL  | AUG   | SEP   | OCT  | NOV   | DEC |
|-------|-----|-------|-----|-------|-------|-------|------|-------|-------|------|-------|-----|
| 1     |     |       |     |       | 0     | 20    | 0    | 19    |       | 0    |       |     |
| 2     |     |       |     |       | 0     | 20    | 0    | 19    |       | 0    |       |     |
| 3     |     |       |     |       | 0     | 20    | 0    | 19    |       | 0    |       |     |
| 4     |     |       |     |       | 0     | 19    | 0    | 18    |       | 0    |       |     |
| 5     |     |       |     |       | 0     | 19    | 0    | 19    |       | 0    |       |     |
| 6     |     |       |     |       | 0     | 19    | 0    | 19    |       | 0    |       |     |
| 7     |     |       |     |       | 0     | 19    | 0    | 18    |       | 6.3  |       |     |
| 8     |     |       |     |       | 0     | 19    | 0    | 18    |       | 9.1  |       |     |
| 9     |     |       |     |       | 0     | 19    | 0    | 18    |       | 4.4  |       |     |
| 10    |     |       |     |       | 0     | 19    | 0    | 18    |       | 0    |       |     |
| 11    |     |       |     |       | 0     | 19    | 0    | 18    |       | 0    |       |     |
| 12    |     |       |     |       | 0     | 19    | 0    | 18    |       | 0    |       |     |
| 13    |     |       |     |       | 0     | 19    | 0    | 18    |       | 0    |       |     |
| 14    |     |       |     |       | 0     | 19    | 0    | 17    |       | 0    |       |     |
| 15    |     |       |     |       | 0     | 19    | 0    | 14    |       | 0    |       |     |
| 16    |     |       |     |       | 0     | 19    | 0    | 17    |       | 0    |       |     |
| 17    |     |       |     |       | 0     | 19    | 0    | 17    |       | 0    |       |     |
| 18    |     |       |     |       | 0     | 19    | 0    | 17    |       | 0    |       |     |
| 19    |     |       |     |       | 0     | 18    | 0    | 17    |       | 0    |       |     |
| 20    |     |       |     |       | 0     | 11    | 12   | 17    |       | 0    |       |     |
| 21    |     |       |     |       | 0     | 11    | 21   | 15    |       | 0    |       |     |
| 22    |     |       |     |       | 0     | 11    | 20   | 8.2   |       | 0    |       |     |
| 23    |     |       |     |       | 0     | 10    | 20   | 12    |       | 0    |       |     |
| 24    |     |       |     |       | 3.4   | 0     | 20   | 12    |       | 0    |       |     |
| 25    |     |       |     |       | 16    | 0     | 20   | 0     |       | 0    |       |     |
| 26    |     |       |     |       | 20    | 0     | 20   | 0     |       | 0    |       |     |
| 27    |     |       |     |       | 20    | 0     | 20   | 0     |       | 0    |       |     |
| 28    |     |       |     |       | 20    | 0     | 19   | 0     |       | 0    |       |     |
| 29    |     | ----- |     |       | 20    | 0     | 19   | 0     |       | 0    |       |     |
| 30    |     | ----- |     |       | 20    | 0     | 19   | 0     |       | 0    |       |     |
| 31    |     | ----- |     | ----- | 20    | ----- | 19   | 0     | ----- | 0    | ----- |     |
| TOTAL |     |       | 0   | 0     | 139.4 | 406   | 229  | 402.2 | 0     | 19.8 |       |     |
| MEAN  |     |       | 0   | 0     | 4.50  | 13.5  | 7.39 | 13.0  | 0     | .64  |       |     |
| MAX   |     |       | 0   | 0     | 20    | 20    | 21   | 19    | 0     | 9.1  |       |     |
| MIN   |     |       | 0   | 0     | 0     | 0     | 0    | 0     | 0     | 0    |       |     |
| AC-FT |     |       | 0   | 0     | 277   | 805   | 454  | 798   | 0     | 39   |       |     |

THE SEASON MARCH TO OCTOBER

AC-FT 2,370

## MILK RIVER BASIN

117

06161500 Val Marie west gravity canal near Val Marie, Saskatchewan

(International gaging station)

LOCATION.--Lat 49°22'10", long 107°53'06", in SW¼ sec.7, T.5, R.14 W., third meridian, on right bank at outlet of Val Marie West Reservoir, 11 miles northwest of Val Marie.

PERIOD OF RECORD.--March 1946 to current season (seasonal records only). Monthly figures only prior to March 1947, published in WSP 1309.

GAGE.--Water-stage recorder. Altitude of gage is 2,650 ft (from topographic map). Prior to Sept. 27, 1949, at site 0.5 mile downstream at different datum.

EXTREMES.--Period of record: Maximum daily discharge, 52 cfs May 22, 1958, May 27-29, 1971; no flow at times each season.

REMARKS.--Records fair. Canal diverts water from Val Marie West Reservoir for irrigation in the Frenchman River basin in Saskatchewan. Since 1962, records have been based on gate openings in Val Marie West Dam.

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

## DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR 1971

| DAY   | JAN | FEB | MAR | APR | MAY  | JUN   | JUL   | AUG   | SEP | OCT | NOV | DEC |
|-------|-----|-----|-----|-----|------|-------|-------|-------|-----|-----|-----|-----|
| 1     |     |     |     |     | 0    | 27    | 0     | 14    |     |     |     |     |
| 2     |     |     |     |     | 0    | 24    | 0     | 13    |     |     |     |     |
| 3     |     |     |     |     | 0    | 13    | 0     | 11    |     |     |     |     |
| 4     |     |     |     |     | 0    | 7.5   | 0     | 7.3   |     |     |     |     |
| 5     |     |     |     |     | 0    | 0     | 0     | 9.5   |     |     |     |     |
| 6     |     |     |     |     | 0    | 0     | 0     | 6.7   |     |     |     |     |
| 7     |     |     |     |     | 0    | 0     | 0     | 4.1   |     |     |     |     |
| 8     |     |     |     |     | 0    | 0     | 0     | 2.5   |     |     |     |     |
| 9     |     |     |     |     | 0    | 0     | 0     | 2.1   |     |     |     |     |
| 10    |     |     |     |     | 0    | 0     | 0     | 1.7   |     |     |     |     |
| 11    |     |     |     |     | 0    | 0     | 0     | .70   |     |     |     |     |
| 12    |     |     |     |     | 0    | 0     | 0     | 0     |     |     |     |     |
| 13    |     |     |     |     | 0    | 4.1   | 0     | 0     |     |     |     |     |
| 14    |     |     |     |     | 0    | 7.0   | 1.1   | 0     |     |     |     |     |
| 15    |     |     |     |     | 0    | 7.0   | 14    | 0     |     |     |     |     |
| 16    |     |     |     |     | 0    | 6.8   | 8.3   | 0     |     |     |     |     |
| 17    |     |     |     |     | 0    | 6.8   | 8.7   | 0     |     |     |     |     |
| 18    |     |     |     |     | 0    | 6.4   | 8.5   | 0     |     |     |     |     |
| 19    |     |     |     |     | 0    | 6.7   | 32    | 0     |     |     |     |     |
| 20    |     |     |     |     | 0    | 6.8   | 40    | 0     |     |     |     |     |
| 21    |     |     |     |     | 0    | 2.6   | 43    | 0     |     |     |     |     |
| 22    |     |     |     |     | 0    | 0     | 41    | 0     |     |     |     |     |
| 23    |     |     |     |     | 0    | 0     | 40    | 0     |     |     |     |     |
| 24    |     |     |     |     | 0    | 0     | 39    | 0     |     |     |     |     |
| 25    |     |     |     |     | 35   | 0     | 37    | 0     |     |     |     |     |
| 26    |     |     |     |     | 50   | 0     | 36    | 0     |     |     |     |     |
| 27    |     |     |     |     | 52   | 0     | 34    | 0     |     |     |     |     |
| 28    |     |     |     |     | 52   | 0     | 32    | 0     |     |     |     |     |
| 29    |     |     |     |     | 52   | 0     | 28    | 0     |     |     |     |     |
| 30    |     |     |     |     | 51   | 0     | 20    | 0     |     |     |     |     |
| 31    |     |     |     |     | 40   | 0     | 15    | 0     |     |     |     |     |
| TOTAL |     |     | 0   | 0   | 332  | 126.1 | 477.6 | 73.60 | 0   | 0   |     |     |
| MEAN  |     |     | 0   | 0   | 10.7 | 4.20  | 15.4  | 2.37  | 0   | 0   |     |     |
| MAX   |     |     | 0   | 0   | 52   | 27    | 43    | 14    | 0   | 0   |     |     |
| MIN   |     |     | 0   | 0   | 0    | 0     | 0     | 0     | 0   | 0   |     |     |
| AC-FT |     |     | 0   | 0   | 659  | 250   | 947   | 146   | 0   | 0   |     |     |

THE SEASON MARCH TO OCTOBER

AC-FT 2,000

## MILK RIVER BASIN

06162500 Val Marie Main Canal near Val Marie, Saskatchewan

(International gaging station)

LOCATION.--Lat 49°18'18", long 107°48'05", in NE¼ sec.15, T.4, R.14 W., third meridian, on right bank about 500 ft downstream from Val Marie Reservoir and 5.4 miles northwest of Val Marie.

PERIOD OF RECORD.--April 1937 to current season (seasonal records only). Prior to April 1947 monthly discharge only, published in WSP 1309. Prior to March 1962, published as Val Marie Canal near Val Marie.

GAGE.--Water-stage recorder. Datum of gage is 2,622.03 ft (corrected) above mean sea level (Geodetic Surveys of Canada datum). Prior to May 21, 1963, at several sites within 2 miles of present site at different datums.

EXTREMES.--Period of record: Maximum daily discharge, 101 cfs June 5, 1969; no flow at times each season.

REMARKS.--Records fair. Canal diverts water from Val Marie Reservoir for irrigation of about 4,700 acres of land in the Frenchman River basin in Saskatchewan.

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

## DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR 1971

| DAY   | JAN | FEB   | MAR | APR   | MAY   | JUN     | JUL   | AUG   | SEP   | OCT | NOV   | DEC |
|-------|-----|-------|-----|-------|-------|---------|-------|-------|-------|-----|-------|-----|
| 1     |     |       |     |       | 0     | 99      | 0     | 63    |       |     |       |     |
| 2     |     |       |     |       | 0     | 100     | 0     | 61    |       |     |       |     |
| 3     |     |       |     |       | 0     | 99      | 0     | 58    |       |     |       |     |
| 4     |     |       |     |       | 0     | 84      | 0     | 56    |       |     |       |     |
| 5     |     |       |     |       | 0     | 70      | 0     | 53    |       |     |       |     |
| 6     |     |       |     |       | 0     | 60      | 0     | 51    |       |     |       |     |
| 7     |     |       |     |       | 0     | 59      | 0     | 48    |       |     |       |     |
| 8     |     |       |     |       | 0     | 59      | 0     | 46    |       |     |       |     |
| 9     |     |       |     |       | 0     | 44      | 0     | 44    |       |     |       |     |
| 10    |     |       |     |       | 0     | 44      | 0     | 42    |       |     |       |     |
| 11    |     |       |     |       | 0     | 43      | 0     | 39    |       |     |       |     |
| 12    |     |       |     |       | 0     | 44      | 0     | 35    |       |     |       |     |
| 13    |     |       |     |       | 0     | 42      | 20    | 37    |       |     |       |     |
| 14    |     |       |     |       | 0     | 36      | 30    | 26    |       |     |       |     |
| 15    |     |       |     |       | 0     | 50      | 45    | 0     |       |     |       |     |
| 16    |     |       |     |       | 0     | 49      | 48    | 0     |       |     |       |     |
| 17    |     |       |     |       | 0     | 38      | 47    | 0     |       |     |       |     |
| 18    |     |       |     |       | 0     | 38      | 47    | 0     |       |     |       |     |
| 19    |     |       |     |       | 0     | 27      | 53    | 0     |       |     |       |     |
| 20    |     |       |     |       | 0     | 21      | 64    | 0     |       |     |       |     |
| 21    |     |       |     |       | 40    | 21      | 69    | 0     |       |     |       |     |
| 22    |     |       |     |       | 55    | 21      | 70    | 0     |       |     |       |     |
| 23    |     |       |     |       | 65    | 21      | 72    | 0     |       |     |       |     |
| 24    |     |       |     |       | 77    | 20      | 70    | 0     |       |     |       |     |
| 25    |     |       |     |       | 85    | 18      | 75    | 0     |       |     |       |     |
| 26    |     |       |     |       | 95    | 3.9     | 77    | 0     |       |     |       |     |
| 27    |     |       |     |       | 94    | 0       | 76    | 0     |       |     |       |     |
| 28    |     |       |     |       | 94    | 0       | 74    | 0     |       |     |       |     |
| 29    |     | ----- |     |       | 93    | 0       | 72    | 0     |       |     |       |     |
| 30    |     | ----- |     |       | 92    | 0       | 70    | 0     |       |     |       |     |
| 31    |     | ----- |     | ----- | 97    | -----   | 66    | 0     | ----- |     | ----- |     |
| TOTAL |     |       | 0   | 0     | 887   | 1,210.9 | 1,145 | 659   | 0     | 0   |       |     |
| MEAN  |     |       | 0   | 0     | 28.6  | 40.4    | 36.9  | 21.3  | 0     | 0   |       |     |
| MAX   |     |       | 0   | 0     | 97    | 100     | 77    | 63    | 0     | 0   |       |     |
| MIN   |     |       | 0   | 0     | 0     | 0       | 0     | 0     | 0     | 0   |       |     |
| AC-FT |     |       | 0   | 0     | 1,760 | 2,400   | 2,270 | 1,310 | 0     | 0   |       |     |

THE SEASON MARCH TO OCTOBER

AC-FT 7,740

06163400 Denniel Creek near Val Marie, Saskatchewan

(International gaging station)

LOCATION.--Lat 49°18'26", long 107°42'12", in SW¼ sec.21, T.4, R.13 W., third meridian, on right bank 4.5 miles north of Val Marie.

DRAINAGE AREA.--251 sq mi.

PERIOD OF RECORD.--March 1963 to current season. April 1914 to May 1931, September 1935 to October 1937, March 1963 to current season in reports of Department of the Environment, Canada. Seasonal records only.

GAGE.--Water-stage recorder. Altitude of gage is 2,620 ft (from topographic map). Prior to February 1963, nonrecording gage at site about 0.8 mile downstream at different datum.

EXTREMES.--Current season: Maximum discharge recorded, 27 cfs Apr. 30 (gage height, 4.73 ft); no flow most of season.

Period of record: Maximum discharge, 2,380 cfs June 18, 1923 (gage height, 13.31 ft, site and datum then in use), from rating curve extended on basis of slope-area measurement of peak flow; no flow at times.

REMARKS.--Records good.

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

## DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR 1971

| JAN   | FEB | MAR | APR   | MAY   | JUN   | JUL  | AUG | SEP   | OCT | NOV   | DEC |
|-------|-----|-----|-------|-------|-------|------|-----|-------|-----|-------|-----|
| 1     |     |     |       | 14    | .21   | .12  |     |       |     |       |     |
| 2     |     |     |       | 10    | .16   | 0    |     |       |     |       |     |
| 3     |     |     |       | 7.5   | .06   | 0    |     |       |     |       |     |
| 4     |     |     |       | 6.3   | .05   | 0    |     |       |     |       |     |
| 5     |     |     |       | 5.1   | 0     | 0    |     |       |     |       |     |
| 6     |     |     |       | 4.3   | .03   | 0    |     |       |     |       |     |
| 7     |     |     |       | 3.5   | .07   | 0    |     |       |     |       |     |
| 8     |     |     |       | 3.1   | .07   | 0    |     |       |     |       |     |
| 9     |     |     |       | 2.4   | .02   | 0    |     |       |     |       |     |
| 10    |     |     |       | 1.9   | 0     | 0    |     |       |     |       |     |
| 11    |     |     |       | 1.5   | 0     | .25  |     |       |     |       |     |
| 12    |     |     |       | 1.3   | 0     | .14  |     |       |     |       |     |
| 13    |     |     |       | 1.0   | 0     | 0    |     |       |     |       |     |
| 14    |     |     |       | .76   | 0     | 0    |     |       |     |       |     |
| 15    |     |     |       | .56   | 0     | 0    |     |       |     |       |     |
| 16    |     |     |       | .45   | 0     | 0    |     |       |     |       |     |
| 17    |     |     |       | .56   | 0     | 0    |     |       |     |       |     |
| 18    |     |     |       | .77   | 0     | 0    |     |       |     |       |     |
| 19    |     |     |       | .59   | 0     | 0    |     |       |     |       |     |
| 20    |     |     |       | .46   | 0     | 0    |     |       |     |       |     |
| 21    |     |     |       | .80   | 0     | 0    |     |       |     |       |     |
| 22    |     |     |       | 1.1   | 0     | 0    |     |       |     |       |     |
| 23    |     |     |       | .80   | 0     | 0    |     |       |     |       |     |
| 24    |     |     |       | .50   | 0     | 0    |     |       |     |       |     |
| 25    |     |     |       | .26   | 2.6   | 0    |     |       |     |       |     |
| 26    |     |     |       | .25   | 2.1   | 0    |     |       |     |       |     |
| 27    |     |     |       | .18   | .91   | 0    |     |       |     |       |     |
| 28    |     |     |       | .15   | .42   | 0    |     |       |     |       |     |
| 29    |     |     |       | .09   | .41   | 0    |     |       |     |       |     |
| 30    |     |     | 24    | .07   | .27   | 0    |     |       |     |       |     |
| 31    |     |     | ----- | .15   | ----- | 0    |     | ----- |     | ----- |     |
| TOTAL |     |     |       | 70.90 | 7.40  | .51  | 0   | 0     | 0   |       |     |
| MEAN  |     |     |       | 2.29  | .25   | .017 | 0   | 0     | 0   |       |     |
| MAX   |     |     |       | 14    | 2.6   | .25  | 0   | 0     | 0   |       |     |
| MIN   |     |     |       | .07   | 0     | 0    | 0   | 0     | 0   |       |     |
| AC-FT |     |     |       | 141   | 15    | 1.0  | 0   | 0     | 0   |       |     |

THE SEASON MAY TO OCTOBER

AC-FT 156

## MILK RIVER BASIN

06163500 Frenchman River below Val Marie, Saskatchewan

(International gaging station)

LOCATION.--Lat 49°11'51", long 107°41'22", in NE $\frac{1}{4}$  sec.9, T.3, R.13 W., third meridian, on right bank 3.7 miles southeast of Val Marie and 6.2 miles northeast of Masefield.

DRAINAGE AREA.--1,725 sq mi.

PERIOD OF RECORD.--March 1937 to October 1952, March 1963 to current season. May 1953 to current season in reports of Department of the Environment, Canada. Seasonal records only.

GAGE.--Water-stage recorder. Altitude of gage is 2,550 ft (from topographic map). Prior to Aug. 18, 1938, nonrecording gage, and Aug. 18, 1938, to Oct. 31, 1950, water-stage recorder at datum 1.00 ft lower.

EXTREMES.--Current season: Maximum discharge, 1,950 cfs May 1 (gage height, 15.60 ft); minimum daily, 3.2 cfs Oct. 2.

Period of record: Maximum discharge, 17,700 cfs Apr. 14, 1952 (gage height, 19.7 ft, from floodmarks), from rating curve extended above 2,400 cfs on basis of slope-area measurement of peak flow; no flow at times.

REMARKS.--Records fair. Natural flow of stream affected by storage reservoirs, diversions for irrigation, and return flow from irrigated areas. Water may be diverted into or from Battle Creek basin through Cypress Lake.

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

REVISIONS.--WSP 1729: Drainage area.

## DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR 1971

| DAY   | JAN | FEB   | MAR   | APR   | MAY   | JUN   | JUL   | AUG   | SEP   | OCT   | NOV   | DEC |
|-------|-----|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-----|
| 1     |     |       |       | -     | 1,310 | 34    | 12    | 30    | 7.9   | 3.4   | 8.5   |     |
| 2     |     |       |       | -     | 440   | 29    | 11    | 28    | 7.2   | 3.2   | 11    |     |
| 3     |     |       |       | -     | 56    | 32    | 10    | 30    | 6.9   | 3.5   | -     |     |
| 4     |     |       |       | -     | 21    | 39    | 9.9   | 33    | 6.9   | 4.1   | -     |     |
| 5     |     |       |       | -     | 16    | 33    | 10    | 27    | 6.6   | 4.2   | -     |     |
| 6     |     |       |       | -     | 13    | 30    | 10    | 27    | 6.3   | 3.8   | -     |     |
| 7     |     |       |       | -     | 11    | 28    | 9.7   | 26    | 5.4   | 4.3   | -     |     |
| 8     |     |       |       | -     | 100   | 31    | 10    | 22    | 5.9   | 4.8   | -     |     |
| 9     |     |       |       | -     | 195   | 27    | 10    | 22    | 6.0   | 5.0   | -     |     |
| 10    |     |       |       | -     | 204   | 21    | 9.8   | 20    | 5.9   | 5.5   | -     |     |
| 11    |     |       |       | -     | 204   | 22    | 13    | 21    | 5.8   | 5.6   | -     |     |
| 12    |     |       |       | -     | 156   | 17    | 11    | 19    | 5.3   | 6.1   | -     |     |
| 13    |     |       |       | -     | 95    | 26    | 11    | 18    | 5.5   | 7.1   | -     |     |
| 14    |     |       |       | -     | 92    | 29    | 15    | 22    | 5.9   | 7.4   | -     |     |
| 15    |     |       |       | -     | 90    | 13    | 19    | 16    | 6.1   | 8.1   | -     |     |
| 16    |     |       |       | -     | 89    | 17    | 35    | 7.8   | 6.1   | 8.0   | -     |     |
| 17    |     |       |       | 97    | 116   | 27    | 40    | 4.4   | 6.2   | 8.5   | -     |     |
| 18    |     |       |       | 82    | 134   | 19    | 33    | 9.8   | 6.0   | 8.7   | -     |     |
| 19    |     |       |       | 69    | 131   | 22    | 36    | 9.7   | 5.6   | 9.0   | -     |     |
| 20    |     |       |       | 62    | 130   | 22    | 28    | 9.5   | 6.4   | 8.3   | -     |     |
| 21    |     |       |       | 58    | 130   | 21    | 28    | 9.0   | 5.8   | 9.0   | -     |     |
| 22    |     |       |       | 63    | 109   | 21    | 40    | 8.3   | 5.4   | 9.4   | -     |     |
| 23    |     |       |       | 186   | 78    | 18    | 34    | 7.7   | 5.6   | 9.7   | -     |     |
| 24    |     |       |       | 285   | 90    | 19    | 34    | 7.5   | 5.5   | 9.5   | -     |     |
| 25    |     |       |       | 332   | 55    | 19    | 42    | 7.9   | 5.3   | 9.3   | -     |     |
| 26    |     |       |       | 360   | 102   | 21    | 48    | 8.1   | 5.2   | 9.1   | -     |     |
| 27    |     |       |       | 376   | 53    | 18    | 42    | 7.9   | 4.8   | 9.1   | -     |     |
| 28    |     |       |       | 383   | 30    | 12    | 32    | 8.0   | 4.3   | 9.0   | -     |     |
| 29    |     | ----- |       | 397   | 27    | 15    | 34    | 7.9   | 5.5   | 9.3   | -     |     |
| 30    |     | ----- |       | 721   | 35    | 13    | 35    | 7.8   | 4.3   | 8.8   | -     |     |
| 31    |     | ----- | ----- | ----- | 40    | ----- | 30    | 7.9   | ----- | 7.6   | ----- |     |
| TOTAL |     |       |       | -     | 4,392 | 695   | 742.4 | 490.2 | 175.6 | 218.4 | -     |     |
| MEAN  |     |       |       | -     | 142   | 23.2  | 23.9  | 15.8  | 5.85  | 7.05  | -     |     |
| MAX   |     |       |       | -     | 1,310 | 39    | 48    | 33    | 7.9   | 9.7   | -     |     |
| MIN   |     |       |       | -     | 11    | 12    | 9.7   | 4.4   | 4.3   | 3.2   | -     |     |
| AC-FT |     |       |       | -     | 8,710 | 1,380 | 1,470 | 972   | 348   | 433   | -     |     |

THE SEASON MAY TO OCTOBER AC-FT 13,320



## MILK RIVER BASIN

121

06164000 Frenchman River at international boundary

(International gaging station)

LOCATION.--Lat 49°00'01", long 107°18'04", in SE¼ sec.5, T.1, R.10 W., third meridian, on left bank 50 ft north of international boundary and 22 miles northeast of Whitewater, Mont.

DRAINAGE AREA.--2,299 sq mi.

PERIOD OF RECORD.--April 1917 to current season (seasonal records only for most years).

GAGE.--Water-stage recorder and concrete control. Altitude of gage is 2,420 ft (from topographic map). Prior to June 23, 1937, water-stage recorder at site 0.5 mile upstream at different datum. June 23, 1937, to October 1952 water-stage recorder at site 100 ft downstream at present datum.

EXTREMES.--Current season: Maximum discharge, 938 cfs May 4 (gage height, 7.65 ft); minimum daily, 0.65 cfs Aug. 23.

Period of record: Maximum discharge, 22,700 cfs Apr. 15, 1952 (gage height, 19.90 ft, from floodmark), from rating curve extended above 2,300 cfs on basis of slope-area measurement of peak flow; no flow at times most years.

REMARKS.--Records good except those for winter period, which are poor. Natural flow of stream affected by several storage reservoirs, diversions for irrigation, and return flow from irrigated areas. Water may be diverted into or from Battle Creek basin through Cypress Lake.

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

REVISIONS (WATER YEARS).--WSP 1389: 1938(M), 1939-41, 1942(M), 1943, 1950(M). WSP 1729: Drainage area.

## DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR 1971

| DAY   | JAN | FEB   | MAR   | APR    | MAY    | JUN   | JUL   | AUG    | SEP   | OCT    | NOV   | DEC |
|-------|-----|-------|-------|--------|--------|-------|-------|--------|-------|--------|-------|-----|
| 1     |     |       | 6.1   | 23     | 452    | 52    | 20    | 30     | 6.3   | 4.4    | 5.1   |     |
| 2     |     |       | 5.1   | 22     | 652    | 20    | 15    | 27     | 6.4   | 4.3    | 7.0   |     |
| 3     |     |       | 6.1   | 27     | 351    | 51    | 14    | 24     | 6.6   | 5.1    | -     |     |
| 4     |     |       | 6.1   | 44     | 725    | 45    | 12    | 23     | 7.3   | 4.4    | -     |     |
| 5     |     |       | 6.1   | 70     | 110    | 42    | 10    | 22     | 7.0   | 3.3    | -     |     |
| 6     |     |       | 6.1   | 45     | 50     | 53    | 9.0   | 26     | 6.7   | 3.0    | -     |     |
| 7     |     |       | 6.1   | 105    | 41     | 40    | 8.3   | 27     | 6.2   | 2.7    | -     |     |
| 8     |     |       | 5.1   | 316    | 25     | 46    | 6.3   | 22     | 5.3   | 2.5    | -     |     |
| 9     |     |       | 6.2   | 557    | 34     | 42    | 7.2   | 21     | 5.0   | 2.0    | -     |     |
| 10    |     |       | 6.4   | 470    | 150    | 43    | 8.7   | 21     | 5.1   | 1.6    | -     |     |
| 11    |     |       | 6.6   | 469    | 134    | 39    | 3.5   | 19     | 4.7   | 1.5    | -     |     |
| 12    |     |       | 6.9   | 349    | 103    | 31    | 12    | 16     | 3.9   | 1.3    | -     |     |
| 13    |     |       | 7.0   | 353    | 191    | 31    | 9.3   | 18     | 3.6   | 1.3    | -     |     |
| 14    |     |       | 7.2   | 370    | 132    | 25    | 11    | 14     | 3.7   | 1.2    | -     |     |
| 15    |     |       | 7.4   | 292    | 112    | 30    | 12    | 17     | 4.1   | 1.1    | -     |     |
| 16    |     |       | 7.6   | 240    | 110    | 35    | 11    | 16     | 4.5   | 1.2    | -     |     |
| 17    |     |       | 7.3   | 242    | 110    | 21    | 9.6   | 19     | 4.2   | 1.2    | -     |     |
| 18    |     |       | 7.2   | 183    | 114    | 18    | 16    | 17     | 3.8   | 1.1    | -     |     |
| 19    |     |       | 7.8   | 192    | 137    | 31    | 37    | 11     | 4.9   | 1.97   | -     |     |
| 20    |     |       | 7.7   | 149    | 144    | 27    | 32    | 5.0    | 5.9   | 2.0    | -     |     |
| 21    |     |       | 7.7   | 149    | 143    | 25    | 32    | 2.4    | 7.2   | 4.7    | -     |     |
| 22    |     |       | 7.6   | 182    | 143    | 25    | 31    | 1.2    | 6.7   | 6.1    | -     |     |
| 23    |     |       | 7.5   | 177    | 141    | 23    | 28    | 6.5    | 6.6   | 5.7    | -     |     |
| 24    |     |       | 7.4   | 168    | 115    | 23    | 35    | 3.3    | 7.3   | 5.3    | -     |     |
| 25    |     |       | 7.3   | 284    | 104    | 22    | 33    | 4.8    | 6.4   | 4.2    | -     |     |
| 26    |     |       | 7.2   | 371    | 109    | 22    | 30    | 4.7    | 6.0   | 4.1    | -     |     |
| 27    |     |       | 7.1   | 406    | 112    | 19    | 35    | 4.3    | 6.1   | 5.1    | -     |     |
| 28    |     |       | 7.0   | 447    | 109    | 18    | 41    | 5.1    | 6.8   | 4.8    | -     |     |
| 29    |     | ----- | 8.1   | 490    | 62     | 22    | 39    | 6.3    | 5.6   | 5.0    | -     |     |
| 30    |     | ----- | 14    | 450    | 53     | 20    | 31    | 4.9    | 4.8   | 7.7    | -     |     |
| 31    |     | ----- | 24    | -----  | 52     | ----- | 29    | 5.6    | ----- | 5.8    | ----- |     |
| TOTAL |     |       | 240.0 | 7,721  | 5,791  | 587   | 634.5 | 445.25 | 169.7 | 104.67 | -     |     |
| MEAN  |     |       | 7.74  | 257    | 187    | 32.9  | 20.5  | 14.4   | 5.66  | 3.38   | -     |     |
| MAX   |     |       | 24    | 557    | 851    | 60    | 41    | 30     | 7.3   | 7.7    | -     |     |
| MIN   |     |       | 6.1   | 22     | 35     | 18    | 6.9   | 6.5    | 3.6   | .97    | -     |     |
| AC-FT |     |       | 476   | 15,310 | 11,490 | 1,960 | 1,260 | 883    | 337   | 208    | -     |     |

THE SEASON MARCH TO OCTOBER AC-FT 31,920

NOTE.--Stage-discharge relation affected by ice Mar. 3 to Apr. 12 (no gage-height record Mar. 1, 2).

## Reservoirs in Frenchman River basin in Saskatchewan

(International gaging stations)

06157000 CYPRESS LAKE.--Lat 49°28'51", long 109°23'44", in SE $\frac{1}{4}$  sec.23, T.6, R.26 W., third meridian, at east dam, 10.6 miles north of Vidora. Drainage area, 159 sq mi. Period of record, February 1939 to current season (seasonal records only). Records prior to October 1946, published only in WSP 1309. March to May 1952 daily elevations and contents, published in WSP 1260-B. Water-stage recorder at east dam. Datum of gage is at mean sea level (Canadian Geodetic Survey datum; subtract 33.67 ft to obtain Reclamation Service datum). Prior to 1969 season, at Reclamation Service datum. Prior to 1940, nonrecording gage on natural lake at "South" station. February 1940 to Apr. 28, 1955, elevations obtained from average of nonrecording gage readings at west and east dams.

Extremes for current season: Maximum contents, 105,400 acre-ft May 8 (elevation, 3,202.19 ft); minimum midnight, 82,930 acre-ft Oct. 29-31 (elevation, 3,198.28 ft). Extremes for period of record: Maximum contents, 117,300 acre-ft Apr. 21, 1955 (elevation, 3,203.36 ft, present datum), by capacity table used prior to 1970 season; minimum since first filling, 32,760 acre-ft (elevation, 3,188.11 ft, present datum), by capacity table used prior to 1970 season.

This is an offstream reservoir formed by two earthfill dams on a natural lake of the same name which was, at one time, the head of the Frenchman River. There are concrete control works at both dams. The following capacity figures are from capacity table effective February 1970; see previous reports for superseded figures. Total capacity, 105,300 acre-ft between elevation 3,187.17 ft (bottom of outlet works) and 3,202.17 ft (maximum design level). Dead storage, 25,130 acre-ft below elevations, 3,187.17 ft. Water is diverted from Battle Creek on the west, 12 miles northwest of Consul, and from Belanger Creek (head of Frenchman River) on the east, 12 miles north of Vidora. Water is released to the same streams for irrigation. Figures given herein represent total contents. This is one of a number of stations which are maintained jointly by Canada and the United States. Records partly furnished by Prairie Farms Rehabilitation Administration, Canada.

06159000 EASTEND RESERVOIR (revised).--Lat 49°30'22", long 108°51'08", in NW $\frac{1}{4}$  sec.25, T.6, R.22 W., third meridian, at dam on Frenchman River, 1.6 miles west of Eastend. Drainage area, 636 sq mi. Period of record, February 1937 to current season (seasonal records only). Prior to 1958, published as East End Reservoir at East End. Nonrecording gages read about once a day during irrigation season and twice a day during high stages. Datum of gage is at mean sea level (Canadian Geodetic Survey datum).

Extremes for current season: Maximum midnight contents, 2,340 acre-ft May 20 (elevation, 3,012.97 ft); no storage Oct. 31, 1970. Extremes for period of record: Maximum contents, about 3,700 acre-ft Apr. 15, 1952 (elevation, about 3,015 ft), dam overtopped; no storage at various times.

Reservoir is formed by earthfill dam completed in 1939, breached during flood in 1952 and rebuilt the same year with a concrete spillway and control works. Usable capacity is 3,300 acre-ft between elevation 3,000.9 ft (bottom of outlet works) and 3,015 ft (spillway crest). Dead storage, 37 acre-ft below elevation, 3,000.9 ft. Prior to 1963, usable capacity was 3,700 acre-ft. Figures given herein represent usable contents. Water is used for irrigation. Records partly furnished by Prairie Farms Rehabilitation Administration, Canada. This is one of a number of stations maintained jointly by Canada and the United States. Revisions (water years).--WSP 1309: 1947-50. WSP 1729: Drainage area.

06162000 VAL MARIE WEST RESERVOIR.--Lat 49°22'06", long 107°53'22", near center of east line of sec.12, T.5, R.15 W., third meridian, at dam on Frenchman River, 11 miles northwest of Val Marie. Period of record, February 1940 to current season (seasonal records only). Records prior to October 1946, published only in WSP 1309. April to May 1952 daily elevations and contents, published in WSP 1260-B. Water-stage recorder. Datum of gage is at mean sea level (Canadian Geodetic Survey datum). May 1952 to May 1954, reference point on control structure. May 1954 to May 10, 1966, nonrecording gages.

Extremes for current season: Maximum contents, 4,210 acre-ft Apr. 19 (elevation, 2,677.54 ft); minimum, 6.5 acre-ft Sept. 17 (elevation, 2,662.93 ft). Extremes for period of record: Maximum contents, 4,360 acre-ft May 20, 1967 (elevation, 2,677.83 ft); no storage Feb. 28, Mar. 31, 1950.

Reservoir is formed by earthfill dam with concrete control works completed in 1939. Usable capacity is 3,540 acre-ft between elevation 2,662.8 ft (bottom of outlet works) and 2,676.35 ft (maximum design level). No dead storage. Prior to February 1961, total capacity, 2,270 acre-ft; dead storage, 100 acre-ft below elevation 2,660.0 ft and February 1961 to 1963, 8 acre-ft below elevation 2,663.0 ft. Figures given herein represent usable contents. Water is used for irrigation. Records partly furnished by Prairie Farms Rehabilitation Administration, Canada. This is one of a number of stations which are maintained jointly by Canada and the United States. Revisions (water years).--WSP 1309: 1947-50.

## Reservoirs in Frenchman River basin in Saskatchewan--Continued

## (International gaging stations)

06163000 VAL MARIE RESERVOIR (revised).--Lat 49°18'18", long 107°48'11", in NE¼ sec.15, T.4, R.14 W., third meridian, at dam on Frenchman River, 5.4 miles northwest of Val Marie. Period of record, February 1937 to current season (seasonal records only). Water-stage recorder. Datum of gage is at mean sea level (Canadian Geodetic Survey datum). Prior to May 11, 1966, nonrecording gages.

Extremes for current season: Maximum contents, 11,460 acre-ft May 17 (elevation, 2,637.00 ft); minimum, 192 acre-ft Oct. 6, 7 (elevation, 2,622.33 ft). Extremes for period of record: Maximum contents observed, 18,920 acre-ft Apr. 19, 1952 (elevation, 2,638.80 ft); no storage at times.

Reservoir is formed by earthfill dam with concrete control works; construction began in 1936; storage began in 1937; completed in 1938. Usable capacity, 14,100 acre-ft between elevation 2,619.5 ft (bottom of outlet works) and 2,638.57 ft (top of dam). No dead storage. Prior to February 1966, capacity varied from 11,060 to 16,560 acre-ft including dead storage of 829 acre-ft. Figures given herein represent usable contents. Water is used for irrigation. This is one of a number of stations which are maintained jointly by Canada and the United States. Records partly furnished by Prairie Farms Rehabilitation Administration, Canada. Revisions (water years).--WSP 1309: 1947-50. WSP 1729: 1949.

## Monthend contents, in acre-feet, year October 1970 to October 1971

| Date  |    | Cypress Lake | Eastend Reservoir | Val Marie West Reservoir | Val Marie Reservoir |
|-------|----|--------------|-------------------|--------------------------|---------------------|
| Oct.  | 31 | 91,430       | 0                 | 2,960                    | 5,290               |
| Nov.  | 30 | -            | -                 | -                        | -                   |
| Dec.  | 31 | -            | -                 | -                        | -                   |
| Jan.  | 31 | -            | -                 | -                        | -                   |
| Feb.  | 28 | 92,740       | g207              | 2,130                    | 2,270               |
| Mar.  | 31 | 92,800       | g199              | 2,540                    | 1,960               |
| Apr.  | 30 | 105,100      | g1,510            | 3,220                    | 8,440               |
| May   | 31 | 101,200      | g1,780            | 2,800                    | 7,800               |
| June  | 30 | 99,970       | g1,260            | 2,580                    | 5,320               |
| July  | 31 | 92,920       | g556              | 787                      | 2,720               |
| Aug.  | 31 | 87,660       | g426              | 16                       | 994                 |
| Sept. | 30 | 84,110       | g794              | 92                       | 270                 |
| Oct.  | 31 | 82,930       | g170              | 710                      | 1,200               |

g From graph based on gage readings.

## MILK RIVER BASIN

06169500 Rock Creek below Horse Creek, near international boundary

(International gaging station)

LOCATION.--Lat 48°58'10", long 106°50'20", in NE1/4 sec.15, T.37 N., R.37 E., Valley County, on right bank 2 miles south of international boundary, 3 miles downstream from Horse Creek, and 21 miles northwest of Opheim, Mont.

DRAINAGE AREA.--328 sq mi.

PERIOD OF RECORD.--March 1916 to October 1926, September 1956 to current season (seasonal records only). Monthly discharge only for some periods, published in WSP 1309. Published as Rock Creek near Barnard, Mont. 1916-17. Prior to September 1956, records were collected at both Horse Creek (1914-56) and Rock Creek above Horse Creek (1914-56). Summations are equivalent to records at this site.

GAGE.--Water-stage recorder. Altitude of gage is 2,530 ft (from topographic map). March 1916 to October 1926, nonrecording gages at several sites within 500 ft upstream at different datum.

EXTREMES.--Current season: Maximum discharge, about 1,000 cfs Apr. 10 (gage height, 8.77 ft, backwater from ice); no flow at times.

Period of record: Maximum discharge, 4,420 cfs Apr. 7, 1969 (gage height, 12.03 ft); no flow at times most seasons.

Flood of Apr. 15, 1952, reached a stage of 12.6 ft, from floodmarks (discharge, 5,110 cfs, by slope-area measurement of peak flow).

REMARKS.--Records good except those for periods of no gage-height record and winter period, which are poor. Several small diversions for irrigation above station.

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

REVISIONS (WATER YEARS).--WSP 1509: 1925(M). WSP 1729: Drainage area.

## DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR 1971

| DAY   | JAN | FEB   | MAR  | APR     | MAY   | JUN   | JUL   | AUG  | SEP   | OCT   | NOV   | DEC |
|-------|-----|-------|------|---------|-------|-------|-------|------|-------|-------|-------|-----|
| 1     |     |       | 0    | 2.0     | 15    | 5.2   | 2.6   | .06  | .26   | 0     |       |     |
| 2     |     |       | 0    | 2.0     | 14    | 4.5   | 2.2   | .06  | .06   | 0     |       |     |
| 3     |     |       | 0    | 3.0     | 13    | 4.4   | 1.8   | .03  | .02   | 0     |       |     |
| 4     |     |       | 0    | 4.0     | 12    | 6.0   | 1.5   | 0    | 0     | .01   |       |     |
| 5     |     |       | 0    | 5.0     | 12    | 6.1   | 1.4   | 0    | 0     | .02   |       |     |
| 6     |     |       | 0    | 6.0     | 11    | 6.5   | 1.2   | 0    | 0     | .03   |       |     |
| 7     |     |       | 0    | 25      | 10    | 5.6   | 1.0   | 0    | 0     | 0     |       |     |
| 8     |     |       | 0    | 180     | 9.7   | 6.1   | .80   | 0    | 0     | 0     |       |     |
| 9     |     |       | 0    | 670     | 8.7   | 6.5   | .75   | 0    | 0     | 0     |       |     |
| 10    |     |       | 0    | 850     | 8.2   | 5.5   | .75   | 0    | 0     | 0     |       |     |
| 11    |     |       | 1.0  | 660     | 8.0   | 5.0   | .87   | 0    | 0     | .02   |       |     |
| 12    |     |       | 1.0  | 408     | 7.6   | 5.0   | .75   | .03  | 0     | 0     |       |     |
| 13    |     |       | 1.0  | 197     | 7.0   | 4.6   | .75   | .06  | 0     | 0     |       |     |
| 14    |     |       | 1.0  | 131     | 6.0   | 3.8   | .65   | .06  | 0     | 0     |       |     |
| 15    |     |       | 1.0  | 123     | 5.5   | 2.8   | .55   | .03  | 0     | .02   |       |     |
| 16    |     |       | 1.0  | 121     | 5.2   | 2.4   | .50   | .03  | 0     | .05   |       |     |
| 17    |     |       | 1.0  | 96      | 4.8   | 1.9   | .40   | .03  | .01   | .48   |       |     |
| 18    |     |       | 1.0  | 69      | 5.0   | 1.8   | .40   | 0    | .04   | .70   |       |     |
| 19    |     |       | 1.0  | 60      | 5.0   | 1.9   | .30   | 0    | .03   | .95   |       |     |
| 20    |     |       | 1.0  | 47      | 4.9   | 1.8   | .24   | 0    | .02   | 1.1   |       |     |
| 21    |     |       | 0    | 46      | 5.3   | 1.7   | .24   | 0    | .02   | 1.4   |       |     |
| 22    |     |       | 0    | 54      | 5.9   | 1.4   | .30   | 0    | .03   | 1.6   |       |     |
| 23    |     |       | 0    | 49      | 5.8   | 1.4   | .35   | 0    | .03   | 1.9   |       |     |
| 24    |     |       | 0    | 40      | 5.6   | 206   | .24   | 0    | .04   | 1.9   |       |     |
| 25    |     |       | 0    | 33      | 5.8   | 82    | .24   | 0    | .03   | 1.8   |       |     |
| 26    |     |       | 1.5  | 28      | 5.6   | 22    | .24   | 0    | .03   | 1.8   |       |     |
| 27    |     |       | 1.5  | 25      | 5.4   | 11    | .15   | 0    | .03   | 1.9   |       |     |
| 28    |     |       | 1.5  | 21      | 4.7   | 6.8   | .15   | 0    | .03   | 2.0   |       |     |
| 29    |     | ----- | 1.5  | 19      | 4.2   | 5.1   | .12   | 0    | .03   | 2.0   |       |     |
| 30    |     | ----- | 1.8  | 17      | 4.2   | 3.6   | .09   | 0    | .01   | 2.0   |       |     |
| 31    |     | ----- | 2.0  | -----   | 5.5   | ----- | .06   | .05  | ----- | 2.0   | ----- |     |
| TOTAL |     |       | 19.8 | 3,991.0 | 230.6 | 428.4 | 21.59 | .44  | .72   | 23.68 |       |     |
| MEAN  |     |       | .64  | 133     | 7.44  | 14.3  | .70   | .014 | .024  | .76   |       |     |
| MAX   |     |       | 2.0  | 850     | 15    | 206   | 2.6   | .06  | .26   | 2.0   |       |     |
| MIN   |     |       | 0    | 2.0     | 4.2   | 1.4   | .06   | 0    | 0     | 0     |       |     |
| AC-FT |     |       | 39   | 7,920   | 457   | 850   | 43    | .9   | 1.4   | 47    |       |     |

THE SEASON MARCH TO OCTOBER: AC-FT 9,350

NOTE.--Stage-discharge relation affected by ice Apr. 6-11. No gage height record Mar. 1 to Apr. 5.

## MILK RIVER BASIN

125

06170000 McEachern Creek at international boundary

(International gaging station)

LOCATION.--Lat 48°59'30", long 106°55'40", in SW 1/4 sec.1, T.37 N., R.36 E., Valley County, on left bank 0.5 mile downstream from East Fork, 0.7 mile south of international boundary, and 8 miles north of Thoeny, Mont.

DRAINAGE AREA.--182 sq mi.

PERIOD OF RECORD.--April 1924 to current season (seasonal records only for most years). Monthly discharge only for some periods, published in WSP 1309.

GAGE.--Water-stage recorder. Concrete control since October 1938. Altitude of gage is 2,540 ft (from topographic map). Prior to Mar. 1, 1927, nonrecording gage at site 0.2 mile downstream at datum 1.25 ft lower. Mar. 1, 1927, to Oct. 1, 1938, nonrecording gage at site 350 ft upstream at present datum. Oct. 2, 1938, to May 28, 1962, nonrecording gage at present site and datum.

EXTREMES.--Current season: Maximum discharge, 278 cfs Apr. 11; maximum gage height, 4.34 ft Apr. 11 (backwater from ice); no flow most of season.

Period of record: Maximum discharge, 7,080 cfs Apr. 15, 1952 (gage height, 13.85 ft, from floodmark), from rating curve extended above 2,800 cfs on basis of slope-area measurement of peak flow; no flow at times each year.

REMARKS.--Records good. Several diversions for irrigation above station.

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

REVISIONS (WATER YEARS).--WSP 1176: 1939(M). WSP 1389: 1927, 1931(M), 1933-36, 1938(M), 1939, 1942(M), 1943, 1944-45(M). WSP 1729: Drainage area.

## DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR 1971

| DAY   | JAN | FEB   | MAR | APR     | MAY   | JUN   | JUL | AUG | SEP   | OCT | NOV   | DEC |
|-------|-----|-------|-----|---------|-------|-------|-----|-----|-------|-----|-------|-----|
| 1     |     |       |     | 0       | 12    | .25   |     |     |       |     |       |     |
| 2     |     |       |     | 0       | 9.2   | .25   |     |     |       |     |       |     |
| 3     |     |       |     | 0       | 6.6   | .25   |     |     |       |     |       |     |
| 4     |     |       |     | 0       | 4.3   | .38   |     |     |       |     |       |     |
| 5     |     |       |     | 0       | 3.2   | .29   |     |     |       |     |       |     |
| 6     |     |       |     | 0       | 2.3   | .24   |     |     |       |     |       |     |
| 7     |     |       |     | 0       | 1.2   | .24   |     |     |       |     |       |     |
| 8     |     |       |     | 7.4     | .70   | .22   |     |     |       |     |       |     |
| 9     |     |       |     | 43      | .51   | .19   |     |     |       |     |       |     |
| 10    |     |       |     | 117     | .42   | .15   |     |     |       |     |       |     |
| 11    |     |       |     | 223     | .36   | .10   |     |     |       |     |       |     |
| 12    |     |       |     | 182     | .30   | .08   |     |     |       |     |       |     |
| 13    |     |       |     | 98      | .25   | .05   |     |     |       |     |       |     |
| 14    |     |       |     | 75      | .21   | .02   |     |     |       |     |       |     |
| 15    |     |       |     | 108     | .16   | 0     |     |     |       |     |       |     |
| 16    |     |       |     | 119     | .10   | 0     |     |     |       |     |       |     |
| 17    |     |       |     | 104     | .11   | 0     |     |     |       |     |       |     |
| 18    |     |       |     | 110     | .10   | 0     |     |     |       |     |       |     |
| 19    |     |       |     | 107     | .07   | 0     |     |     |       |     |       |     |
| 20    |     |       |     | 76      | .06   | 0     |     |     |       |     |       |     |
| 21    |     |       |     | 89      | .15   | 0     |     |     |       |     |       |     |
| 22    |     |       |     | 105     | .27   | 0     |     |     |       |     |       |     |
| 23    |     |       |     | 73      | .18   | 0     |     |     |       |     |       |     |
| 24    |     |       |     | 52      | .17   | 0     |     |     |       |     |       |     |
| 25    |     |       |     | 37      | .16   | 0     |     |     |       |     |       |     |
| 26    |     |       |     | 29      | .12   | 0     |     |     |       |     |       |     |
| 27    |     |       |     | 25      | .10   | 0     |     |     |       |     |       |     |
| 28    |     |       |     | 21      | .10   | 0     |     |     |       |     |       |     |
| 29    |     | ----- |     | 17      | .07   | 0     |     |     |       |     |       |     |
| 30    |     | ----- |     | 14      | .05   | 0     |     |     |       |     |       |     |
| 31    |     | ----- |     | -----   | .15   | ----- |     |     | ----- |     | ----- |     |
| TOTAL |     |       | 0   | 1,831.4 | 43.71 | 2.71  | 0   | 0   | 0     | 0   |       |     |
| MEAN  |     |       | 0   | 61.0    | 1.41  | .090  | 0   | 0   | 0     | 0   |       |     |
| MAX   |     |       | 0   | 223     | 12    | .38   | 0   | 0   | 0     | 0   |       |     |
| MIN   |     |       | 0   | 0       | .05   | 0     | 0   | 0   | 0     | 0   |       |     |
| AC-FT |     |       | 0   | 3,630   | 87    | 5.4   | 0   | 0   | 0     | 0   |       |     |

THE SEASON MARCH TO OCTOBER

AC-FT 3,720



06170200 Willow Creek near Hinsdale, Mont.

LOCATION.--Lat 48°33'54", long 106°58'48", in NE $\frac{1}{4}$  sec.1, T.32 N., R.36 E., Valley County, near center of span on upstream side of county road bridge, 0.8 mile upstream from Rock Creek, and 13 miles northeast of Hinsdale.

DRAINAGE AREA.--283 sq mi.

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

GAGE.--Nonrecording gage and crest-stage gage. Altitude of gage is 2,200 ft (from topographic map).

AVERAGE DISCHARGE.--6 years, 19.5 cfs (14,130 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 1,610 cfs Apr. 7 (gage height, 12.00 ft, from graph based on gage readings); no flow for many days.

Period of record: Maximum discharge, 4,040 cfs May 6, 1965 (gage height, 16.00 ft, from graph based on gage readings), from rating curve extended above 800 cfs; no flow for many days each year.

REMARKS.--Records fair. Some storage in numerous small stock ponds on tributary streams. No known diversions.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT   | NOV      | DEC  | JAN  | FEB   | MAR   | APR     | MAY  | JUN   | JUL    | AUG | SEP   |
|-------------|-------|----------|------|------|-------|-------|---------|------|-------|--------|-----|-------|
| 1           |       |          |      |      |       | 0     | 88      | .70  | .10   |        |     |       |
| 2           |       |          |      |      |       | 0     | 124     | .50  | .50   |        |     |       |
| 3           |       |          |      |      |       | 0     | 149     | .30  | .80   |        |     |       |
| 4           |       |          |      |      |       | 0     | 201     | .20  | .50   |        |     |       |
| 5           |       |          |      |      |       | 0     | 176     | .10  | .50   |        |     |       |
| 6           |       |          |      |      |       | 0     | 530     | .05  | 1.0   |        |     |       |
| 7           |       |          |      |      |       | 0     | 615     | 0    | 1.0   |        |     |       |
| 8           |       |          |      |      |       | 0     | 938     | 0    | 1.0   |        |     |       |
| 9           |       |          |      |      |       | 0     | 670     | 0    | 1.5   |        |     |       |
| 10          |       |          |      |      |       | 0     | 423     | 0    | 1.0   |        |     |       |
| 11          |       |          |      |      |       | 0     | 250     | 0    | 1.0   |        |     |       |
| 12          |       |          |      |      |       | 0     | 87      | 0    | 1.0   |        |     |       |
| 13          |       |          |      |      |       | 0     | 41      | 0    | .50   |        |     |       |
| 14          |       |          |      |      |       | 0     | 29      | 0    | .30   |        |     |       |
| 15          |       |          |      |      |       | 0     | 27      | 0    | .20   |        |     |       |
| 16          |       |          |      |      |       | 0     | 28      | 0    | .10   |        |     |       |
| 17          |       |          |      |      |       | 0     | 22      | 0    | .05   |        |     |       |
| 18          |       |          |      |      |       | 0     | 19      | 0    | .03   |        |     |       |
| 19          |       |          |      |      |       | 0     | 17      | 0    | .03   |        |     |       |
| 20          |       |          |      |      |       | 0     | 13      | 0    | .02   |        |     |       |
| 21          |       |          |      |      |       | 0     | 12      | .05  | 0     |        |     |       |
| 22          |       |          |      |      |       | 0     | 26      | .10  | 0     |        |     |       |
| 23          |       |          |      |      |       | 0     | 15      | .10  | 0     |        |     |       |
| 24          |       |          |      |      |       | 0     | 10      | .10  | 0     |        |     |       |
| 25          |       |          |      |      |       | 0     | 7.0     | .10  | 10    |        |     |       |
| 26          |       |          |      |      |       | 0     | 2.8     | .10  | 6.0   |        |     |       |
| 27          |       |          |      |      |       | 0     | 2.2     | .10  | .50   |        |     |       |
| 28          |       |          |      |      |       | 0     | 2.0     | .10  | 0     |        |     |       |
| 29          |       |          |      |      | ----- | .60   | 1.5     | .05  | 1.1   |        |     |       |
| 30          |       |          |      |      | ----- | 20    | 1.0     | 0    | .40   |        |     |       |
| 31          |       | -----    |      |      | ----- | 50    | -----   | .05  | ----- |        |     | ----- |
| TOTAL       | 0     | 0        | 0    | 0    | 0     | 70.60 | 4,527.5 | 2.70 | 29.13 | 0      | 0   | 0     |
| MEAN        | 0     | 0        | 0    | 0    | 0     | 2.28  | 151     | .087 | .97   | 0      | 0   | 0     |
| MAX         | 0     | 0        | 0    | 0    | 0     | 50    | 938     | .70  | 10    | 0      | 0   | 0     |
| MIN         | 0     | 0        | 0    | 0    | 0     | 0     | 1.0     | 0    | 0     | 0      | 0   | 0     |
| AC-FT       | 0     | 0        | 0    | 0    | 0     | 140   | 8,980   | 5.4  | 58    | 0      | 0   | 0     |
| CAL YR 1970 | TOTAL | 5,279.10 | MEAN | 14.5 | MAX   | 838   | MIN     | 0    | AC-FT | 10,470 |     |       |
| WTR YR 1971 | TOTAL | 4,629.93 | MEAN | 12.7 | MAX   | 938   | MIN     | 0    | AC-FT | 9,180  |     |       |

06172000 Milk River at Vandalia, Mont.

LOCATION.--Lat 48°21'33", long 106°54'14", in SE 1/4 sec. 15, T.30 N., R.37 E., Valley County, on county bridge 0.3 mile northeast of Vandalia Post Office, 0.9 mile upstream from Bear Creek, 7.1 miles downstream from Vandalia Dam, and at mile 105.3.

DRAINAGE AREA.--20,944 sq mi. Area at site used prior to Oct. 1, 1969, 20,926 sq mi.

PERIOD OF RECORD.--October 1914 to September 1925, August 1928 to September 1939, October 1969 to current year. April to May 1952 scattered daily elevations published in WSP 1260-B. Monthly discharge only for some periods, published in WSP 1309. Prior to October 1969, published as "near Vandalia."

GAGE.--Nonrecording gage. Datum of gage is 2,085.00 ft above mean sea level (Bureau of Reclamation bench mark). Prior to October 1969, at site 7.1 miles upstream at datum 4.00 ft higher.

AVERAGE DISCHARGE.--24 years (1914-25, 1928-39, 1969-71), 741 cfs (536,900 acre-ft per year).

EXTREMES.--Current year: Maximum discharge about 3,800 cfs Feb. 22; maximum gage height, 23.14 ft Feb. 22 (backwater from ice); minimum daily discharge, 17 cfs Sept. 26.

Period of record: Maximum discharge observed, 27,200 cfs Apr. 1, 1925 (gage height, 35.35 ft, site and datum then in use); maximum gage height, 36.47 ft Mar. 25, 1939 (site and datum then in use); no flow at times.

Flood of Apr. 17, 1952, reached an observed stage of 38.67 ft (furnished by Corps of Engineers), site and datum then in use (discharge, about 45,000 cfs).

REMARKS.--Records fair except those for winter period, which are poor. Since 1917, flow increased during irrigation season by water from St. Mary Canal which diverts from the St. Mary River near Babb (see p. 20). Flow regulated by Fresno and Nelson Reservoirs (see p. 184), two reservoirs in Lodge Creek basin in Saskatchewan (see p. 96), and four reservoirs in Frenchman River basin in Saskatchewan (see p. 122). Water is diverted at Vandalia Dam, 7.1 miles upstream for irrigation downstream. Diversions above station for irrigation of about 126,000 acres of which 18,000 acres lies below station. Records of chemical analyses and water temperatures for the current year are published in Part 2 of this report.

REVISIONS (WATER YEARS).--WSP 1309: 1920(M). WSP 1729: Drainage area.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT           | NOV      | DEC       | JAN    | FEB           | MAR    | APR     | MAY    | JUN    | JUL   | AUG   | SEP   |
|-------------|---------------|----------|-----------|--------|---------------|--------|---------|--------|--------|-------|-------|-------|
| 1           | 52            | 225      | 180       | 150    | 190           | 1,100  | 2,000   | 826    | 306    | 341   | 50    | 109   |
| 2           | 46            | 166      | 190       | 145    | 200           | 900    | 2,500   | 912    | 311    | 329   | 55    | 161   |
| 3           | 46            | 115      | 190       | 140    | 195           | 860    | 3,500   | 998    | 339    | 299   | 52    | 197   |
| 4           | 44            | 107      | 180       | 140    | 210           | 820    | 3,200   | 965    | 344    | 281   | 37    | 220   |
| 5           | 36            | 102      | 170       | 145    | 230           | 790    | 3,000   | 957    | 340    | 262   | 33    | 233   |
| 6           | 41            | 103      | 160       | 150    | 250           | 760    | 3,600   | 1,000  | 339    | 239   | 30    | 241   |
| 7           | 37            | 157      | 170       | 155    | 280           | 740    | 3,180   | 984    | 323    | 187   | 30    | 263   |
| 8           | 36            | 233      | 160       | 150    | 290           | 720    | 2,950   | 780    | 306    | 94    | 26    | 214   |
| 9           | 36            | 210      | 160       | 140    | 280           | 700    | 2,930   | 565    | 275    | 41    | 26    | 174   |
| 10          | 34            | 237      | 150       | 140    | 280           | 680    | 2,800   | 563    | 222    | 32    | 27    | 163   |
| 11          | 33            | 236      | 160       | 140    | 290           | 680    | 2,920   | 658    | 216    | 32    | 31    | 126   |
| 12          | 33            | 231      | 160       | 130    | 290           | 680    | 2,760   | 620    | 271    | 30    | 34    | 100   |
| 13          | 32            | 230      | 150       | 145    | 280           | 700    | 2,220   | 454    | 355    | 29    | 35    | 94    |
| 14          | 32            | 259      | 150       | 150    | 280           | 720    | 1,800   | 178    | 419    | 29    | 37    | 85    |
| 15          | 32            | 269      | 145       | 160    | 270           | 740    | 1,540   | 161    | 468    | 30    | 38    | 84    |
| 16          | 31            | 294      | 145       | 160    | 270           | 760    | 1,390   | 162    | 356    | 31    | 41    | 79    |
| 17          | 31            | 296      | 145       | 160    | 270           | 760    | 1,270   | 157    | 322    | 33    | 41    | 69    |
| 18          | 29            | 300      | 145       | 160    | 270           | 790    | 1,050   | 149    | 290    | 37    | 45    | 60    |
| 19          | 28            | 290      | 140       | 170    | 400           | 860    | 893     | 140    | 261    | 51    | 49    | 60    |
| 20          | 27            | 250      | 135       | 180    | 1,000         | 1,100  | 804     | 122    | 250    | 41    | 52    | 56    |
| 21          | 27            | 200      | 140       | 170    | 2,500         | 1,300  | 738     | 116    | 245    | 31    | 66    | 41    |
| 22          | 24            | 160      | 145       | 160    | 3,200         | 1,500  | 688     | 140    | 232    | 27    | 57    | 30    |
| 23          | 24            | 170      | 150       | 150    | 2,700         | 1,400  | 861     | 315    | 223    | 32    | 52    | 29    |
| 24          | 24            | 190      | 160       | 150    | 2,400         | 1,300  | 870     | 489    | 204    | 45    | 52    | 24    |
| 25          | 24            | 200      | 170       | 170    | 2,000         | 1,250  | 832     | 544    | 208    | 88    | 43    | 21    |
| 26          | 50            | 190      | 160       | 180    | 1,800         | 1,200  | 777     | 556    | 205    | 94    | 33    | 17    |
| 27          | 100           | 180      | 160       | 180    | 1,500         | 1,150  | 712     | 547    | 216    | 76    | 28    | 21    |
| 28          | 320           | 170      | 150       | 190    | 1,300         | 1,100  | 691     | 526    | 219    | 50    | 26    | 22    |
| 29          | 280           | 180      | 150       | 180    | -----         | 1,100  | 745     | 399    | 236    | 38    | 30    | 22    |
| 30          | 260           | 190      | 150       | 190    | -----         | 1,200  | 756     | 323    | 267    | 37    | 36    | 22    |
| 31          | 240           | -----    | 155       | 200    | -----         | 1,400  | -----   | 300    | -----  | 43    | 62    | ----- |
| TOTAL       | 2,089         | 6,140    | 4,875     | 4,930  | 23,425        | 29,760 | 53,977  | 15,606 | 8,568  | 3,009 | 1,254 | 3,037 |
| MEAN        | 67.4          | 205      | 157       | 159    | 837           | 960    | 1,799   | 503    | 286    | 97.1  | 40.5  | 101   |
| MAX         | 320           | 300      | 190       | 200    | 3,200         | 1,500  | 3,600   | 1,000  | 468    | 341   | 66    | 263   |
| MIN         | 24            | 102      | 135       | 130    | 190           | 680    | 688     | 116    | 204    | 27    | 26    | 17    |
| AC-FT       | 4,140         | 12,180   | 9,670     | 9,780  | 46,460        | 59,030 | 107,100 | 30,950 | 16,990 | 5,970 | 2,490 | 6,020 |
| CAL YR 1970 | TOTAL 249,771 | MEAN 684 | MAX 5,890 | MIN 24 | AC-FT 495,400 |        |         |        |        |       |       |       |
| WTR YR 1971 | TOTAL 156,670 | MEAN 429 | MAX 3,600 | MIN 17 | AC-FT 310,800 |        |         |        |        |       |       |       |

NOTE.--Stage-discharge relation affected by ice Nov. 18 to Apr. 6.

LOCATION.--Lat 48°06'52", long 106°40'15", in SW<sup>1</sup>/<sub>4</sub>NW<sup>1</sup>/<sub>4</sub> sec.10, T.27 N., R.39 E., Valley County, on right bank 5.8 miles south of Glasgow and 10.6 miles upstream from mouth.

Period of record: Maximum discharge, 12,400 cfs July 14, 1962 (gage height, 21.70 ft); maximum gage height, 22.0 ft July 7, 1969 (from graph based on floodmarks); no flow at times each year.

REVISIONS (WATER YEARS).--WSP 1729: Drainage area. WSP 1916: 1960.

| DAY         | OCT   | NOV       | DEC  | JAN  | FEB   | MAR    | APR     | MAY   | JUN   | JUL    | AUG | SEP   |
|-------------|-------|-----------|------|------|-------|--------|---------|-------|-------|--------|-----|-------|
| 1           | 0     |           |      |      | 0     | 70     | 706     | 3.6   | 5.6   | 0      |     |       |
| 2           | 0     |           |      |      | 0     | 60     | 540     | 3.6   | 9.5   | 0      |     |       |
| 3           | 0     |           |      |      | 0     | 50     | 498     | 3.0   | 5.3   | 0      |     |       |
| 4           | 0     |           |      |      | 0     | 70     | 469     | 2.7   | 13    | 0      |     |       |
| 5           | 0     |           |      |      | 0     | 80     | 336     | 2.1   | 77    | 0      |     |       |
| 6           | 0     |           |      |      | 0     | 60     | 265     | 2.3   | 33    | 0      |     |       |
| 7           | 0     |           |      |      | 0     | 50     | 206     | 1.5   | 13    | 0      |     |       |
| 8           | 0     |           |      |      | 0     | 40     | 141     | 1.1   | 8.0   | 0      |     |       |
| 9           | 0     |           |      |      | 0     | 40     | 109     | .60   | 5.8   | 0      |     |       |
| 10          | 0     |           |      |      | 0     | 40     | 78      | 1.5   | 3.4   | 0      |     |       |
| 11          | 0     |           |      |      | 0     | 70     | 61      | .90   | 1.1   | 0      |     |       |
| 12          | 0     |           |      |      | 0     | 120    | 45      | .20   | 0     | 0      |     |       |
| 13          | 0     |           |      |      | 0     | 200    | 35      | 0     | 0     | 0      |     |       |
| 14          | 0     |           |      |      | 10    | 300    | 30      | 0     | 0     | 0      |     |       |
| 15          | 0     |           |      |      | 40    | 320    | 25      | 0     | 0     | 0      |     |       |
| 16          | 0     |           |      |      | 100   | 330    | 22      | 0     | 0     | 0      |     |       |
| 17          | 0     |           |      |      | 180   | 310    | 20      | 0     | 0     | 0      |     |       |
| 18          | 0     |           |      |      | 200   | 280    | 17      | 0     | 0     | 0      |     |       |
| 19          | 0     |           |      |      | 180   | 300    | 14      | 0     | 0     | 0      |     |       |
| 20          | 0     |           |      |      | 170   | 280    | 11      | 0     | 0     | 0      |     |       |
| 21          | 63    |           |      |      | 160   | 260    | 16      | 0     | 0     | 0      |     |       |
| 22          | 50    |           |      |      | 150   | 200    | 16      | 0     | 0     | 0      |     |       |
| 23          | 40    |           |      |      | 150   | 190    | 13      | 0     | 0     | 0      |     |       |
| 24          | 30    |           |      |      | 160   | 200    | 10      | 0     | 0     | 0      |     |       |
| 25          | 25    |           |      |      | 150   | 190    | 8.8     | 0     | 0     | 23     |     |       |
| 26          | 15    |           |      |      | 130   | 180    | 8.0     | 0     | 0     | 27     |     |       |
| 27          | 10    |           |      |      | 100   | 200    | 7.5     | 0     | 0     | 14     |     |       |
| 28          | 5.0   |           |      |      | 90    | 220    | 6.8     | 0     | 0     | 9.8    |     |       |
| 29          | 0     |           |      |      | ----- | 250    | 5.5     | 0     | 0     | 5.3    |     |       |
| 30          | 0     |           |      |      | ----- | 1,430  | 4.6     | 0     | 0     | 2.7    |     |       |
| 31          | 0     | -----     |      |      | ----- | 1,260  | -----   | 0     | ----- | .80    |     | ----- |
| TOTAL       | 238.0 | 0         | 0    | 0    | 1,970 | 7,650  | 3,724.2 | 23.10 | 174.7 | 81.60  | 0   | 0     |
| MEAN        | 7.68  | 0         | 0    | 0    | 70.4  | 247    | 124     | .75   | 5.82  | 2.63   | 0   | 0     |
| MAX         | 63    | 0         | 0    | 0    | 200   | 1,430  | 706     | 3.6   | 77    | 27     | 0   | 0     |
| MIN         | 0     | 0         | 0    | 0    | 0     | 40     | 4.6     | 0     | 0     | 0      | 0   | 0     |
| AC-FT       | 472   | 0         | 0    | 0    | 3,910 | 15,170 | 7,390   | 46    | 347   | 162    | 0   | 0     |
| CAL YR 1970 | TOTAL | 25,521.40 | MEAN | 69.9 | MAX   | 2,980  | MIN     | 0     | AC-FT | 50,620 |     |       |
| WTR YR 1971 | TOTAL | 13,861.60 | MEAN | 38.0 | MAX   | 1,430  | MIN     | 0     | AC-FT | 27,490 |     |       |

## MILK RIVER BASIN

129

06174500 Milk River at Nashua, Mont.

LOCATION.--Lat 48°07'52", long 106°21'50", in NE¼NE¼ sec.1, T.27 N., R.41 E., Valley County, on right bank at downstream side of former highway bridge site, 0.6 mile southwest of Nashua, 2.0 miles upstream from Porcupine Creek, and at mile 24.0

DRAINAGE AREA.--22,332 sq mi.

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

GAGE.--Water-stage recorder. Datum of gage is 2,027.75 ft above mean sea level.

AVERAGE DISCHARGE.--32 years, 703 cfs (509,300 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 4,670 cfs Apr. 9 (gage height, 12.41 ft); maximum gage height, 14.57 ft Apr. 4 (backwater from ice); minimum discharge, 23 cfs July 16, 17.

Period of record: Maximum discharge, 45,300 cfs Apr. 18, 1952 (gage height, 31.38 ft); minimum, 0.6 cfs July 15, 1961 (gage height, 1.96 ft).

REMARKS.--Records good except those for winter period, which are poor. Flow increased during irrigation season by water from St. Mary Canal which diverts from the St. Mary River near Babb (see p. 20). Flow regulated by Fresno Reservoir (see p. 184), two reservoirs in Lodge Creek basin in Saskatchewan (see p. 96), and four reservoirs in Frenchman River basin in Saskatchewan (see p. 122). Diversions for irrigation of about 140,000 acres above station. Records of chemical analyses for the current year are published in Part 2 of this report.

REVISIONS.--WSP 1729: Drainage area.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT                                                    | NOV    | DEC    | JAN   | FEB    | MAR    | APR     | MAY    | JUN    | JUL   | AUG   | SEP    |
|-------------|--------------------------------------------------------|--------|--------|-------|--------|--------|---------|--------|--------|-------|-------|--------|
| 1           | 175                                                    | 259    | 220    | 160   | 170    | 1,900  | 2,500   | 702    | 376    | 275   | 100   | 112    |
| 2           | 169                                                    | 232    | 200    | 150   | 160    | 1,600  | 3,000   | 722    | 364    | 296   | 112   | 143    |
| 3           | 164                                                    | 214    | 180    | 150   | 160    | 1,500  | 3,100   | 798    | 388    | 320   | 119   | 185    |
| 4           | 164                                                    | 179    | 170    | 150   | 170    | 1,300  | 3,500   | 894    | 424    | 305   | 116   | 227    |
| 5           | 163                                                    | 140    | 160    | 150   | 180    | 1,200  | 4,500   | 922    | 484    | 269   | 112   | 275    |
| 6           | 163                                                    | 122    | 170    | 150   | 200    | 1,100  | 4,270   | 906    | 540    | 248   | 97    | 300    |
| 7           | 165                                                    | 115    | 180    | 160   | 220    | 940    | 4,150   | 904    | 472    | 227   | 94    | 316    |
| 8           | 161                                                    | 114    | 170    | 160   | 240    | 900    | 4,410   | 943    | 448    | 213   | 89    | 325    |
| 9           | 156                                                    | 139    | 160    | 150   | 250    | 860    | 4,650   | 890    | 419    | 197   | 86    | 322    |
| 10          | 146                                                    | 204    | 160    | 150   | 260    | 840    | 4,300   | 660    | 385    | 170   | 90    | 287    |
| 11          | 146                                                    | 213    | 170    | 140   | 270    | 820    | 3,770   | 497    | 352    | 92    | 89    | 264    |
| 12          | 146                                                    | 228    | 170    | 140   | 280    | 800    | 3,360   | 493    | 296    | 57    | 83    | 250    |
| 13          | 150                                                    | 231    | 160    | 150   | 270    | 780    | 3,120   | 567    | 270    | 46    | 75    | 234    |
| 14          | 146                                                    | 223    | 155    | 135   | 260    | 800    | 2,780   | 549    | 335    | 40    | 79    | 215    |
| 15          | 138                                                    | 223    | 150    | 155   | 250    | 860    | 2,290   | 409    | 412    | 31    | 103   | 194    |
| 16          | 128                                                    | 235    | 150    | 160   | 240    | 960    | 1,820   | 208    | 448    | 26    | 128   | 194    |
| 17          | 126                                                    | 255    | 150    | 160   | 230    | 960    | 1,510   | 135    | 442    | 24    | 125   | 192    |
| 18          | 123                                                    | 246    | 150    | 150   | 230    | 1,100  | 1,360   | 135    | 412    | 28    | 115   | 187    |
| 19          | 123                                                    | 230    | 150    | 155   | 250    | 1,200  | 1,220   | 174    | 376    | 29    | 103   | 174    |
| 20          | 124                                                    | 220    | 140    | 170   | 300    | 1,300  | 1,000   | 252    | 358    | 31    | 85    | 171    |
| 21          | 120                                                    | 220    | 150    | 160   | 350    | 1,400  | 827     | 248    | 340    | 44    | 75    | 173    |
| 22          | 136                                                    | 210    | 150    | 160   | 450    | 1,500  | 761     | 193    | 318    | 59    | 85    | 169    |
| 23          | 176                                                    | 220    | 155    | 160   | 1,000  | 1,600  | 709     | 170    | 307    | 62    | 107   | 154    |
| 24          | 160                                                    | 240    | 160    | 160   | 1,500  | 1,600  | 754     | 170    | 280    | 59    | 125   | 135    |
| 25          | 140                                                    | 260    | 170    | 160   | 3,000  | 1,550  | 864     | 323    | 255    | 44    | 128   | 123    |
| 26          | 125                                                    | 240    | 160    | 150   | 3,500  | 1,500  | 864     | 483    | 226    | 47    | 126   | 119    |
| 27          | 116                                                    | 230    | 150    | 160   | 3,000  | 1,500  | 852     | 523    | 217    | 127   | 105   | 120    |
| 28          | 118                                                    | 230    | 150    | 170   | 2,500  | 1,500  | 767     | 546    | 213    | 148   | 80    | 119    |
| 29          | 288                                                    | 240    | 150    | 160   | -----  | 1,600  | 689     | 527    | 231    | 126   | 68    | 117    |
| 30          | 319                                                    | 250    | 160    | 170   | -----  | 1,900  | 676     | 478    | 265    | 103   | 68    | 120    |
| 31          | 290                                                    | -----  | 170    | 180   | -----  | 2,100  | -----   | 412    | -----  | 93    | 80    | -----  |
| TOTAL       | 4,964                                                  | 6,356  | 5,040  | 4,835 | 19,890 | 39,470 | 68,373  | 15,833 | 10,653 | 3,836 | 3,047 | 5,916  |
| MEAN        | 160                                                    | 212    | 163    | 156   | 710    | 1,273  | 2,279   | 511    | 355    | 124   | 98.3  | 197    |
| MAX         | 319                                                    | 260    | 220    | 180   | 3,500  | 2,100  | 4,650   | 943    | 540    | 320   | 128   | 325    |
| MIN         | 116                                                    | 114    | 140    | 135   | 160    | 780    | 676     | 135    | 213    | 24    | 68    | 112    |
| AC-FT       | 9,850                                                  | 12,610 | 10,000 | 9,590 | 39,450 | 78,290 | 135,600 | 31,400 | 21,130 | 7,610 | 6,040 | 11,730 |
| CAL YR 1970 | TOTAL 303,931 MEAN 833 MAX 6,230 MIN 108 AC-FT 602,800 |        |        |       |        |        |         |        |        |       |       |        |
| WTR YR 1971 | TOTAL 188,213 MEAN 516 MAX 4,650 MIN 24 AC-FT 373,300  |        |        |       |        |        |         |        |        |       |       |        |

NOTE.--Stage-discharge relation affected by ice Nov. 18 to Apr. 5.

06177000 Missouri River near Wolf Point, Mont.

LOCATION.--Lat 48°03'57", long 105°32'12", in SW1/4 sec.28, T.27 N., R.48 E., McCone County, on right bank 500 ft downstream from bridge on State Highway 13, 5 miles southeast of Wolf Point, 7.8 miles downstream from Wolf Creek, and at mile 1,701.4.

DRAINAGE AREA.--82,290 sq mi.

PERIOD OF RECORD.--September 1928 to current year.

GAGE.--Water-stage recorder and nonrecording gage. Datum of gage is 1,958.57 ft above mean sea level. Prior to Apr. 13, 1930, nonrecording gages at Wolf Point ferry landing 5.5 miles upstream at different datum.

AVERAGE DISCHARGE.--11 years (1928-39, prior to Fort Peck Lake reaching operational level), 7,219 cfs (5,230,000 acre-ft per year); 28 years (1943-71, after operational level was reached), 10,200 cfs (7,390,000 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 20,800 cfs Apr. 10 (gage height, 7.50 ft); maximum gage height, 10.85 ft Feb. 3 (backwater from ice); minimum daily discharge, 8,760 cfs Oct. 10.

Period of record: Maximum discharge, 66,800 cfs Mar. 25, 1939 (gage height, 14.4 ft, ice present), from rating curve extended above 39,000 cfs; maximum gage height, 15.64 ft Mar. 27, 1960 (backwater from ice); minimum daily discharge, 320 cfs Dec. 10, 1941.

Flood of June 14, 1908, reached a stage of about 20 ft, present site and datum.

REMARKS.--Records good except those for winter period, which are fair. Flow partly regulated by Fort Peck Lake (see p. 80) and many other reservoirs above station. Diversions for irrigation of about 1,010,400 acres above station. Records of chemical analyses for the current year are published in Part 2 of this report.

REVISIONS (WATER YEARS).--WSP 1146: 1931. WSP 1729: Drainage area.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT             | NOV         | DEC        | JAN       | FEB             | MAR     | APR     | MAY     | JUN     | JUL     | AUG     | SEP     |
|-------------|-----------------|-------------|------------|-----------|-----------------|---------|---------|---------|---------|---------|---------|---------|
| 1           | 14,200          | 14,600      | 10,300     | 14,000    | 13,000          | 16,500  | 13,000  | 14,700  | 14,700  | 11,300  | 11,900  | 10,100  |
| 2           | 14,100          | 14,300      | 10,200     | 14,000    | 14,000          | 16,500  | 13,400  | 14,400  | 14,400  | 11,100  | 11,800  | 10,200  |
| 3           | 14,200          | 14,300      | 10,300     | 14,200    | 15,000          | 16,500  | 13,700  | 15,000  | 14,400  | 10,200  | 11,800  | 10,400  |
| 4           | 14,200          | 14,400      | 10,200     | 12,500    | 15,100          | 16,000  | 13,400  | 14,400  | 14,400  | 10,600  | 12,000  | 10,300  |
| 5           | 14,200          | 14,300      | 10,200     | 12,000    | 15,300          | 16,000  | 13,600  | 13,600  | 14,100  | 10,700  | 11,700  | 10,200  |
| 6           | 12,900          | 14,100      | 10,300     | 12,600    | 15,300          | 16,200  | 14,200  | 13,900  | 14,500  | 10,700  | 12,000  | 9,240   |
| 7           | 11,100          | 14,100      | 9,800      | 12,500    | 15,300          | 16,200  | 16,000  | 15,200  | 14,700  | 10,100  | 11,800  | 8,900   |
| 8           | 10,800          | 13,800      | 10,000     | 12,800    | 15,300          | 16,500  | 18,400  | 15,400  | 14,700  | 10,800  | 11,800  | 10,000  |
| 9           | 9,400           | 14,100      | 11,000     | 13,000    | 15,300          | 16,200  | 19,100  | 15,500  | 14,500  | 10,800  | 12,000  | 10,400  |
| 10          | 8,760           | 13,800      | 11,600     | 13,000    | 15,600          | 16,200  | 20,200  | 15,500  | 14,300  | 10,700  | 11,900  | 9,990   |
| 11          | 10,800          | 13,700      | 12,000     | 13,200    | 15,600          | 16,000  | 20,400  | 15,200  | 12,800  | 10,400  | 12,200  | 10,800  |
| 12          | 13,400          | 13,800      | 12,000     | 14,000    | 15,600          | 15,200  | 19,200  | 14,900  | 12,400  | 10,600  | 11,800  | 10,400  |
| 13          | 14,400          | 14,000      | 12,000     | 14,200    | 15,600          | 14,700  | 16,300  | 14,700  | 12,500  | 10,200  | 12,000  | 9,640   |
| 14          | 14,300          | 13,900      | 12,000     | 14,400    | 15,600          | 12,900  | 14,800  | 14,700  | 12,700  | 10,000  | 12,000  | 9,860   |
| 15          | 13,800          | 14,000      | 13,000     | 14,800    | 15,600          | 12,000  | 17,300  | 14,700  | 12,700  | 10,100  | 12,000  | 10,000  |
| 16          | 14,100          | 14,300      | 14,000     | 15,000    | 15,600          | 11,500  | 14,800  | 14,600  | 12,700  | 10,200  | 12,000  | 10,000  |
| 17          | 14,200          | 14,200      | 14,100     | 15,100    | 15,600          | 12,200  | 15,000  | 14,400  | 12,600  | 11,400  | 11,200  | 10,000  |
| 18          | 14,400          | 14,200      | 13,800     | 15,100    | 15,500          | 10,800  | 16,600  | 14,300  | 12,800  | 11,700  | 10,100  | 10,000  |
| 19          | 14,600          | 14,400      | 12,000     | 15,100    | 15,600          | 11,500  | 16,100  | 14,100  | 13,000  | 11,500  | 10,300  | 9,790   |
| 20          | 14,600          | 14,300      | 10,000     | 15,100    | 15,600          | 10,900  | 16,300  | 14,000  | 13,000  | 11,700  | 10,100  | 9,400   |
| 21          | 13,900          | 14,200      | 9,800      | 15,100    | 15,600          | 11,100  | 16,100  | 11,900  | 13,000  | 11,400  | 10,400  | 9,120   |
| 22          | 12,500          | 14,400      | 9,800      | 15,100    | 15,600          | 11,200  | 14,900  | 14,000  | 12,600  | 11,500  | 10,200  | 9,210   |
| 23          | 12,800          | 14,300      | 10,000     | 15,100    | 16,000          | 11,500  | 15,300  | 14,000  | 12,800  | 11,500  | 9,910   | 9,040   |
| 24          | 14,100          | 13,000      | 10,200     | 15,100    | 17,000          | 11,700  | 15,600  | 14,100  | 12,900  | 11,800  | 10,100  | 9,070   |
| 25          | 14,000          | 10,700      | 10,200     | 15,100    | 17,800          | 11,900  | 14,900  | 14,100  | 12,800  | 11,300  | 11,000  | 9,310   |
| 26          | 14,200          | 10,400      | 10,800     | 15,100    | 18,800          | 11,800  | 15,000  | 14,100  | 12,200  | 11,600  | 10,700  | 9,120   |
| 27          | 14,400          | 10,600      | 11,000     | 15,100    | 17,200          | 11,800  | 15,500  | 14,200  | 10,500  | 11,600  | 11,100  | 9,260   |
| 28          | 14,400          | 10,700      | 11,700     | 15,100    | 16,000          | 12,700  | 14,200  | 14,400  | 10,600  | 11,600  | 11,600  | 9,310   |
| 29          | 14,300          | 11,200      | 12,000     | 15,100    | -----           | 12,300  | 14,700  | 14,300  | 9,940   | 11,800  | 10,600  | 9,400   |
| 30          | 14,400          | 10,500      | 12,800     | 15,100    | -----           | 12,400  | 14,600  | 14,500  | 10,200  | 11,700  | 10,400  | 9,280   |
| 31          | 14,300          | -----       | 13,100     | 14,900    | -----           | 13,200  | -----   | 14,600  | -----   | 11,800  | 10,300  | -----   |
| TOTAL       | 415,760         | 402,600     | 350,200    | 442,500   | 439,100         | 422,100 | 472,600 | 447,400 | 389,440 | 342,400 | 348,710 | 291,740 |
| MEAN        | 13,410          | 13,420      | 11,300     | 14,270    | 15,680          | 13,620  | 15,750  | 14,430  | 12,980  | 11,050  | 11,250  | 9,725   |
| MAX         | 14,600          | 14,600      | 14,100     | 15,100    | 18,800          | 16,500  | 20,400  | 15,500  | 14,700  | 11,800  | 12,200  | 10,800  |
| MIN         | 8,760           | 10,400      | 9,800      | 12,000    | 13,000          | 10,800  | 13,000  | 11,900  | 9,940   | 10,000  | 9,910   | 8,900   |
| AC-FT       | 824,700         | 798,600     | 694,600    | 877,700   | 871,000         | 837,200 | 937,400 | 887,400 | 772,500 | 679,200 | 691,700 | 578,700 |
| CAL YR 1970 | TOTAL 4,821,670 | MEAN 13,210 | MAX 19,400 | MIN 5,780 | AC-FT 9,564,000 |         |         |         |         |         |         |         |
| WTR YR 1971 | TOTAL 4,764,550 | MEAN 13,050 | MAX 20,400 | MIN 8,760 | AC-FT 9,450,000 |         |         |         |         |         |         |         |

NOTE.--Stage-discharge relation affected by ice Dec. 4 to Mar. 12.



06177500 Redwater River at Circle, Mont.

LOCATION.--Lat 47°24'51", long 105°34'30", in SW1/4 sec.11, T.19 N., R.48 E., McCone County, on left bank at Circle, 1 mile upstream from Horse Creek, and at mile 79.6.

DRAINAGE AREA.--547 sq mi.

PERIOD OF RECORD.--April to November 1929, March to November 1930, July 1931 to December 1932, March to June 1933, February to November 1934, April 1935 to December 1936, April 1937 to current year. Monthly discharge only for some periods, published in WSP 1309. Prior to October 1967, published as Redwater Creek at Circle.

GAGE.--Water-stage recorder. Sharp-crested weir since Sept. 24, 1938. Altitude of gage is 2,380 ft (by barometer). Prior to June 1, 1941, and Mar. 23, 1943, to Feb. 16, 1948, nonrecording gage at site 0.3 mile upstream at same datum. June 1, 1941, to Mar. 22, 1943, nonrecording gage at site 200 ft upstream at datum 2.8 ft lower. Feb. 26, 1948, to May 7, 1950, nonrecording gage at site 200 ft upstream at present datum.

AVERAGE DISCHARGE.--36 years (1931-32, 1935-36, 1937-71), 14.6 cfs (10,580 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 3,640 cfs Mar. 28 (gage height, 11.90 ft); no flow at times.

Period of record: Maximum discharge, 6,730 cfs July 14, 1957 (gage height, 12.77 ft); no flow at times most years.

REMARKS.--Records fair except those for winter period, which are poor. Few minor diversions for irrigation of hay meadows above station.

REVISIONS (WATER YEARS).--WSP 1006: 1929-30, 1932-33, 1935-39. WSP 1509: 1929, 1934. WSP 1729: Drainage area.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY               | OCT      | NOV   | DEC  | JAN | FEB   | MAR      | APR   | MAY   | JUN   | JUL  | AUG  | SEP   |
|-------------------|----------|-------|------|-----|-------|----------|-------|-------|-------|------|------|-------|
| 1                 | .03      | .06   | .10  |     | 0     | 2.0      | 152   | 6.7   | 2.9   | .87  | .03  | .03   |
| 2                 | .01      | .06   | .08  |     | 0     | 1.5      | 93    | 6.2   | 2.9   | .75  | .02  | .01   |
| 3                 | .01      | .06   | .07  |     | 0     | 1.0      | 54    | 5.9   | 2.7   | .67  | .01  | .01   |
| 4                 | .03      | .07   | .08  |     | 0     | 1.0      | 39    | 5.3   | 2.6   | .59  | .01  | .01   |
| 5                 | .03      | .07   | .09  |     | 0     | .50      | 32    | 5.0   | 2.8   | .56  | .01  | .04   |
| 6                 | .07      | .07   | .08  |     | 0     | .40      | 28    | 4.3   | 2.4   | .49  | .01  | .02   |
| 7                 | .03      | .08   | .09  |     | 0     | .35      | 26    | 4.3   | 2.3   | .39  | 0    | .01   |
| 8                 | .03      | .08   | .11  |     | 0     | .45      | 24    | 4.5   | 2.2   | .35  | 0    | 0     |
| 9                 | .03      | .07   | .08  |     | 0     | 1.5      | 22    | 3.9   | 2.2   | .29  | 0    | 0     |
| 10                | .03      | .10   | .06  |     | 0     | 4.5      | 21    | 3.5   | 2.0   | .29  | 0    | .01   |
| 11                | .01      | .11   | .07  |     | 1.0   | 12       | 19    | 3.0   | 1.7   | .24  | 0    | .01   |
| 12                | .01      | .11   | .06  |     | 2.0   | 50       | 17    | 3.1   | 1.8   | .21  | .01  | 0     |
| 13                | .01      | .13   | .06  |     | 1.5   | 250      | 15    | 2.9   | 2.1   | .21  | .01  | 0     |
| 14                | .01      | .16   | .05  |     | 1.1   | 745      | 14    | 2.7   | 1.8   | .18  | 0    | 0     |
| 15                | .01      | .16   | .05  |     | 1.0   | 416      | 13    | 2.4   | 1.6   | .16  | 0    | 0     |
| 16                | .01      | .16   | .06  |     | 2.5   | 262      | 12    | 2.4   | 1.5   | .15  | 0    | .02   |
| 17                | .01      | .14   | .04  |     | 10    | 162      | 11    | 2.3   | 1.6   | .12  | 0    | .04   |
| 18                | .03      | .19   | .03  |     | 150   | 87       | 10    | 2.6   | 1.1   | .09  | 0    | .02   |
| 19                | .03      | .18   | .02  |     | 100   | 45       | 9.4   | 2.7   | 1.4   | .09  | 0    | .01   |
| 20                | .03      | .16   | .02  |     | 30    | 47       | 10    | 2.8   | 1.4   | .09  | 0    | .07   |
| 21                | .01      | .16   | .01  |     | 10    | 50       | 12    | 3.0   | 1.7   | .08  | 0    | .04   |
| 22                | .01      | .11   | 0    |     | 9.0   | 56       | 14    | 3.3   | 1.6   | .19  | 0    | .03   |
| 23                | .01      | .09   | 0    |     | 10    | 60       | 13    | 3.5   | 1.4   | .16  | 0    | .03   |
| 24                | .01      | .09   | 0    |     | 11    | 70       | 12    | 3.6   | 1.8   | .08  | 0    | .03   |
| 25                | .03      | .09   | 0    |     | 15    | 100      | 11    | 3.5   | 1.8   | .06  | 0    | .03   |
| 26                | .03      | .07   | 0    |     | 13    | 106      | 9.8   | 3.0   | 1.5   | .05  | 0    | .04   |
| 27                | .05      | .15   | 0    |     | 10    | 1,350    | 9.4   | 2.6   | 1.2   | .04  | 0    | .06   |
| 28                | .04      | .13   | 0    |     | 3.5   | 2,360    | 8.5   | 2.2   | 1.1   | .03  | 0    | .06   |
| 29                | .03      | .11   | 0    |     | ----- | 858      | 8.0   | 1.9   | 1.2   | .04  | 0    | .06   |
| 30                | .05      | .12   | 0    |     | ----- | 926      | 7.6   | 2.1   | 1.0   | .04  | 0    | .06   |
| 31                | .05      | ----- | 0    |     | ----- | 370      | ----- | 2.6   | ----- | .04  | 0    | ----- |
| TOTAL             | .78      | 3.34  | 1.31 | 0   | 380.6 | 8,395.20 | 726.7 | 107.8 | 55.3  | 7.60 | .11  | .75   |
| MEAN              | .025     | .11   | .042 | 0   | 13.6  | 271      | 24.2  | 3.48  | 1.84  | .25  | .004 | .025  |
| MAX               | .07      | .19   | .11  | 0   | 150   | 2,360    | 152   | 6.7   | 2.9   | .87  | .03  | .07   |
| MIN               | .01      | .06   | 0    | 0   | 0     | .35      | 7.6   | 1.9   | 1.0   | .03  | 0    | 0     |
| AC-FT             | 1.6      | 6.6   | 2.6  | 0   | 755   | 16,650   | 1,440 | 214   | 110   | 15   | .2   | 1.5   |
| CAL YR 1970 TOTAL | 1,502.30 |       |      |     |       |          |       |       |       |      |      |       |
| MEAN              | 4.12     |       |      |     |       |          |       |       |       |      |      |       |
| MAX               | 55       |       |      |     |       |          |       |       |       |      |      |       |
| MIN               | 0        |       |      |     |       |          |       |       |       |      |      |       |
| AC-FT             | 2,980    |       |      |     |       |          |       |       |       |      |      |       |
| WTR YR 1971 TOTAL | 9,679.49 |       |      |     |       |          |       |       |       |      |      |       |
| MEAN              | 26.5     |       |      |     |       |          |       |       |       |      |      |       |
| MAX               | 2,360    |       |      |     |       |          |       |       |       |      |      |       |
| MIN               | 0        |       |      |     |       |          |       |       |       |      |      |       |
| AC-FT             | 19,200   |       |      |     |       |          |       |       |       |      |      |       |

## PEAK DISCHARGE (BASE, 80 CFS)

| DATE                  | TIME | G.HT.  | DISCHARGE | DATE | TIME | G.HT. | DISCHARGE |
|-----------------------|------|--------|-----------|------|------|-------|-----------|
| 2-18                  | 1730 | a7.24  | b200      | 3-28 | 0245 | 11.90 | 3,640     |
| 3-13                  | 0130 | a10.13 | b900      |      |      |       |           |
| a Backwater from ice. |      |        |           |      |      |       |           |
| b About.              |      |        |           |      |      |       |           |

NOTE.--Stage-discharge relation affected by ice Nov. 27 to Mar. 13 (no gage-height record Jan. 11-17, Jan. 30 to Feb. 10, Feb. 20 to Mar. 10).

## POPLAR RIVER BASIN

06178000 Middle Fork Poplar River at international boundary

(International gaging station)

LOCATION.--Lat 48°59'30", long 105°41'40", in SE $\frac{1}{4}$  sec.6, T.37 N., R.46 E., Daniels County, on left bank 0.5 mile south of international boundary, 1.5 miles upstream from Coal Creek, and 18.5 miles northwest of Scobey, Mont.

DRAINAGE AREA.--362 sq mi.

PERIOD OF RECORD.--March 1931 to current season (seasonal records only for most seasons).

GAGE.--Water-stage recorder. Altitude of gage is 2,460 ft (from topographic map).

EXTREMES.--Current season: Maximum daily discharge, 250 cfs Mar. 30; maximum gage height recorded, 4.34 ft Apr. 6 (backwater from ice); no flow Mar. 1-16.

Period of record: Maximum discharge, 12,700 cfs Apr. 6, 1954 (gage height, 10.25 ft, from floodmark), from rating curve extended above 2,500 cfs on basis of slope-area measurement of peak flow; no flow at times.

REMARKS.--Records good except those for winter period, which are poor. A few small diversions for irrigation above station.

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

REVISIONS (WATER YEARS).--WSP 1389: 1931, 1935-37(M), 1939-40, 1942(M), 1943, 1948(M), 1950(M). WSP 1729: Drainage area.

## DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR 1971

| DAY   | JAN | FEB   | MAR   | APR   | MAY   | JUN   | JUL   | AUG  | SEP   | OCT   | NOV   | DEC |
|-------|-----|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-----|
| 1     |     |       | 0     | 150   | 14    | 7.4   | 1.7   | .08  | .07   | .14   |       |     |
| 2     |     |       | 0     | 100   | 13    | 6.5   | 1.3   | .08  | .05   | .14   |       |     |
| 3     |     |       | 0     | 70    | 12    | 5.6   | 1.2   | .08  | .07   | .18   |       |     |
| 4     |     |       | 0     | 50    | 11    | 7.6   | .88   | .07  | .07   | .18   |       |     |
| 5     |     |       | 0     | 75    | 10    | 9.0   | .62   | .07  | .07   | .18   |       |     |
| 6     |     |       | 0     | 120   | 9.3   | 8.2   | .47   | .07  | .07   | .18   |       |     |
| 7     |     |       | 0     | 235   | 9.0   | 11    | .28   | .07  | .05   | .14   |       |     |
| 8     |     |       | 0     | 205   | 8.4   | 10    | .28   | .05  | .07   | .14   |       |     |
| 9     |     |       | 0     | 151   | 7.6   | 8.7   | .23   | .05  | .07   | .14   |       |     |
| 10    |     |       | 0     | 133   | 7.1   | 7.6   | .23   | .07  | .07   | .14   |       |     |
| 11    |     |       | 0     | 139   | 6.8   | 7.1   | .40   | .07  | .07   | .18   |       |     |
| 12    |     |       | 0     | 146   | 6.5   | 6.0   | .34   | .07  | .05   | .14   |       |     |
| 13    |     |       | 0     | 101   | 6.8   | 5.1   | .28   | .07  | .07   | .18   |       |     |
| 14    |     |       | 0     | 75    | 6.0   | 4.9   | .18   | .07  | .07   | .18   |       |     |
| 15    |     |       | 0     | 50    | 5.6   | 3.6   | .14   | .05  | .08   | .18   |       |     |
| 16    |     |       | 0     | 42    | 5.6   | 2.6   | .14   | .05  | .08   | .23   |       |     |
| 17    |     |       | 9.0   | 35    | 5.3   | 2.0   | .14   | .05  | .10   | .28   |       |     |
| 18    |     |       | 25    | 39    | 5.3   | 1.8   | .10   | .05  | .10   | .62   |       |     |
| 19    |     |       | 20    | 47    | 5.6   | 2.0   | .10   | .03  | .10   | .88   |       |     |
| 20    |     |       | 10    | 40    | 5.6   | 3.2   | .10   | .03  | .08   | .34   |       |     |
| 21    |     |       | 2.0   | 38    | 5.8   | 3.2   | .10   | .03  | .08   | .40   |       |     |
| 22    |     |       | 2.0   | 35    | 7.1   | 2.8   | .14   | .02  | .10   | .70   |       |     |
| 23    |     |       | 2.0   | 29    | 7.6   | 2.2   | .14   | .02  | .10   | 1.3   |       |     |
| 24    |     |       | 2.0   | 25    | 8.7   | 2.4   | .10   | .03  | .14   | 1.3   |       |     |
| 25    |     |       | 3.0   | 22    | 8.4   | 2.0   | .08   | .03  | .14   | 1.2   |       |     |
| 26    |     |       | 3.0   | 21    | 7.1   | 1.8   | .10   | .03  | .14   | 1.3   |       |     |
| 27    |     |       | 4.0   | 21    | 6.3   | 2.0   | .08   | .03  | .18   | 1.4   |       |     |
| 28    |     |       | 10    | 19    | 6.0   | 2.0   | .08   | .03  | .23   | 1.4   |       |     |
| 29    |     | ----- | 50    | 17    | 5.6   | 2.2   | .08   | .03  | .23   | 1.5   |       |     |
| 30    |     | ----- | 250   | 15    | 5.6   | 2.2   | .08   | .03  | .18   | 1.5   |       |     |
| 31    |     | ----- | 200   | ----- | 7.1   | ----- | .07   | .07  | ----- | 1.5   | ----- |     |
| TOTAL |     |       | 592.0 | 2,245 | 235.8 | 142.7 | 10.16 | 1.58 | 2.98  | 18.27 |       |     |
| MEAN  |     |       | 19.1  | 74.8  | 7.61  | 4.76  | .33   | .051 | .099  | .59   |       |     |
| MAX   |     |       | 250   | 235   | 14    | 11    | 1.7   | .08  | .23   | 1.5   |       |     |
| MIN   |     |       | 0     | 15    | 5.3   | 1.8   | .07   | .02  | .05   | .14   |       |     |
| AC-FT |     |       | 1,170 | 4,450 | 468   | 283   | 20    | 3.1  | 5.9   | 36    |       |     |

THE SEASON MARCH TO OCTOBER

AC-FT 6,440

## POPLAR RIVER BASIN

133

06178500 East Poplar River at international boundary

(International gaging station)

LOCATION.--Lat 49°00'00", long 105°24'30", in SW 1/4 sec.3, T.1, R.26 W., second meridian, on left bank 10 ft north of international boundary, 400 ft southwest of Canadian East Poplar Port of Entry, 14 miles upstream from mouth, and 14 miles north of Scobey, Mont.

DRAINAGE AREA.--534 sq mi.

PERIOD OF RECORD.--March 1931 to current season (seasonal records only for most years). Prior to March 1962, published as East Fork Poplar River at international boundary.

GAGE.--Water-stage recorder. Rock and concrete control since July 8, 1968. Datum of gage is 2,410.92 ft above mean sea level (International Boundary Surveys datum). Prior to Oct. 5, 1953, water-stage recorder at site 80 ft upstream at same datum.

EXTREMES.--Current season: Maximum discharge, about 850 cfs Apr. 1 (gage height, 10.77 ft, backwater from ice); minimum daily discharge, 1.0 cfs Mar. 1, 6.

Period of record: Maximum discharge, 2,760 cfs Mar. 22, 1939 (gage height, 12.40 ft); maximum gage height, 12.8 ft Mar. 25, 1943, from floodmark (backwater from ice); no flow at times.

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

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

REVISIONS (WATER YEARS).--WSP 1389: 1932, 1939, 1942-43, 1947. WSP 1729: Drainage area.

## DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR 1971

| DAY   | JAN | FEB   | MAR     | APR   | MAY   | JUN   | JUL  | AUG  | SEP   | OCT   | NOV   | DEC |
|-------|-----|-------|---------|-------|-------|-------|------|------|-------|-------|-------|-----|
| 1     |     |       | 1.5     | 720   | 1.5   | 5.1   | 4.5  | 2.6  | 3.4   | 4.3   |       |     |
| 2     |     |       | 1.5     | 525   | 2.5   | 4.0   | 4.5  | 2.6  | 3.4   | 4.6   |       |     |
| 3     |     |       | 1.5     | 340   | 3.7   | 4.1   | 3.8  | 2.4  | 3.4   | 4.3   |       |     |
| 4     |     |       | 1.5     | 195   | 9.1   | 7.4   | 3.9  | 2.4  | 3.6   | 4.3   |       |     |
| 5     |     |       | 1.5     | 157   | 6.4   | 11    | 3.6  | 2.4  | 3.6   | 4.1   |       |     |
| 6     |     |       | 1.5     | 215   | 9.1   | 9.1   | 3.5  | 2.4  | 3.5   | 4.2   |       |     |
| 7     |     |       | 1.5     | 54    | 2.5   | 7.5   | 3.6  | 2.6  | 3.5   | 4.9   |       |     |
| 8     |     |       | 1.5     | 36    | 7.9   | 8.7   | 3.2  | 2.6  | 3.4   | 4.1   |       |     |
| 9     |     |       | 1.5     | 195   | 8.4   | 3.7   | 3.2  | 2.6  | 3.6   | 3.9   |       |     |
| 10    |     |       | 1.5     | 120   | 7.1   | 7.1   | 3.1  | 2.6  | 3.5   | 4.1   |       |     |
| 11    |     |       | 2.5     | 86    | 7.2   | 6.6   | 3.5  | 2.6  | 3.6   | 4.5   |       |     |
| 12    |     |       | 2.5     | 63    | 6.2   | 6.5   | 3.9  | 2.6  | 3.5   | 4.7   |       |     |
| 13    |     |       | 12      | 45    | 7.7   | 5.5   | 3.6  | 2.8  | 3.8   | 4.1   |       |     |
| 14    |     |       | 12      | 32    | 7.2   | 5.3   | 3.6  | 3.2  | 3.8   | 4.5   |       |     |
| 15    |     |       | 7.5     | 25    | 6.7   | 5.5   | 3.4  | 3.5  | 3.9   | 4.3   |       |     |
| 16    |     |       | 7.5     | 23    | 6.5   | 4.4   | 3.5  | 2.8  | 4.2   | 4.3   |       |     |
| 17    |     |       | 6.5     | 21    | 6.5   | 4.7   | 3.2  | 3.5  | 4.1   | 4.7   |       |     |
| 18    |     |       | 6.5     | 22    | 6.5   | 4.5   | 3.2  | 2.8  | 4.1   | 5.8   |       |     |
| 19    |     |       | 5.5     | 37    | 5.8   | 4.4   | 3.5  | 2.9  | 4.5   | 6.6   |       |     |
| 20    |     |       | 2.5     | 27    | 5.5   | 4.1   | 3.5  | 2.9  | 4.6   | 6.1   |       |     |
| 21    |     |       | 25      | 25    | 5.7   | 4.1   | 3.5  | 2.8  | 4.2   | 5.3   |       |     |
| 22    |     |       | 20      | 17    | 5.8   | 3.6   | 3.5  | 2.7  | 4.2   | 4.5   |       |     |
| 23    |     |       | 17      | 16    | 3.7   | 3.6   | 2.8  | 2.8  | 4.3   | 4.7   |       |     |
| 24    |     |       | 13      | 15    | 5.7   | 4.2   | 3.4  | 2.7  | 4.3   | 5.6   |       |     |
| 25    |     |       | 11      | 14    | 5.4   | 3.6   | 2.8  | 2.7  | 4.3   | 4.5   |       |     |
| 26    |     | 10.3  | 18      | 17    | 5.5   | 3.9   | 2.6  | 2.9  | 4.1   | 4.5   |       |     |
| 27    |     | 10.3  | 14      | 23    | 4.7   | 3.9   | 2.8  | 2.9  | 4.3   | 4.8   |       |     |
| 28    |     | 9.9   | 13      | 17    | 5.5   | 3.8   | 2.6  | 3.0  | 4.3   | 3.3   |       |     |
| 29    |     | ----- | 15      | 13    | 4.6   | 4.4   | 2.4  | 3.1  | 4.1   | 3.8   |       |     |
| 30    |     | ----- | 230     | 11    | 4.5   | 4.4   | 2.4  | 2.9  | 4.5   | 4.8   |       |     |
| 31    |     | ----- | 650     | ----- | 5.3   | ----- | 2.6  | 3.2  | ----- | 4.5   | ----- |     |
| TOTAL |     |       | 1,120.5 | 3,896 | 211.8 | 164.1 | 99.8 | 85.3 | 117.1 | 140.7 |       |     |
| MEAN  |     |       | 35.1    | 130   | 6.83  | 5.47  | 3.22 | 2.75 | 3.90  | 4.54  |       |     |
| MAX   |     |       | 650     | 720   | 11    | 11    | 4.0  | 3.2  | 4.6   | 6.8   |       |     |
| MIN   |     |       | 1.5     | 11    | 4.5   | 3.6   | 2.4  | 2.4  | 3.4   | 3.3   |       |     |
| AC-FT |     |       | 2,220   | 7,730 | 420   | 325   | 198  | 169  | 232   | 279   |       |     |

THE SEASON MARCH TO OCTOBER: AC-FT 11,570

NOTE.--Stage-discharge relation affected by ice Mar. 1 to Apr. 8.

## BIG MUDDY CREEK BASIN

06182500 Big Muddy Creek at Daleview, Mont.

LOCATION.--Lat 48°54'40", long 104°56'42", near center of north line of sec.5, T.36 N., R.52 E., Sheridan County, on right bank 0.5 mile west of Daleview, 0.5 mile upstream from Whitetail Creek, 6 miles north of Redstone, and at mile 149.6.

DRAINAGE AREA.--279 sq mi.

PERIOD OF RECORD.--August 1947 to current year.

GAGE.--Water-stage recorder. Altitude of gage is 2,120 ft (by barometer).

AVERAGE DISCHARGE.--24 years, 15.7 cfs (11,370 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 406 cfs Apr. 7 (gage height, 9.89 ft); maximum gage height, 13.08 ft Mar. 31 (backwater from ice); no flow at times.

Period of record: Maximum discharge, 6,360 cfs Apr. 7, 1952 (gage height, 17.15 ft), from rating curve extended above 1,300 cfs on basis of slope-area measurement of peak flow; no flow at times.

REMARKS.--Records poor. No known regulation. Diversions for irrigation of about 90 acres above station.

REVISIONS (WATER YEARS).--WSP 1209: 1948(M). WSP 1309: Drainage area. WSP 1389: 1948. WSP 1559: 1955.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY   | OCT  | NOV   | DEC   | JAN | FEB   | MAR    | APR     | MAY   | JUN   | JUL   | AUG | SEP   |
|-------|------|-------|-------|-----|-------|--------|---------|-------|-------|-------|-----|-------|
| 1     | 0    | 2.4   | .90   |     |       | 0      | 70      | 8.1   | 2.3   | 2.0   |     | 0     |
| 2     | 0    | 2.3   | .80   |     |       | 0      | 40      | 7.5   | 2.2   | 2.1   |     | 0     |
| 3     | 0    | 2.2   | .80   |     |       | 0      | 20      | 7.1   | 1.9   | 1.7   |     | 0     |
| 4     | 0    | 2.8   | .80   |     |       | .10    | 10      | 6.8   | 1.8   | 1.3   |     | 0     |
| 5     | 1.2  | 2.8   | .70   |     |       | .20    | 20      | 6.4   | 2.1   | 1.0   |     | 0     |
| 6     | 3.8  | 2.6   | .70   |     |       | .20    | 80      | 6.1   | 2.2   | .76   |     | 0     |
| 7     | 4.1  | 2.6   | .60   |     |       | .20    | 322     | 5.7   | 1.9   | .57   |     | 0     |
| 8     | 3.4  | 2.4   | .60   |     |       | .20    | 263     | 5.5   | 1.6   | .33   |     | 0     |
| 9     | 2.8  | 2.2   | .60   |     |       | .20    | 130     | 5.2   | 1.6   | .05   |     | 0     |
| 10    | 2.6  | 2.1   | .60   |     |       | .20    | 72      | 4.6   | 1.6   | .16   |     | 0     |
| 11    | 2.5  | 2.0   | .60   |     |       | .20    | 51      | 4.5   | 1.5   | .58   |     | 0     |
| 12    | 2.5  | 1.9   | .50   |     |       | 1.0    | 39      | 4.3   | 1.3   | 1.6   |     | 0     |
| 13    | 2.3  | 1.9   | .50   |     |       | 1.7    | 27      | 4.2   | 1.1   | 1.7   |     | 0     |
| 14    | 2.3  | 1.9   | .40   |     |       | 1.5    | 22      | 4.1   | 1.2   | 1.4   |     | 0     |
| 15    | 2.3  | 1.9   | .40   |     |       | 1.5    | 19      | 3.7   | 1.9   | 1.1   |     | 0     |
| 16    | 2.2  | 2.0   | .40   |     |       | 1.7    | 19      | 3.6   | 1.8   | .88   |     | 0     |
| 17    | 2.1  | 2.0   | .40   |     |       | 1.9    | 17      | 3.5   | 1.8   | .46   |     | 0     |
| 18    | 2.1  | 1.9   | .30   |     |       | 2.1    | 18      | 3.3   | 1.5   | .23   |     | 0     |
| 19    | 1.9  | 1.8   | .30   |     |       | 2.3    | 17      | 3.2   | 1.5   | .23   |     | 0     |
| 20    | 2.0  | 1.7   | .30   |     |       | 2.6    | 16      | 3.0   | 1.7   | 0     |     | 0     |
| 21    | 1.9  | 1.6   | .30   |     |       | 2.7    | 17      | 2.8   | 1.8   | 0     |     | 0     |
| 22    | 1.8  | 1.4   | .20   |     |       | 2.1    | 16      | 3.1   | 1.7   | 0     |     | 0     |
| 23    | 1.9  | 1.3   | .20   |     |       | 1.8    | 14      | 3.0   | 1.8   | 0     |     | 0     |
| 24    | 1.9  | 1.2   | .20   |     |       | 1.6    | 13      | 2.8   | 2.0   | 0     |     | 0     |
| 25    | 1.8  | 1.3   | .20   |     |       | 1.4    | 12      | 2.5   | 2.0   | 0     |     | 0     |
| 26    | 1.8  | 1.2   | .20   |     |       | 1.3    | 11      | 2.3   | 2.0   | 0     |     | .01   |
| 27    | 2.0  | 1.1   | .20   |     |       | 3.8    | 10      | 2.0   | 2.2   | 0     |     | .05   |
| 28    | 2.1  | 1.0   | .10   |     |       | 9.0    | 9.6     | 1.8   | 2.0   | 0     |     | .15   |
| 29    | 2.5  | 1.0   | .10   |     | ----- | 18     | 9.2     | 1.6   | 2.1   | 0     |     | .20   |
| 30    | 2.5  | .90   | .10   |     | ----- | 50     | 8.5     | 1.8   | 2.1   | 0     |     | .24   |
| 31    | 2.5  | ----- | .10   |     | ----- | 120    | -----   | 2.1   | ----- | 0     |     | ----- |
| TOTAL | 62.8 | 55.40 | 13.10 | 0   | 0     | 229.50 | 1,392.3 | 126.2 | 54.2  | 18.15 | 0   | .65   |
| MEAN  | 2.03 | 1.85  | .42   | 0   | 0     | 7.40   | 46.4    | 4.07  | 1.81  | .59   | 0   | .022  |
| MAX   | 4.1  | 2.8   | .90   | 0   | 0     | 120    | 322     | 8.1   | 2.3   | 2.1   | 0   | .24   |
| MIN   | 0    | .90   | .10   | 0   | 0     | 0      | 8.5     | 1.6   | 1.1   | 0     | 0   | 0     |
| AC-FT | 125  | 110   | 26    | 0   | 0     | 455    | 2,760   | 250   | 108   | 36    | 0   | 1.3   |

CAL YR 1970 TOTAL 4,097.58 MEAN 11.2 MAX 550 MIN 0 AC-FT 8,130  
WTR YR 1971 TOTAL 1,952.30 MEAN 5.35 MAX 322 MIN 0 AC-FT 3,870

## PEAK DISCHARGE (BASE, 50 CFS)

| DATE | TIME | G.HT.  | DISCHARGE | DATE | TIME | G.HT. | DISCHARGE |
|------|------|--------|-----------|------|------|-------|-----------|
| 3-31 | 0745 | a13.08 | b150      | 4-7  | 2200 | 9.89  | 406       |

NOTE.--Stage-discharge relation affected by ice Nov. 7 to Apr. 6 (no gage height record Dec. 5, 6, Dec. 29 to Feb. 2, Mar. 24-29, Apr. 1-4).

a Backwater from ice.  
b About.

06185500. Missouri River near Culbertson, Mont.

LOCATION.--Lat 48°07'24", long 104°28'30", in SE¼NW¼ sec.3, T.27 N., R.56 E., Richland County, on right bank at downstream side of bridge on State Highway 16, 3 miles southeast of Culbertson, 9.6 miles downstream from Big Muddy Creek, and at mile 1,620.76.

DRAINAGE AREA.--91,557 sq mi.

PERIOD OF RECORD.--July 1941 to December 1951, April 1958 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,883.4 ft above mean sea level, datum of 1929 (Corps of Engineers bench mark). July 1 to Nov. 6, 1941, water-stage recorder at site 400 ft upstream at datum 0.11 ft higher. Nov. 7, 1941, to Aug. 17, 1950, water-stage recorder at site 580 ft downstream at present datum. Aug. 18, 1950, to Dec. 31, 1951, nonrecording gage on bridge at present datum. Apr. 1, 1958, to Nov. 1, 1967, water-stage recorder at site 500 ft downstream at present datum.

AVERAGE DISCHARGE.--21 years (1943-51, 1958-71, after operational level at Fort Peck Reservoir was reached), 10,260 cfs (7,433,000 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 22,300 cfs Apr. 12 (gage height, 10.15 ft, from graph based on gage readings); maximum gage height observed, 13.60 ft Mar. 15 (backwater from ice); minimum daily discharge, 8,550 cfs Sept. 8.

Period of record: Maximum discharge, 78,200 cfs Mar. 26, 1943 (gage height, 14.80 ft), from rating curve extended above 30,000 cfs; maximum gage height, 19.14 ft Mar. 23, 1960 (backwater from ice); minimum daily discharge, 575 cfs Nov. 22, 1941.

REMARKS.--Records good except those for winter period, which are poor. Flow partly regulated by Fort Peck Lake (see p. 80) and many other reservoirs above station. Diversions for irrigation of about 1,030,400 acres above station. Records of chemical analyses and water temperatures for the current year are published in Part 2 of this report.

REVISIONS.--WSP 1729: Drainage area.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT             | NOV     | DEC         | JAN     | FEB        | MAR     | APR       | MAY     | JUN             | JUL     | AUG     | SEP     |
|-------------|-----------------|---------|-------------|---------|------------|---------|-----------|---------|-----------------|---------|---------|---------|
| 1           | 14,800          | 14,100  | 10,500      | 13,000  | 15,000     | 18,000  | 16,100    | 15,100  | 15,200          | 9,530   | 11,900  | 9,850   |
| 2           | 14,600          | 14,200  | 10,500      | 13,500  | 14,000     | 17,000  | 16,100    | 15,100  | 15,300          | 10,300  | 12,000  | 9,750   |
| 3           | 14,600          | 14,400  | 10,500      | 14,000  | 14,500     | 17,000  | 15,200    | 14,800  | 15,100          | 10,600  | 12,000  | 9,700   |
| 4           | 14,600          | 14,400  | 10,500      | 14,000  | 15,000     | 17,000  | 15,200    | 14,900  | 14,800          | 9,680   | 12,000  | 9,900   |
| 5           | 14,700          | 14,300  | 10,500      | 13,000  | 15,500     | 16,500  | 14,800    | 14,900  | 14,900          | 9,830   | 12,100  | 10,200  |
| 6           | 14,700          | 14,200  | 10,000      | 12,000  | 15,500     | 17,000  | 14,800    | 14,100  | 14,600          | 9,930   | 11,900  | 10,100  |
| 7           | 14,200          | 14,100  | 10,000      | 12,800  | 15,500     | 17,000  | 14,700    | 13,900  | 14,900          | 9,730   | 11,800  | 9,630   |
| 8           | 12,000          | 13,900  | 10,000      | 12,800  | 15,500     | 17,000  | 16,000    | 14,800  | 15,200          | 9,680   | 12,000  | 8,550   |
| 9           | 11,100          | 13,700  | 9,800       | 13,000  | 15,500     | 17,000  | 18,800    | 15,600  | 15,400          | 9,880   | 11,800  | 9,330   |
| 10          | 9,900           | 13,500  | 10,500      | 13,000  | 16,000     | 17,000  | 21,200    | 15,800  | 15,200          | 10,100  | 11,900  | 10,100  |
| 11          | 8,850           | 13,600  | 11,500      | 13,000  | 16,000     | 17,000  | 21,800    | 16,000  | 14,900          | 10,200  | 11,900  | 9,980   |
| 12          | 9,900           | 13,300  | 12,000      | 13,500  | 16,000     | 17,500  | 22,100    | 15,800  | 13,700          | 9,880   | 12,100  | 10,000  |
| 13          | 12,200          | 13,200  | 12,000      | 14,000  | 16,500     | 17,700  | 20,700    | 15,600  | 12,700          | 9,730   | 11,800  | 10,300  |
| 14          | 14,100          | 13,400  | 12,000      | 14,500  | 16,000     | 18,000  | 18,300    | 15,300  | 12,800          | 9,730   | 11,800  | 9,880   |
| 15          | 14,400          | 13,600  | 12,500      | 15,000  | 16,000     | 18,500  | 15,700    | 15,300  | 12,700          | 9,500   | 11,900  | 9,480   |
| 16          | 14,200          | 13,600  | 13,500      | 15,000  | 16,000     | 18,500  | 16,900    | 15,200  | 12,700          | 9,630   | 11,900  | 9,730   |
| 17          | 13,700          | 13,800  | 14,000      | 15,000  | 16,000     | 18,000  | 16,800    | 15,000  | 12,700          | 9,680   | 12,100  | 9,850   |
| 18          | 14,000          | 13,900  | 14,000      | 15,500  | 16,000     | 17,000  | 14,400    | 14,900  | 12,500          | 10,000  | 11,900  | 9,950   |
| 19          | 13,800          | 14,000  | 13,500      | 15,500  | 16,000     | 16,000  | 16,300    | 14,600  | 12,700          | 11,300  | 10,600  | 9,900   |
| 20          | 14,200          | 14,100  | 12,500      | 15,500  | 16,000     | 15,000  | 16,800    | 14,700  | 12,800          | 11,700  | 10,200  | 9,830   |
| 21          | 14,200          | 12,000  | 10,000      | 15,000  | 17,000     | 14,000  | 16,600    | 14,400  | 12,800          | 11,600  | 10,100  | 9,430   |
| 22          | 14,000          | 11,000  | 9,600       | 15,000  | 18,000     | 13,500  | 16,600    | 12,800  | 12,900          | 11,600  | 10,000  | 9,000   |
| 23          | 12,700          | 10,000  | 9,600       | 15,500  | 18,000     | 14,000  | 16,100    | 13,400  | 12,600          | 11,600  | 10,300  | 9,050   |
| 24          | 12,300          | 10,000  | 9,800       | 15,500  | 18,000     | 14,000  | 15,700    | 14,300  | 12,700          | 11,600  | 9,830   | 8,950   |
| 25          | 13,100          | 10,000  | 10,000      | 15,000  | 19,000     | 14,000  | 16,100    | 14,500  | 12,600          | 11,600  | 9,430   | 8,800   |
| 26          | 13,700          | 9,600   | 10,400      | 15,000  | 19,000     | 14,500  | 16,000    | 14,500  | 12,600          | 11,500  | 10,400  | 8,900   |
| 27          | 13,900          | 9,600   | 10,800      | 15,000  | 20,000     | 14,500  | 15,900    | 14,500  | 12,400          | 11,400  | 10,300  | 9,000   |
| 28          | 14,100          | 10,000  | 11,000      | 15,000  | 19,000     | 14,500  | 16,000    | 14,500  | 10,700          | 11,700  | 10,500  | 8,900   |
| 29          | 14,200          | 10,500  | 11,500      | 15,000  | -----      | 15,000  | 15,600    | 14,700  | 10,100          | 11,600  | 11,200  | 9,000   |
| 30          | 14,200          | 11,000  | 12,000      | 15,500  | -----      | 16,500  | 14,900    | 14,600  | 9,650           | 11,800  | 10,500  | 9,130   |
| 31          | 14,200          | -----   | 12,500      | 15,500  | -----      | 16,000  | -----     | 14,900  | -----           | 11,900  | 10,300  | -----   |
| TOTAL       | 415,150         | 381,000 | 347,500     | 444,600 | 460,500    | 504,200 | 502,200   | 458,500 | 399,850         | 328,510 | 348,460 | 286,170 |
| MEAN        | 13,390          | 12,700  | 11,210      | 14,340  | 16,450     | 16,260  | 16,740    | 14,790  | 13,330          | 10,600  | 11,240  | 9,539   |
| MAX         | 14,800          | 14,400  | 14,000      | 15,500  | 20,000     | 18,500  | 22,100    | 16,000  | 15,400          | 11,900  | 12,100  | 10,300  |
| MIN         | 8,850           | 9,600   | 9,600       | 12,000  | 14,000     | 13,500  | 14,400    | 12,800  | 9,650           | 9,500   | 9,430   | 8,550   |
| AC-FT       | 823,500         | 755,700 | 689,300     | 881,900 | 913,400    | 1,000M  | 996,100   | 909,400 | 793,100         | 651,600 | 691,200 | 567,600 |
| CAL YR 1970 | TOTAL 4,940,880 |         | MEAN 13,540 |         | MAX 19,700 |         | MIN 7,800 |         | AC-FT 9,800,000 |         |         |         |
| WTR YR 1971 | TOTAL 4,876,640 |         | MEAN 13,360 |         | MAX 22,100 |         | MIN 8,550 |         | AC-FT 9,673,000 |         |         |         |

NOTE.--Stage-discharge relation affected by ice Nov. 21 to Apr. 1.



## YELLOWSTONE RIVER BASIN

06186000 Yellowstone Lake at Bridge Bay, Yellowstone National Park.

LOCATION.--Lat 44°32'00", long 110°26'20", Yellowstone National Park, at marina at Bridge Bay, 3.7 miles southwest of lake outlet.

DRAINAGE AREA.--1,006 sq mi.

PERIOD OF RECORD.--October 1921 to current year. Prior to October 1966, published as Yellowstone Lake at Lake Hotel.

GAGE.--Nonrecording gage usually read once daily except during winter months when it is read occasionally. Datum of gage is 7,729.45 ft above mean sea level. Prior to Oct. 1, 1966, nonrecording gages at Lake Hotel dock at same datum.

EXTREMES.--Current year: Maximum gage height observed, 7.06 ft June 30; minimum observed, 1.40 ft Apr. 24.

Period of record: Maximum gage height observed, 7.06 ft June 30, 1971; minimum observed, -0.1 ft Dec. 7, 8, 1931.

REMARKS.--No regulation.

REVISIONS.--WSP 1916: Drainage area.

## GAGE HEIGHT, IN FEET, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY | OCT  | NOV   | DEC  | JAN  | FEB   | MAR  | APR   | MAY  | JUN   | JUL  | AUG  | SEP   |
|-----|------|-------|------|------|-------|------|-------|------|-------|------|------|-------|
| 1   |      |       |      |      |       |      |       |      |       | 7.04 | 5.40 |       |
| 2   |      |       |      |      |       |      |       |      |       | 7.02 | 5.38 | 3.50  |
| 3   |      |       |      |      |       |      | 1.46  |      |       | 6.88 | 5.22 |       |
| 4   |      |       |      |      |       |      |       |      |       | 6.82 | 5.16 | 3.48  |
| 5   |      |       |      |      |       |      |       |      |       | 6.78 | 5.10 |       |
| 6   |      |       |      |      |       |      |       |      |       | 6.76 | 5.04 |       |
| 7   |      | 1.68  |      |      |       |      |       |      |       | 6.72 | 4.98 |       |
| 8   |      |       |      |      |       |      |       | 1.54 |       | 6.68 | 4.90 |       |
| 9   |      |       |      |      |       |      |       |      |       | 6.66 | 4.86 |       |
| 10  |      |       |      |      |       |      |       |      |       | 6.64 | 4.78 |       |
| 11  |      |       |      |      |       |      |       |      |       | 6.62 | 4.72 |       |
| 12  |      |       |      |      |       |      |       |      |       | 6.58 | 4.68 |       |
| 13  |      |       |      |      | 1.58  |      |       |      | 4.88  | 6.52 | 4.60 |       |
| 14  |      |       |      |      |       | 1.48 |       |      | 5.08  | 6.48 | 4.52 |       |
| 15  |      |       |      |      |       |      |       |      | 5.28  | 6.42 | 4.46 |       |
| 16  |      |       |      | 1.68 |       |      |       |      | 5.38  | 6.34 | 4.38 |       |
| 17  |      |       |      |      |       |      |       |      | 5.48  | 6.30 | 4.36 |       |
| 18  |      |       |      |      |       |      |       |      | 5.58  | 6.28 | 4.28 |       |
| 19  |      |       | 1.50 |      |       |      |       |      | 5.78  | 6.24 | 4.20 |       |
| 20  |      |       |      |      |       |      |       |      | 5.98  | 6.20 | 4.12 |       |
| 21  |      |       |      |      |       |      |       |      | 6.08  | 6.12 | 4.00 |       |
| 22  |      |       |      |      |       |      |       | 2.28 | 6.30  | 6.08 | 3.98 | 2.78  |
| 23  |      |       |      |      |       |      |       |      | 6.34  | 6.00 | 3.94 |       |
| 24  |      | 1.47  |      |      |       |      | 1.40  |      | 6.52  | 5.98 | 3.88 |       |
| 25  |      |       |      |      |       |      |       | 2.46 | 6.72  | 5.88 |      |       |
| 26  |      |       |      |      |       |      |       |      | 6.86  | 5.82 |      |       |
| 27  |      |       |      |      |       |      |       |      | 6.88  | 5.74 | 3.74 |       |
| 28  | 1.82 |       |      |      |       |      |       |      | 6.96  | 5.68 | 3.66 |       |
| 29  |      | 1.60  |      |      |       |      |       |      | 7.02  | 5.60 | 3.66 |       |
| 30  |      |       |      | 1.54 | ----- |      |       |      | 7.06  | 5.52 |      |       |
| 31  |      | ----- |      |      | ----- |      | ----- |      | ----- | 5.44 |      | ----- |

## YELLOWSTONE RIVER BASIN

137

06186500 Yellowstone River at Yellowstone Lake Outlet, Yellowstone National Park.

LOCATION.--Lat 44°34'03", long 110°22'48", Yellowstone National Park, on left bank 450 ft downstream from Fishing Bridge, 0.2 mile downstream from outlet of Yellowstone Lake, and at mile 594.8.

DRAINAGE AREA.--1,006 sq mi.

PERIOD OF RECORD.--December 1922 to current year (prior to October 1926, gage heights only). Monthly discharge only for winter periods in water years 1927-30, 1932-33, 1935-38, 1940, 1942-46, published in WSP 1309; figures of daily discharge for these months published in WSP 646, 666, 686, 701, 731, 746, 786, 806, 826, 856, 896, 956, 976, 1006, 1036, and 1056, have been found to be unreliable and should not be used.

GAGE.--Water-stage recorder. Datum of gage is 7,727.77 ft above mean sea level. Prior to Oct. 2, 1928, non-recording gage at site 450 ft upstream at datum 1.07 ft higher.

AVERAGE DISCHARGE.--45 years (1926-71), 1,312 cfs (17.71 inches per year, 950,500 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 8,250 cfs June 28 (gage height, 7.95 ft); minimum, 572 cfs Dec. 11, but may have been less during period of ice effect.

Period of record: Maximum discharge, 8,250 cfs June 28, 1971 (gage height, 7.95 ft); minimum daily, 130 cfs Mar. 1-31, 1935, but may have been less during periods of ice effect; minimum gage height, 1.45 ft Dec. 17, 1936.

REMARKS.--Records good except those for winter period, which are poor. No artificial regulation.

REVISIONS (WATER YEARS).--WSP 1309: See PERIOD OF RECORD. WSP 1729: Drainage area.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY   | OCT    | NOV    | DEC    | JAN    | FEB    | MAR    | APR    | MAY    | JUN     | JUL     | AUG     | SEP     |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|---------|---------|---------|---------|
| 1     | 1,150  | 798    | 744    | 630    | 640    | 610    | 557    | 665    | 2,450   | 7,940   | 5,000   | 2,330   |
| 2     | 1,140  | 786    | 756    | 630    | 640    | 610    | 537    | 665    | 2,570   | 7,830   | 4,860   | 2,230   |
| 3     | 1,120  | 774    | 726    | 630    | 640    | 610    | 537    | 665    | 2,660   | 7,890   | 4,730   | 2,270   |
| 4     | 1,100  | 762    | 704    | 630    | 640    | 610    | 532    | 665    | 2,760   | 7,790   | 4,620   | 2,240   |
| 5     | 1,100  | 756    | 720    | 630    | 640    | 610    | 675    | 670    | 2,870   | 7,720   | 4,540   | 2,210   |
| 6     | 1,100  | 756    | 720    | 630    | 640    | 610    | 670    | 682    | 3,000   | 7,640   | 4,440   | 2,170   |
| 7     | 1,060  | 756    | 738    | 630    | 640    | 610    | 660    | 682    | 3,080   | 7,620   | 4,350   | 2,130   |
| 8     | 1,050  | 750    | 750    | 630    | 630    | 610    | 560    | 704    | 3,200   | 7,520   | 4,260   | 2,110   |
| 9     | 1,030  | 744    | 733    | 630    | 630    | 610    | 554    | 720    | 3,360   | 7,450   | 4,130   | 2,060   |
| 10    | 1,000  | 744    | 733    | 630    | 630    | 610    | 554    | 738    | 3,540   | 7,370   | 4,060   | 2,030   |
| 11    | 1,020  | 750    | 665    | 640    | 630    | 610    | 554    | 756    | 3,910   | 7,300   | 3,930   | 1,980   |
| 12    | 995    | 744    | 670    | 640    | 630    | 610    | 543    | 792    | 4,000   | 7,260   | 3,930   | 1,930   |
| 13    | 995    | 735    | 660    | 640    | 630    | 610    | 643    | 834    | 4,200   | 7,200   | 3,720   | 1,890   |
| 14    | 980    | 726    | 660    | 640    | 630    | 610    | 643    | 882    | 4,420   | 7,070   | 3,600   | 1,820   |
| 15    | 966    | 720    | 660    | 640    | 630    | 610    | 554    | 931    | 4,640   | 6,970   | 3,520   | 1,760   |
| 16    | 959    | 720    | 660    | 640    | 630    | 610    | 565    | 1,010  | 4,920   | 6,880   | 3,410   | 1,690   |
| 17    | 952    | 714    | 660    | 640    | 620    | 610    | 670    | 1,090  | 5,130   | 6,760   | 3,310   | 1,670   |
| 18    | 939    | 704    | 650    | 640    | 620    | 610    | 675    | 1,140  | 5,400   | 6,650   | 3,230   | 1,650   |
| 19    | 936    | 709    | 650    | 640    | 620    | 610    | 570    | 1,140  | 5,720   | 6,550   | 3,140   | 1,610   |
| 20    | 933    | 704    | 650    | 640    | 620    | 610    | 670    | 1,200  | 6,020   | 6,460   | 3,050   | 1,560   |
| 21    | 931    | 704    | 640    | 640    | 620    | 610    | 670    | 1,210  | 6,280   | 6,400   | 2,980   | 1,520   |
| 22    | 910    | 692    | 640    | 640    | 620    | 610    | 570    | 1,240  | 6,630   | 6,300   | 2,870   | 1,500   |
| 23    | 896    | 682    | 640    | 640    | 620    | 610    | 570    | 1,270  | 6,930   | 6,170   | 2,830   | 1,480   |
| 24    | 882    | 704    | 640    | 640    | 620    | 610    | 670    | 1,320  | 7,260   | 6,040   | 2,720   | 1,460   |
| 25    | 875    | 726    | 640    | 640    | 620    | 620    | 570    | 1,370  | 7,580   | 5,900   | 2,650   | 1,440   |
| 26    | 865    | 732    | 640    | 650    | 620    | 640    | 692    | 1,430  | 7,340   | 5,780   | 2,580   | 1,410   |
| 27    | 861    | 744    | 640    | 650    | 620    | 660    | 687    | 1,530  | 8,040   | 5,640   | 2,520   | 1,390   |
| 28    | 847    | 726    | 640    | 650    | 620    | 680    | 682    | 1,680  | 8,140   | 5,500   | 2,460   | 1,360   |
| 29    | 828    | 720    | 640    | 650    | -----  | 692    | 692    | 1,870  | 8,140   | 5,380   | 2,420   | 1,330   |
| 30    | 816    | 720    | 640    | 650    | -----  | 682    | 576    | 2,070  | 8,060   | 5,240   | 2,420   | 1,330   |
| 31    | 804    | -----  | 630    | 650    | -----  | 682    | -----  | 2,300  | -----   | 5,110   | 2,370   | -----   |
| TOTAL | 30,049 | 21,995 | 20,949 | 19,800 | 17,540 | 19,206 | 20,069 | 33,961 | 152,650 | 209,330 | 108,550 | 53,560  |
| MEAN  | 969    | 733    | 676    | 639    | 628    | 620    | 660    | 1,096  | 5,088   | 6,753   | 3,502   | 1,785   |
| MAX   | 1,150  | 798    | 756    | 650    | 640    | 692    | 587    | 2,300  | 8,140   | 7,940   | 5,000   | 2,330   |
| MIN   | 804    | 682    | 630    | 630    | 620    | 600    | 543    | 665    | 2,450   | 5,110   | 2,370   | 1,330   |
| CFSM  | .96    | .73    | .67    | .54    | .62    | .62    | .67    | 1.09   | 5.06    | 6.71    | 3.48    | 1.77    |
| IN.   | 1.11   | .81    | .77    | .73    | .65    | .71    | .74    | 1.26   | 5.64    | 7.74    | 4.01    | 1.98    |
| AC-FT | 59,600 | 43,630 | 41,550 | 39,270 | 34,890 | 38,100 | 39,310 | 67,360 | 302,800 | 415,200 | 215,300 | 106,200 |

CAL YR 1970 TOTAL 548,624 MEAN 1,503 MAX 6,460 MIN 360 CFSM 1.49 IN 20.29 AC-FT 1,088,000  
 WTR YR 1971 TOTAL 707,709 MEAN 1,939 MAX 8,140 MIN 600 CFSM 1.93 IN 26.17 AC-FT 1,404,000

NOTE.--Stage-discharge relation affected by ice Dec. 12 to Mar. 28 (no gage-height record Mar. 8-13).

## YELLOWSTONE RIVER BASIN

06191000 Gardner River near Mammoth, Yellowstone National Park

LOCATION.--Lat 44°59'35", long 110°41'25", Park County, Yellowstone National Park, on left bank at Wyoming-Montana State line, 400 ft upstream from highway bridge, 0.5 mile downstream from Hot River (formerly Boiling River), 1.5 miles north of Mammoth, and 3 miles upstream from mouth.

DRAINAGE AREA.--202 sq mi.

PERIOD OF RECORD.--October 1938 to current year. Prior to October 1959, published as Gardiner River near Mammoth.

GAGE.--Water-stage recorder. Altitude of gage is 5,620 ft (from topographic map).

AVERAGE DISCHARGE.--33 years, 217 cfs (14.59 inches per year, 157,200 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 1,660 cfs June 11, 23 (gage height, 4.05 ft); minimum, 59 cfs Feb. 21 (gage height, 1.73 ft), but may have been less during period of no gage-height record.

Period of record: Maximum discharge, 2,080 cfs June 4, 1956 (gage height, 4.46 ft); maximum gage height, 4.78 ft June 16, 1962 (backwater from log and debris); minimum discharge, 35 cfs Mar. 28, 1942 (gage height, 1.08 ft).

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

REVISIONS.--WSP 1729: Drainage area.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY   | OCT   | NOV   | DEC   | JAN   | FEB   | MAR   | APR   | MAY    | JUN    | JUL    | AUG    | SEP    |
|-------|-------|-------|-------|-------|-------|-------|-------|--------|--------|--------|--------|--------|
| 1     | 151   | 140   | 112   | 103   | 112   | 90    | 92    | 168    | 1,240  | 859    | 283    | 188    |
| 2     | 151   | 131   | 117   | 88    | 109   | 90    | 90    | 196    | 1,120  | 842    | 276    | 182    |
| 3     | 151   | 128   | 112   | 90    | 106   | 106   | 92    | 217    | 1,070  | 985    | 272    | 205    |
| 4     | 151   | 126   | 109   | 90    | 90    | 100   | 90    | 224    | 1,030  | 877    | 268    | 211    |
| 5     | 151   | 131   | 114   | 90    | 92    | 98    | 92    | 233    | 1,150  | 794    | 261    | 199    |
| 6     | 156   | 134   | 114   | 90    | 95    | 92    | 95    | 291    | 1,240  | 770    | 258    | 185    |
| 7     | 151   | 131   | 117   | 90    | 112   | 98    | 103   | 410    | 1,170  | 738    | 254    | 193    |
| 8     | 151   | 128   | 120   | 90    | 114   | 98    | 103   | 458    | 1,240  | 698    | 243    | 188    |
| 9     | 151   | 131   | 118   | 106   | 103   | 98    | 106   | 496    | 1,480  | 674    | 236    | 179    |
| 10    | 156   | 134   | 110   | 117   | 106   | 98    | 109   | 626    | 1,530  | 658    | 230    | 173    |
| 11    | 154   | 120   | 100   | 114   | 109   | 95    | 106   | 650    | 1,570  | 642    | 224    | 168    |
| 12    | 156   | 134   | 95    | 114   | 106   | 98    | 100   | 738    | 1,540  | 603    | 217    | 165    |
| 13    | 154   | 128   | 92    | 112   | 106   | 100   | 98    | 802    | 1,520  | 573    | 214    | 165    |
| 14    | 148   | 120   | 106   | 109   | 106   | 92    | 103   | 802    | 1,510  | 550    | 208    | 162    |
| 15    | 145   | 123   | 120   | 109   | 106   | 95    | 123   | 794    | 1,550  | 516    | 205    | 162    |
| 16    | 145   | 126   | 115   | 106   | 103   | 95    | 120   | 931    | 1,510  | 496    | 199    | 162    |
| 17    | 145   | 126   | 105   | 106   | 100   | 95    | 117   | 778    | 1,510  | 490    | 196    | 162    |
| 18    | 145   | 126   | 95    | 109   | 106   | 88    | 112   | 618    | 1,480  | 490    | 202    | 162    |
| 19    | 145   | 123   | 85    | 112   | 103   | 95    | 109   | 535    | 1,470  | 464    | 191    | 159    |
| 20    | 142   | 120   | 92    | 120   | 98    | 95    | 109   | 509    | 1,370  | 464    | 188    | 162    |
| 21    | 145   | 120   | 105   | 106   | 77    | 95    | 109   | 490    | 1,400  | 483    | 188    | 156    |
| 22    | 142   | 85    | 106   | 92    | 98    | 95    | 112   | 558    | 1,490  | 446    | 182    | 156    |
| 23    | 142   | 112   | 95    | 109   | 106   | 98    | 117   | 503    | 1,550  | 410    | 179    | 154    |
| 24    | 148   | 145   | 112   | 112   | 109   | 100   | 123   | 610    | 1,470  | 394    | 173    | 154    |
| 25    | 137   | 165   | 114   | 106   | 103   | 98    | 128   | 722    | 1,360  | 377    | 173    | 154    |
| 26    | 140   | 142   | 112   | 106   | 106   | 106   | 123   | 940    | 1,290  | 355    | 173    | 162    |
| 27    | 128   | 131   | 114   | 112   | 90    | 95    | 114   | 1,120  | 1,420  | 337    | 174    | 165    |
| 28    | 131   | 128   | 123   | 109   | 103   | 92    | 117   | 1,220  | 1,280  | 328    | 180    | 165    |
| 29    | 134   | 123   | 120   | 109   | ----- | 95    | 128   | 1,350  | 1,120  | 310    | 205    | 165    |
| 30    | 137   | 128   | 114   | 106   | ----- | 98    | 145   | 1,250  | 940    | 302    | 254    | 162    |
| 31    | 137   | ----- | 112   | 112   | ----- | 95    | ----- | 1,330  | -----  | 291    | 208    | -----  |
| TOTAL | 4,520 | 3,839 | 3,375 | 3,244 | 2,874 | 2,983 | 3,285 | 20,569 | 40,620 | 17,216 | 6,714  | 5,125  |
| MEAN  | 146   | 128   | 109   | 105   | 103   | 96.2  | 110   | 664    | 1,354  | 555    | 217    | 171    |
| MAX   | 156   | 165   | 123   | 120   | 114   | 106   | 145   | 1,350  | 1,570  | 985    | 283    | 211    |
| MIN   | 128   | 85    | 85    | 88    | 77    | 88    | 90    | 168    | 940    | 291    | 173    | 154    |
| CFSM  | .72   | .63   | .54   | .52   | .51   | .48   | .54   | 3.29   | 6.70   | 2.75   | 1.07   | .85    |
| IN.   | .83   | .71   | .62   | .60   | .53   | .55   | .60   | 3.79   | 7.48   | 3.17   | 1.24   | .94    |
| AC-FT | 8,970 | 7,610 | 6,690 | 6,430 | 5,700 | 5,920 | 6,520 | 40,800 | 80,570 | 34,150 | 13,320 | 10,170 |

|             |       |         |      |     |     |       |     |    |      |      |    |       |       |         |
|-------------|-------|---------|------|-----|-----|-------|-----|----|------|------|----|-------|-------|---------|
| CAL YR 1970 | TOTAL | 86,333  | MEAN | 237 | MAX | 1,420 | MIN | 83 | CFSM | 1.17 | IN | 15.90 | AC-FT | 171,200 |
| WTR YR 1971 | TOTAL | 114,364 | MEAN | 313 | MAX | 1,570 | MIN | 77 | CFSM | 1.55 | IN | 21.06 | AC-FT | 226,800 |

## PEAK DISCHARGE (BASE, 700 CFS)

| DATE | TIME | G.HT. | DISCHARGE | DATE | TIME | G.HT. | DISCHARGE |
|------|------|-------|-----------|------|------|-------|-----------|
| 5-15 | 2315 | 3.41  | 985       | 6-11 | 0245 | 4.05  | 1,660     |
| 5-29 | 0915 | 3.83  | 1,430     | 6-23 | 0445 | 4.05  | 1,660     |

## 06191500 Yellowstone River at Corwin Springs, Mont.

LOCATION.--Lat 45°06'43", long 110°47'37", in SE¼NW¼ sec.30, T.8 S., R.8 E., Park County, on left bank 20 ft downstream from highway bridge at Corwin Springs, 1.3 miles upstream from Mol Herron Creek, 7 miles northwest of Gardiner, and at mile 530.5.

DRAINAGE AREA.--2,623 sq mi.

PERIOD OF RECORD.--August 1889 to November 1893 (published as "at Horr"), September 1910 to current year. Monthly discharge only for some periods, published in WSP 1309.

GAGE.--Water-stage recorder. Datum of gage is 5,079.09 ft above mean sea level. Aug. 12, 1889, to Nov. 4, 1893, nonrecording gages at site 2 miles upstream at different datums. Sept. 2, 1910, to Apr. 19, 1935, nonrecording gages on bridge at present datum.

AVERAGE DISCHARGE.--65 years, 3,097 cfs (16.03 inches per year, 2,244,000 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 25,200 cfs June 23 (gage height, 9.73 ft); minimum, 708 cfs Dec. 13 (gage height, 0.65), result of freezeup.

Period of record: Maximum discharge observed, 32,000 cfs June 14, 15, 1918 (gage height, 11.5 ft), from rating curve extended above 18,000 cfs; minimum observed, 389 cfs Feb. 23, Mar. 5, 9, 1937 (gage height, 0.05 ft).

REMARKS.--Records excellent. Natural storage in Yellowstone Lake. Diversions for irrigation of about 960 acres, of which 40 acres lies below station. Records of chemical analyses for the current year are published in Part 2 of this report.

REVISIONS (WATER YEARS).--WSP 1309: 1912. WSP 1509: 1889-94, 1911, 1913, 1916-18, 1920-21, 1925, 1927. WSP 1559: Drainage area.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT             | NOV        | DEC        | JAN     | FEB       | MAR      | APR             | MAY     | JUN     | JUL     | AUG     | SEP     |
|-------------|-----------------|------------|------------|---------|-----------|----------|-----------------|---------|---------|---------|---------|---------|
| 1           | 1,970           | 1,430      | 1,270      | 1,100   | 1,310     | 1,040    | 1,100           | 1,780   | 11,900  | 14,600  | 6,600   | 3,250   |
| 2           | 1,920           | 1,350      | 1,240      | 1,020   | 1,280     | 1,010    | 1,150           | 2,190   | 10,700  | 14,800  | 6,420   | 3,160   |
| 3           | 1,980           | 1,330      | 1,170      | 988     | 1,240     | 1,060    | 1,170           | 2,710   | 11,000  | 16,800  | 6,270   | 3,320   |
| 4           | 1,940           | 1,320      | 962        | 962     | 1,110     | 1,050    | 1,100           | 3,030   | 11,200  | 15,700  | 6,120   | 3,560   |
| 5           | 1,820           | 1,360      | 771        | 960     | 1,030     | 1,040    | 1,150           | 3,140   | 11,100  | 14,600  | 5,980   | 3,420   |
| 6           | 1,840           | 1,390      | 881        | 970     | 1,070     | 1,020    | 1,220           | 3,580   | 11,800  | 14,300  | 5,930   | 3,320   |
| 7           | 1,820           | 1,370      | 1,090      | 990     | 1,110     | 1,020    | 1,310           | 4,280   | 12,000  | 14,000  | 5,790   | 3,240   |
| 8           | 1,770           | 1,330      | 1,230      | 1,020   | 1,150     | 1,060    | 1,360           | 5,210   | 14,100  | 13,300  | 5,670   | 3,250   |
| 9           | 1,770           | 1,340      | 1,270      | 1,120   | 1,130     | 1,070    | 1,330           | 5,170   | 16,500  | 12,900  | 5,400   | 3,040   |
| 10          | 1,800           | 1,370      | 1,270      | 1,080   | 1,150     | 1,090    | 1,380           | 5,150   | 17,700  | 12,800  | 5,210   | 2,920   |
| 11          | 1,750           | 1,240      | 1,230      | 1,100   | 1,190     | 1,100    | 1,360           | 6,080   | 18,200  | 12,600  | 5,080   | 2,820   |
| 12          | 1,750           | 1,350      | 999        | 1,150   | 1,170     | 1,140    | 1,320           | 7,140   | 17,100  | 12,200  | 4,950   | 2,760   |
| 13          | 1,780           | 1,320      | 860        | 1,080   | 1,200     | 1,180    | 1,210           | 8,620   | 17,300  | 11,700  | 4,800   | 2,760   |
| 14          | 1,730           | 1,290      | 1,200      | 1,030   | 1,220     | 1,130    | 1,280           | 7,300   | 17,500  | 11,400  | 4,650   | 2,620   |
| 15          | 1,640           | 1,230      | 1,230      | 1,050   | 1,200     | 1,130    | 1,460           | 7,450   | 18,800  | 11,100  | 4,550   | 2,540   |
| 16          | 1,660           | 1,240      | 1,270      | 1,070   | 1,130     | 1,100    | 1,550           | 8,870   | 13,500  | 10,700  | 4,440   | 2,470   |
| 17          | 1,660           | 1,300      | 1,230      | 1,100   | 1,150     | 1,120    | 1,440           | 8,040   | 19,100  | 10,400  | 4,340   | 2,400   |
| 18          | 1,670           | 1,300      | 1,210      | 1,100   | 1,160     | 994      | 1,450           | 6,370   | 19,000  | 10,200  | 4,260   | 2,370   |
| 19          | 1,630           | 1,240      | 1,200      | 1,140   | 1,190     | 1,050    | 1,400           | 5,330   | 19,700  | 9,790   | 4,100   | 2,360   |
| 20          | 1,640           | 1,270      | 1,180      | 1,250   | 1,150     | 1,070    | 1,390           | 4,930   | 18,300  | 9,490   | 4,000   | 2,340   |
| 21          | 1,530           | 1,210      | 1,140      | 1,200   | 1,010     | 1,110    | 1,380           | 4,570   | 20,300  | 9,370   | 3,910   | 2,240   |
| 22          | 1,600           | 1,000      | 1,170      | 1,030   | 1,040     | 1,110    | 1,400           | 5,100   | 22,400  | 9,160   | 3,790   | 2,210   |
| 23          | 1,570           | 1,020      | 1,090      | 930     | 1,080     | 1,130    | 1,490           | 4,650   | 23,500  | 8,870   | 3,740   | 2,180   |
| 24          | 1,580           | 1,330      | 1,160      | 1,070   | 1,120     | 1,150    | 1,570           | 5,650   | 22,600  | 8,560   | 3,630   | 2,170   |
| 25          | 1,520           | 1,540      | 1,200      | 1,100   | 1,130     | 1,160    | 1,700           | 6,270   | 21,200  | 8,340   | 3,520   | 2,140   |
| 26          | 1,490           | 1,480      | 1,150      | 1,130   | 1,080     | 1,200    | 1,520           | 8,310   | 19,600  | 7,990   | 3,440   | 2,120   |
| 27          | 1,420           | 1,360      | 1,120      | 1,160   | 1,060     | 1,220    | 1,510           | 11,200  | 19,700  | 7,690   | 3,350   | 2,130   |
| 28          | 1,410           | 1,320      | 1,110      | 1,200   | 1,070     | 1,180    | 1,490           | 13,900  | 18,300  | 7,450   | 3,300   | 2,080   |
| 29          | 1,440           | 1,320      | 1,140      | 1,200   | -----     | 1,190    | 1,500           | 15,100  | 16,500  | 7,190   | 3,400   | 2,040   |
| 30          | 1,440           | 1,340      | 1,120      | 1,210   | -----     | 1,260    | 1,560           | 13,700  | 14,900  | 7,010   | 3,610   | 2,090   |
| 31          | 1,440           | -----      | 1,110      | 1,240   | -----     | 1,280    | -----           | 13,000  | -----   | 6,820   | 3,490   | -----   |
| TOTAL       | 51,440          | 39,430     | 35,183     | 33,754  | 31,380    | 34,444   | 41,390          | 208,310 | 510,600 | 341,830 | 143,740 | 79,320  |
| MEAN        | 1,675           | 1,314      | 1,135      | 1,089   | 1,142     | 1,111    | 1,380           | 6,720   | 17,020  | 11,030  | 4,637   | 2,644   |
| MAX         | 1,970           | 1,540      | 1,270      | 1,260   | 1,310     | 1,280    | 1,700           | 15,100  | 23,500  | 16,800  | 6,600   | 3,560   |
| MIN         | 1,410           | 1,000      | 771        | 930     | 1,010     | 994      | 1,100           | 1,780   | 10,700  | 6,820   | 3,300   | 2,040   |
| CFSM        | .64             | .50        | .43        | .42     | .44       | .42      | .53             | 2.56    | 6.49    | 4.21    | 1.77    | 1.01    |
| IN.         | .74             | .56        | .50        | .43     | .45       | .49      | .59             | 2.95    | 7.24    | 4.85    | 2.04    | 1.12    |
| AC-FT       | 103,000         | 79,210     | 69,790     | 66,460  | 63,430    | 68,320   | 82,100          | 413,200 | 1,013M  | 678,000 | 285,100 | 157,300 |
| CAL YR 1970 | TOTAL 1,298,623 | MEAN 3,558 | MAX 18,600 | MIN 680 | CFSM 1.36 | IN 18.42 | AC-FT 2,576,000 |         |         |         |         |         |
| WTR YR 1971 | TOTAL 1,551,925 | MEAN 4,252 | MAX 23,500 | MIN 771 | CFSM 1.62 | IN 22.01 | AC-FT 3,078,000 |         |         |         |         |         |

## PEAK DISCHARGE (BASE, 12,000 CFS)

| DATE | TIME | G.H.T. | DISCHARGE | DATE | TIME | G.H.T. | DISCHARGE |
|------|------|--------|-----------|------|------|--------|-----------|
| 5-29 | 0600 | 7.53   | 16,100    | 6-23 | 0500 | 9.73   | 25,200    |

## YELLOWSTONE RIVER BASIN

06192500 Yellowstone River near Livingston, Mont.

LOCATION.--Lat 45°35'50", long 110°33'55", in NE1/4NW1/4 sec.12, T.3 S., R.9 E., Park County, on right bank 50 ft downstream from bridge on former U.S. Highway 89, 2 miles downstream from Suce Creek, 4 miles south of Livingston, and at mile 481.3.

DRAINAGE AREA.--3,551 sq mi.

PERIOD OF RECORD.--May 1897 to December 1905, August 1928 to September 1932, October 1937 to current year. Monthly discharge only for some periods, published in WSP 1309.

GAGE.--Water-stage recorder. Datum of gage is 4,542.49 ft above mean sea level. May 2, 1897, to Dec. 31, 1905, nonrecording gage on highway bridge at different datum. Aug. 23, 1928, to Sept. 30, 1932, and Mar. 14, 1938, to Feb. 3, 1951, nonrecording gage on highway bridge at present datum.

AVERAGE DISCHARGE.--46 years, 3,715 cfs (2,692,000 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 29,200 cfs June 23 (gage height, 8.45 ft); minimum daily, 1,100 cfs Jan. 7, 12.

Period of record: Maximum discharge observed, 30,600 cfs June 20, 1943 (gage height, 9.34 ft); minimum daily, 590 cfs Jan. 22, 1940.

REMARKS.--Records good except those for winter period, which are poor. Diversions for irrigation of 24,200 acres of which 2,000 acres is below station. Records of chemical analyses and water temperatures for the current year are published in Part 2 of this report.

REVISIONS.--WSP 1309: 1899. WSP 1509: 1902. WSP 1629: Drainage area.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT                                                             | NOV     | DEC     | JAN    | FEB    | MAR    | APR     | MAY     | JUN     | JUL     | AUG     | SEP     |
|-------------|-----------------------------------------------------------------|---------|---------|--------|--------|--------|---------|---------|---------|---------|---------|---------|
| 1           | 2,710                                                           | 2,100   | 1,960   | 1,400  | 1,870  | 1,520  | 1,660   | 2,160   | 14,900  | 17,900  | 7,540   | 3,790   |
| 2           | 2,630                                                           | 2,070   | 1,870   | 1,250  | 1,840  | 1,440  | 1,550   | 2,550   | 13,300  | 17,900  | 7,260   | 3,670   |
| 3           | 2,600                                                           | 2,010   | 1,820   | 1,150  | 1,780  | 1,490  | 1,600   | 3,170   | 13,000  | 19,700  | 7,060   | 3,740   |
| 4           | 2,550                                                           | 1,980   | 1,690   | 1,150  | 1,670  | 1,550  | 1,580   | 3,720   | 13,200  | 19,700  | 6,990   | 4,130   |
| 5           | 2,530                                                           | 1,980   | 1,520   | 1,150  | 1,600  | 1,530  | 1,560   | 3,980   | 13,100  | 18,200  | 6,760   | 3,980   |
| 6           | 2,530                                                           | 2,030   | 1,440   | 1,150  | 1,560  | 1,510  | 1,630   | 4,280   | 13,800  | 17,600  | 6,650   | 3,910   |
| 7           | 2,560                                                           | 2,040   | 1,570   | 1,100  | 1,570  | 1,490  | 1,730   | 5,000   | 14,000  | 17,200  | 6,540   | 3,830   |
| 8           | 2,480                                                           | 2,010   | 1,710   | 1,150  | 1,640  | 1,510  | 1,850   | 6,050   | 15,900  | 16,300  | 6,430   | 3,910   |
| 9           | 2,500                                                           | 1,970   | 1,820   | 1,250  | 1,630  | 1,530  | 1,810   | 6,500   | 19,100  | 15,600  | 6,160   | 3,720   |
| 10          | 2,510                                                           | 2,010   | 1,820   | 1,200  | 1,630  | 1,540  | 1,840   | 6,330   | 21,000  | 15,500  | 5,960   | 3,580   |
| 11          | 2,500                                                           | 1,980   | 1,760   | 1,150  | 1,670  | 1,550  | 1,840   | 7,020   | 21,900  | 15,300  | 5,760   | 3,470   |
| 12          | 2,510                                                           | 1,950   | 1,670   | 1,100  | 1,680  | 1,560  | 1,780   | 8,220   | 21,300  | 14,800  | 5,610   | 3,400   |
| 13          | 2,550                                                           | 2,000   | 1,320   | 1,150  | 1,670  | 1,630  | 1,720   | 9,940   | 21,200  | 14,100  | 5,430   | 3,360   |
| 14          | 2,500                                                           | 1,940   | 1,430   | 1,250  | 1,690  | 1,610  | 1,680   | 9,940   | 21,600  | 13,600  | 5,260   | 3,300   |
| 15          | 2,390                                                           | 1,890   | 1,670   | 1,350  | 1,690  | 1,570  | 1,840   | 9,260   | 22,600  | 13,200  | 5,140   | 3,260   |
| 16          | 2,360                                                           | 1,880   | 1,760   | 1,500  | 1,680  | 1,570  | 2,030   | 10,100  | 22,400  | 12,800  | 5,030   | 3,210   |
| 17          | 2,360                                                           | 1,920   | 1,780   | 1,750  | 1,630  | 1,560  | 2,000   | 10,100  | 22,800  | 12,500  | 4,890   | 3,150   |
| 18          | 2,360                                                           | 1,940   | 1,700   | 1,940  | 1,630  | 1,530  | 1,950   | 8,260   | 22,600  | 12,300  | 4,830   | 3,130   |
| 19          | 2,360                                                           | 1,910   | 1,650   | 1,820  | 1,660  | 1,470  | 1,890   | 6,580   | 23,200  | 11,800  | 4,720   | 3,090   |
| 20          | 2,360                                                           | 1,870   | 1,550   | 1,890  | 1,640  | 1,530  | 1,850   | 5,890   | 22,300  | 11,300  | 4,560   | 3,070   |
| 21          | 2,300                                                           | 1,870   | 1,590   | 1,870  | 1,530  | 1,540  | 1,850   | 5,400   | 23,500  | 11,200  | 4,430   | 3,030   |
| 22          | 2,300                                                           | 1,700   | 1,660   | 1,630  | 1,470  | 1,560  | 1,870   | 5,550   | 25,600  | 10,900  | 4,350   | 2,970   |
| 23          | 2,270                                                           | 1,600   | 1,550   | 1,520  | 1,560  | 1,580  | 1,940   | 5,460   | 27,600  | 10,600  | 4,250   | 2,930   |
| 24          | 2,280                                                           | 1,850   | 1,600   | 1,570  | 1,570  | 1,610  | 2,040   | 5,760   | 27,000  | 10,200  | 4,150   | 2,890   |
| 25          | 2,250                                                           | 2,070   | 1,600   | 1,690  | 1,620  | 1,610  | 2,160   | 6,540   | 25,500  | 9,860   | 3,980   | 2,870   |
| 26          | 2,160                                                           | 2,180   | 1,600   | 1,690  | 1,560  | 1,610  | 2,180   | 8,540   | 24,000  | 9,460   | 3,930   | 2,860   |
| 27          | 2,150                                                           | 2,040   | 1,650   | 1,670  | 1,540  | 1,730  | 2,060   | 11,600  | 24,200  | 9,020   | 3,860   | 2,860   |
| 28          | 2,090                                                           | 2,000   | 1,650   | 1,710  | 1,510  | 1,610  | 1,980   | 15,300  | 23,000  | 8,700   | 3,790   | 2,820   |
| 29          | 2,120                                                           | 1,920   | 1,600   | 1,690  | -----  | 1,610  | 1,980   | 18,200  | 21,100  | 8,380   | 3,880   | 2,780   |
| 30          | 2,130                                                           | 1,950   | 1,500   | 1,720  | -----  | 1,670  | 2,030   | 17,500  | 18,900  | 8,060   | 4,030   | 2,800   |
| 31          | 2,130                                                           | -----   | 1,500   | 1,820  | -----  | 1,760  | -----   | 16,100  | -----   | 7,780   | 4,000   | -----   |
| TOTAL       | 74,030                                                          | 58,660  | 51,010  | 45,430 | 45,790 | 48,580 | 55,480  | 245,000 | 613,600 | 411,460 | 163,230 | 99,510  |
| MEAN        | 2,388                                                           | 1,955   | 1,645   | 1,465  | 1,635  | 1,567  | 1,849   | 7,903   | 20,450  | 13,270  | 5,265   | 3,317   |
| MAX         | 2,710                                                           | 2,180   | 1,960   | 1,940  | 1,870  | 1,760  | 2,180   | 18,200  | 27,600  | 19,700  | 7,540   | 4,130   |
| MIN         | 2,090                                                           | 1,600   | 1,320   | 1,100  | 1,470  | 1,440  | 1,550   | 2,160   | 13,000  | 7,780   | 3,790   | 2,780   |
| AC-FT       | 146,800                                                         | 116,400 | 101,200 | 90,110 | 90,820 | 96,360 | 110,000 | 486,000 | 1,217M  | 816,100 | 323,800 | 197,400 |
| CAL YR 1970 | TOTAL 1,628,220 MEAN 4,461 MAX 23,400 MIN 1,050 AC-FT 3,230,000 |         |         |        |        |        |         |         |         |         |         |         |
| WTR YR 1971 | TOTAL 1,911,780 MEAN 5,238 MAX 27,600 MIN 1,100 AC-FT 3,792,000 |         |         |        |        |        |         |         |         |         |         |         |

## PEAK DISCHARGE (BASE, 13,500 CFS)

NOTE.--Stage-discharge relation affected by ice Dec. 18 to Jan. 17.

| DATE | TIME | G.HT. | DISCHARGE | DATE | TIME | G.HT. | DISCHARGE |
|------|------|-------|-----------|------|------|-------|-----------|
| 5-29 | 1145 | 6.83  | 19,700    | 6-23 | 1345 | 8.45  | 29,200    |



06197500 Boulder River near Contact, Mont.

LOCATION.--Lat 45°33'17", long 110°12'00", in NW¼SE¼ sec.23, T.3 S., R.12 E., Sweet Grass County, Gallatin National Forest, on left bank 0.5 mile downstream from Boulder Falls, 3.4 miles north of Contact, 6 miles upstream from East Fork, 22 miles southwest of Big Timber, and at mile 28.8.

DRAINAGE AREA.--226 sq mi.

PERIOD OF RECORD.--May 1910 to October 1912, April 1913 to September 1916 (no winter records), April to August 1929, October 1950 to September 1969, September 1970 to September 1971. Monthly discharge only January to March 1912, published in WSP 1309, and February, March 1955, published in WSP 1729.

GAGE.--Water-stage recorder. Altitude of gage is 4,930 ft (from topographic map). Prior to July 15, 1951, non-recording gages at site 2.7 miles downstream at different datums.

AVERAGE DISCHARGE.--22 years, 382 cfs (22.95 inches per year, 276,800 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 5,590 cfs June 23 (gage height, 6.72 ft); minimum, 9.5 cfs Feb. 17 (gage height, 1.05 ft), result of freezeup, but may have been less during period of no gage-height record.

Period of record: Maximum discharge, 5,590 cfs June 23, 1971 (gage height, 6.72 ft); maximum gage height, 8.8 ft June 14, 1911, site and datum then in use; minimum, 4.2 cfs Feb. 27, 1961 (gage height, 0.86 ft), result of freezeup.

REMARKS.--Records good. Diversions for irrigation of about 10 acres above station. Records of chemical analyses, water temperatures, and suspended sediment loads for the current year are published in Part 2 of this report.

REVISIONS (WATER YEARS).--WSP 1509: 1910-11, 1915(M). WSP 1916: 1955.

## DISCHARGE IN CUBIC FEET PER SECOND, 1970

|                   |     |                   |     |                   |     |
|-------------------|-----|-------------------|-----|-------------------|-----|
| Sept.16 . . . . . | 187 | Sept.21 . . . . . | 194 | Sept.26 . . . . . | 169 |
| 17 . . . . .      | 178 | 22 . . . . .      | 181 | 27 . . . . .      | 166 |
| 18 . . . . .      | 175 | 23 . . . . .      | 178 | 28 . . . . .      | 163 |
| 19 . . . . .      | 172 | 24 . . . . .      | 181 | 29 . . . . .      | 158 |
| 20 . . . . .      | 200 | 25 . . . . .      | 169 | 30 . . . . .      | 155 |

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| CAY   | CCT   | NOV   | DEC   | JAN   | FEB   | MAR   | APR   | MAY    | JUN     | JUL    | AUG    | SEP    |
|-------|-------|-------|-------|-------|-------|-------|-------|--------|---------|--------|--------|--------|
| 1     | 150   | 113   | 88    | 72    | 113   | 56    | 60    | 117    | 1,160   | 1,570  | 554    | 233    |
| 2     | 148   | 105   | 86    | 65    | 102   | 54    | 57    | 155    | 1,040   | 1,820  | 542    | 214    |
| 3     | 145   | 98    | 85    | 66    | 92    | 58    | 60    | 222    | 1,100   | 2,480  | 548    | 241    |
| 4     | 140   | 96    | 84    | 60    | 66    | 64    | 57    | 265    | 1,150   | 2,170  | 625    | 288    |
| 5     | 135   | 111   | 82    | 60    | 60    | 60    | 60    | 310    | 1,200   | 1,900  | 572    | 274    |
| 6     | 135   | 111   | 98    | 62    | 55    | 60    | 69    | 360    | 1,360   | 1,960  | 566    | 265    |
| 7     | 135   | 105   | 90    | 64    | 65    | 60    | 72    | 404    | 1,340   | 1,990  | 578    | 278    |
| 8     | 140   | 102   | 88    | 67    | 75    | 62    | 79    | 482    | 1,790   | 1,700  | 542    | 288    |
| 9     | 140   | 100   | 87    | 67    | 78    | 62    | 76    | 482    | 2,320   | 1,590  | 494    | 245    |
| 10    | 145   | 109   | 78    | 67    | 79    | 62    | 87    | 442    | 2,610   | 1,770  | 454    | 225    |
| 11    | 150   | 96    | 66    | 67    | 79    | 62    | 79    | 494    | 2,770   | 1,810  | 420    | 208    |
| 12    | 150   | 107   | 60    | 60    | 79    | 62    | 78    | 610    | 2,490   | 1,620  | 398    | 200    |
| 13    | 155   | 102   | 55    | 55    | 81    | 67    | 69    | 776    | 2,700   | 1,540  | 371    | 190    |
| 14    | 150   | 98    | 83    | 50    | 79    | 62    | 78    | 812    | 2,820   | 1,470  | 350    | 184    |
| 15    | 140   | 94    | 85    | 52    | 78    | 60    | 94    | 707    | 2,990   | 1,420  | 340    | 181    |
| 16    | 135   | 100   | 83    | 54    | 71    | 59    | 100   | 828    | 2,770   | 1,380  | 340    | 181    |
| 17    | 135   | 100   | 81    | 58    | 66    | 56    | 94    | 741    | 3,180   | 1,410  | 325    | 181    |
| 18    | 130   | 100   | 74    | 63    | 74    | 56    | 90    | 622    | 2,880   | 1,400  | 315    | 172    |
| 19    | 130   | 96    | 67    | 70    | 69    | 57    | 85    | 530    | 3,200   | 1,260  | 296    | 175    |
| 20    | 130   | 96    | 67    | 68    | 66    | 64    | 85    | 500    | 2,930   | 1,110  | 278    | 169    |
| 21    | 128   | 90    | 79    | 64    | 60    | 60    | 85    | 459    | 3,570   | 1,080  | 265    | 160    |
| 22    | 126   | 72    | 80    | 66    | 71    | 53    | 92    | 426    | 4,240   | 1,000  | 253    | 158    |
| 23    | 126   | 62    | 75    | 68    | 71    | 60    | 92    | 388    | 4,640   | 948    | 245    | 155    |
| 24    | 126   | 115   | 71    | 70    | 72    | 62    | 98    | 415    | 4,210   | 895    | 237    | 150    |
| 25    | 120   | 117   | 74    | 68    | 66    | 60    | 142   | 494    | 3,760   | 880    | 222    | 145    |
| 26    | 115   | 102   | 74    | 66    | 66    | 62    | 122   | 720    | 3,390   | 769    | 214    | 148    |
| 27    | 113   | 96    | 74    | 63    | 57    | 67    | 109   | 1,140  | 3,490   | 714    | 208    | 145    |
| 28    | 105   | 94    | 72    | 66    | 56    | 62    | 107   | 1,610  | 2,630   | 674    | 204    | 140    |
| 29    | 124   | 96    | 74    | 71    | ----- | 60    | 107   | 1,990  | 1,990   | 636    | 222    | 140    |
| 30    | 122   | 98    | 72    | 79    | ----- | 66    | 107   | 1,560  | 1,590   | 603    | 301    | 142    |
| 31    | 115   | ----- | 74    | 117   | ----- | 69    | ----- | 1,260  | -----   | 590    | 261    | -----  |
| TOTAL | 4,138 | 2,981 | 2,406 | 2,046 | 2,046 | 1,884 | 2,590 | 20,321 | 77,310  | 42,159 | 11,544 | 5,875  |
| MEAN  | 133   | 99.4  | 77.6  | 66.1  | 73.1  | 60.8  | 86.3  | 656    | 2,577   | 1,360  | 372    | 196    |
| MAX   | 155   | 117   | 98    | 117   | 113   | 69    | 142   | 1,990  | 4,640   | 2,480  | 629    | 288    |
| MIN   | 105   | 62    | 55    | 50    | 55    | 53    | 57    | 117    | 1,040   | 590    | 204    | 140    |
| CFSM  | .59   | .44   | .34   | .25   | .32   | .27   | .38   | 2.90   | 11.4    | 6.02   | 1.65   | .87    |
| IN.   | .68   | .49   | .40   | .34   | .34   | .31   | .43   | 3.34   | 12.73   | 6.94   | 1.90   | .97    |
| AC-FT | 8,210 | 5,910 | 4,770 | 4,060 | 4,060 | 3,740 | 5,140 | 40,310 | 153,300 | 83,620 | 22,900 | 11,650 |

WTR YR 1971 TOTAL 175,303 MEAN 480 MAX 4,640 MIN 50 CFSM 2.12 IN 28.86 AC-FT 347,700

PEAK DISCHARGE (BASE, 2,200 CFS)

DATE TIME G.H.T. DISCHARGE DATE TIME G.H.T. DISCHARGE

6-23 0400 6.72 5,590 7-3 0900 5.24 2,730

## YELLOWSTONE RIVER BASIN

06200000 Boulder River at Big Timber, Mont.

LOCATION.--Lat 45°50'03", long 109°56'17", in NE 1/4 sec. 14, T.1 N., R.14 E., Sweet Grass County, on left bank at Old Boulder Bridge, 1 mile east of Big Timber and 1.6 miles upstream from mouth.

DRAINAGE AREA.--523 sq mi.

PERIOD OF RECORD.--April 1947 to December 1953, March 1955 to current year. Monthly discharge only for April 1947, published in WSP 1309.

GAGE.--Water-stage recorder. Altitude of gage is 4,060 ft (from topographic map).

AVERAGE DISCHARGE.--22 years, 603 cfs (436,900 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 8,000 cfs June 23 (gage height, 7.60 ft); minimum daily, 80 cfs Dec. 19.

Period of record: Maximum discharge, 9,840 cfs May 28, 1956 (gage height, 7.84 ft); minimum, 10 cfs about Aug. 26 or 27, 1961.

REMARKS.--Records good except those for winter period, which are poor. Diversion for irrigation of 13,300 acres, of which 250 acres is below station.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT           | NOV      | DEC       | JAN    | FEB           | MAR   | APR    | MAY    | JUN     | JUL     | AUG    | SEP    |
|-------------|---------------|----------|-----------|--------|---------------|-------|--------|--------|---------|---------|--------|--------|
| 1           | 290           | 211      | 190       | 130    | 228           | 120   | 171    | 396    | 2,240   | 2,730   | 804    | 330    |
| 2           | 283           | 205      | 180       | 125    | 240           | 110   | 155    | 452    | 2,060   | 3,040   | 774    | 302    |
| 3           | 275           | 191      | 180       | 115    | 199           | 177   | 152    | 555    | 2,090   | 3,990   | 750    | 366    |
| 4           | 258           | 183      | 185       | 110    | 149           | 157   | 149    | 656    | 2,280   | 3,840   | 834    | 505    |
| 5           | 258           | 193      | 179       | 125    | 125           | 127   | 149    | 728    | 2,340   | 3,280   | 768    | 480    |
| 6           | 273           | 201      | 225       | 135    | 120           | 151   | 159    | 776    | 2,640   | 3,270   | 744    | 460    |
| 7           | 278           | 197      | 203       | 145    | 140           | 146   | 183    | 837    | 2,540   | 3,390   | 816    | 475    |
| 8           | 268           | 191      | 195       | 165    | 160           | 152   | 218    | 921    | 3,170   | 2,860   | 738    | 500    |
| 9           | 268           | 187      | 195       | 160    | 187           | 143   | 199    | 984    | 4,200   | 2,660   | 649    | 470    |
| 10          | 278           | 201      | 181       | 150    | 207           | 145   | 209    | 949    | 4,670   | 2,860   | 589    | 433    |
| 11          | 270           | 191      | 154       | 140    | 268           | 142   | 213    | 963    | 5,060   | 3,030   | 525    | 398    |
| 12          | 290           | 189      | 135       | 130    | 197           | 140   | 205    | 1,100  | 4,650   | 2,720   | 464    | 378    |
| 13          | 311           | 191      | 120       | 120    | 209           | 154   | 189    | 1,390  | 4,790   | 2,470   | 433    | 362    |
| 14          | 278           | 185      | 140       | 110    | 191           | 154   | 189    | 1,610  | 5,010   | 2,370   | 406    | 342    |
| 15          | 255           | 179      | 170       | 120    | 181           | 140   | 207    | 1,420  | 5,170   | 2,250   | 386    | 354    |
| 16          | 255           | 181      | 150       | 140    | 169           | 140   | 243    | 1,480  | 4,810   | 2,190   | 390    | 366    |
| 17          | 253           | 179      | 130       | 160    | 145           | 140   | 235    | 1,430  | 5,430   | 2,150   | 374    | 366    |
| 18          | 248           | 191      | 110       | 180    | 171           | 119   | 235    | 1,230  | 5,000   | 2,260   | 354    | 362    |
| 19          | 248           | 201      | 80        | 210    | 155           | 133   | 220    | 1,060  | 5,500   | 1,990   | 338    | 354    |
| 20          | 245           | 197      | 95        | 200    | 155           | 148   | 215    | 956    | 5,160   | 1,780   | 320    | 366    |
| 21          | 240           | 199      | 115       | 195    | 100           | 146   | 215    | 879    | 6,040   | 1,680   | 292    | 374    |
| 22          | 238           | 150      | 130       | 190    | 120           | 125   | 283    | 865    | 6,560   | 1,590   | 280    | 350    |
| 23          | 235           | 110      | 110       | 225    | 187           | 137   | 308    | 812    | 7,300   | 1,480   | 274    | 330    |
| 24          | 238           | 220      | 120       | 255    | 145           | 146   | 326    | 824    | 6,830   | 1,370   | 250    | 320    |
| 25          | 238           | 250      | 140       | 235    | 169           | 148   | 496    | 900    | 6,110   | 1,340   | 200    | 309    |
| 26          | 215           | 210      | 170       | 190    | 143           | 148   | 464    | 1,220  | 5,460   | 1,180   | 190    | 306    |
| 27          | 213           | 190      | 165       | 185    | 127           | 193   | 408    | 1,880  | 6,260   | 1,070   | 188    | 302    |
| 28          | 205           | 180      | 160       | 179    | 100           | 157   | 384    | 2,710  | 5,060   | 1,010   | 188    | 286    |
| 29          | 223           | 170      | 150       | 177    | -----         | 148   | 388    | 3,530  | 3,670   | 938     | 210    | 277    |
| 30          | 220           | 180      | 140       | 187    | -----         | 191   | 388    | 3,010  | 2,910   | 910     | 451    | 280    |
| 31          | 215           | -----    | 135       | 211    | -----         | 240   | -----  | 2,480  | -----   | 861     | 415    | -----  |
| TOTAL       | 7,862         | 5,703    | 4,732     | 5,099  | 4,687         | 4,617 | 7,555  | 39,003 | 135,010 | 68,559  | 14,394 | 11,103 |
| MEAN        | 254           | 190      | 153       | 164    | 167           | 149   | 252    | 1,258  | 4,500   | 2,212   | 464    | 370    |
| MAX         | 311           | 250      | 225       | 255    | 268           | 240   | 496    | 3,530  | 7,300   | 3,990   | 834    | 505    |
| MIN         | 205           | 110      | 80        | 110    | 100           | 110   | 149    | 396    | 2,060   | 861     | 188    | 277    |
| AC-FT       | 15,590        | 11,310   | 9,390     | 10,110 | 9,300         | 9,160 | 14,990 | 77,360 | 267,800 | 136,000 | 28,550 | 22,020 |
| CAL YR 1970 | TOTAL 268,468 | MEAN 736 | MAX 6,000 | MIN 70 | AC-FT 532,500 |       |        |        |         |         |        |        |
| WTR YR 1971 | TOTAL 308,324 | MEAN 845 | MAX 7,300 | MIN 80 | AC-FT 611,600 |       |        |        |         |         |        |        |

## PEAK DISCHARGE (BASE, 3,000 CFS)

NOTE.--Stage-discharge relation affected by ice Dec. 12 to Jan. 26.

| DATE | TIME | G.HT. | DISCHARGE | DATE | TIME | G.HT. | DISCHARGE |
|------|------|-------|-----------|------|------|-------|-----------|
| 5-29 | 1045 | 5.85  | 3,830     | 7-3  | 1400 | 5.92  | 4,390     |
| 6-23 | 1130 | 7.60  | 8,000     |      |      |       |           |

## YELLOWSTONE RIVER BASIN

143

06202600 Stillwater River at Nye, Mont.

LOCATION.--Lat 45°26'16", long 109°47'27", in SE 1/4 sec. 31, T. 4 S., R. 16 E., Stillwater County, on right bank 250 ft downstream from West Fork, 0.8 mile northeast of Nye, and at mile 34.1.

DRAINAGE AREA.--337 sq mi.

PERIOD OF RECORD.--October 1969 to current year.

GAGE.--Water-stage recorder. Altitude of gage is 4,770 ft (from topographic map).

EXTREMES.--Current year: Maximum discharge, 6,070 cfs June 23 (gage height, 5.61 ft); minimum, 23 cfs Mar. 2, 15 (gage height, 1.23 ft), result of freezeup, but may have been less during period of ice effect.

Period of record: Maximum discharge, 6,390 cfs June 28, 1970 (gage height, 5.55 ft); minimum, 23 cfs Mar. 2, 15, 1971 (gage height, 1.23 ft), result of freezeup, but may have been less during period of ice effect.

REMARKS.--Records good. Diversions for irrigation of about 1,150 acres, of which 150 acres lies below station. Records of chemical analyses, water temperatures, and suspended sediment loads for the current year at site 4.8 miles downstream (see station 06202610) are published in Part 2 of this report.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY   | OCT    | NOV   | DEC   | JAN   | FEB   | MAR   | APR   | MAY    | JUN     | JUL     | AUG    | SEP    |
|-------|--------|-------|-------|-------|-------|-------|-------|--------|---------|---------|--------|--------|
| 1     | 268    | 177   | 144   | 120   | 137   | 90    | 72    | 201    | 1,310   | 1,920   | 772    | 448    |
| 2     | 264    | 158   | 144   | 110   | 124   | 46    | 65    | 250    | 1,220   | 2,240   | 772    | 395    |
| 3     | 250    | 154   | 140   | 100   | 121   | 127   | 72    | 310    | 1,310   | 3,220   | 812    | 460    |
| 4     | 240    | 154   | 144   | 90    | 109   | 95    | 65    | 351    | 1,440   | 2,780   | 919    | 490    |
| 5     | 246    | 173   | 140   | 95    | 105   | 77    | 70    | 395    | 1,480   | 2,430   | 847    | 460    |
| 6     | 259    | 164   | 151   | 100   | 100   | 70    | 74    | 436    | 1,600   | 2,400   | 829    | 478    |
| 7     | 255    | 165   | 148   | 110   | 124   | 97    | 79    | 484    | 1,660   | 2,420   | 796    | 508    |
| 8     | 250    | 162   | 140   | 120   | 137   | 90    | 84    | 534    | 2,240   | 2,100   | 788    | 541    |
| 9     | 246    | 158   | 137   | 130   | 124   | 84    | 82    | 534    | 2,900   | 1,990   | 740    | 478    |
| 10    | 246    | 162   | 127   | 115   | 116   | 87    | 90    | 508    | 3,220   | 2,150   | 675    | 448    |
| 11    | 236    | 144   | 124   | 105   | 112   | 87    | 92    | 569    | 3,500   | 2,200   | 639    | 412    |
| 12    | 246    | 153   | 109   | 95    | 109   | 84    | 84    | 668    | 3,200   | 2,020   | 590    | 395    |
| 13    | 250    | 158   | 119   | 100   | 118   | 90    | 87    | 856    | 3,430   | 1,900   | 632    | 373    |
| 14    | 232    | 140   | 134   | 110   | 112   | 79    | 84    | 937    | 3,500   | 1,840   | 527    | 367    |
| 15    | 218    | 144   | 127   | 120   | 109   | 80    | 87    | 883    | 3,690   | 1,800   | 520    | 351    |
| 16    | 228    | 151   | 137   | 130   | 95    | 77    | 112   | 973    | 3,450   | 1,740   | 514    | 345    |
| 17    | 216    | 158   | 130   | 140   | 85    | 72    | 103   | 928    | 3,760   | 1,730   | 503    | 340    |
| 18    | 223    | 151   | 134   | 151   | 57    | 74    | 103   | 780    | 3,470   | 1,870   | 484    | 320    |
| 19    | 218    | 137   | 140   | 140   | 95    | 44    | 95    | 653    | 3,780   | 1,660   | 460    | 320    |
| 20    | 214    | 151   | 110   | 144   | 87    | 79    | 95    | 590    | 3,570   | 1,520   | 442    | 330    |
| 21    | 210    | 144   | 130   | 127   | 74    | 72    | 95    | 527    | 4,220   | 1,430   | 418    | 310    |
| 22    | 205    | 171   | 110   | 110   | 103   | 72    | 134   | 508    | 4,520   | 1,400   | 400    | 295    |
| 23    | 201    | 133   | 100   | 115   | 97    | 74    | 124   | 466    | 5,200   | 1,290   | 400    | 291    |
| 24    | 201    | 189   | 125   | 120   | 100   | 74    | 162   | 444    | 4,940   | 1,220   | 389    | 277    |
| 25    | 189    | 193   | 150   | 120   | 90    | 74    | 340   | 555    | 4,460   | 1,220   | 362    | 273    |
| 26    | 181    | 162   | 160   | 120   | 95    | 79    | 223   | 804    | 3,840   | 1,120   | 345    | 273    |
| 27    | 164    | 154   | 160   | 124   | 90    | 79    | 177   | 1,310  | 3,880   | 1,010   | 335    | 264    |
| 28    | 167    | 162   | 150   | 120   | 100   | 72    | 182   | 1,880  | 3,160   | 955     | 335    | 259    |
| 29    | 205    | 154   | 140   | 115   | ----- | 72    | 180   | 2,270  | 2,330   | 874     | 373    | 250    |
| 30    | 193    | 152   | 135   | 125   | ----- | 74    | 184   | 1,770  | 1,980   | 847     | 520    | 264    |
| 31    | 149    | ----- | 130   | 134   | ----- | 82    | ----- | 1,410  | -----   | 812     | 514    | -----  |
| TOTAL | 5,914  | 4,703 | 4,169 | 3,655 | 2,961 | 2,573 | 3,517 | 23,824 | 92,260  | 54,108  | 17,659 | 11,015 |
| MEAN  | 223    | 157   | 134   | 118   | 105   | 83.0  | 117   | 769    | 3,075   | 1,745   | 570    | 367    |
| MAX   | 268    | 193   | 160   | 151   | 137   | 127   | 340   | 2,270  | 5,200   | 3,220   | 919    | 541    |
| MIN   | 164    | 121   | 100   | 90    | 78    | 72    | 65    | 201    | 1,220   | 812     | 335    | 250    |
| CFSM  | .65    | .47   | .40   | .35   | .31   | .25   | .35   | 2.28   | 9.12    | 5.18    | 1.69   | 1.09   |
| IN    | .76    | .52   | .46   | .40   | .33   | .28   | .39   | 2.63   | 10.18   | 5.97    | 1.95   | 1.22   |
| AC-FT | 13,710 | 9,340 | 8,270 | 7,250 | 5,370 | 5,100 | 6,980 | 47,250 | 183,000 | 107,300 | 35,020 | 21,850 |

CAL YR 1970 TOTAL 207,320 MEAN 568 MAX 5,450 MIN 50 CFSM 1.64 IN 22.89 AC-FT 411,200  
 WTR YR 1971 TOTAL 227,363 MEAN 623 MAX 5,200 MIN 65 CFSM 1.85 IN 25.10 AC-FT 451,000

## PEAK DISCHARGE (BASE, 2,000 CFS)

| DATE | TIME | G.H.T. | DISCHARGE | DATE | TIME | G.H.T. | DISCHARGE |
|------|------|--------|-----------|------|------|--------|-----------|
| 5-29 | 0700 | 4.20   | 2,430     | 7-3  | 1130 | 4.74   | 3,640     |
| 6-23 | 0500 | 5.61   | 6,070     |      |      |        |           |

## YELLOWSTONE RIVER BASIN

06204050 West Rosebud Creek near Roscoe, Mont.

LOCATION.--Lat 45°14'35", long 109°43'50", in NE¼ sec.10, T.7 S., R.16 E., Stillwater County, on left bank at Mystic Lake powerplant, 2 miles downstream from Mystic Lake, and 13 miles southwest of Roscoe.

DRAINAGE AREA.--52.1 sq mi.

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

GAGE.--Water-stage recorder and sharp-crested weir. Datum of gage is 6,535.60 ft above mean sea level.

AVERAGE DISCHARGE.--6 years, 132 cfs (34.41 inches per year, 95,630 acre-ft per year), adjusted for change in contents in Mystic Lake.

EXTREMES.--Current year: Maximum discharge, 785 cfs June 26, 27 (gage height, 2.97 ft); minimum daily, 48 cfs Mar. 11, 12, 22.

Period of record: Maximum discharge, 1,470 cfs June 28, 1970 (gage height, 4.30 ft); minimum daily, 2.5 cfs Apr. 3, 4, 6, 7, 1967.

REMARKS.--Records good. Flow regulated by Mystic Lake (see p. 184).

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY   | OCT   | NOV   | DEC   | JAN   | FEB   | MAR   | APR   | MAY   | JUN    | JUL    | AUG    | SEP    |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|--------|--------|--------|
| 1     | 80    | 78    | 78    | 77    | 75    | 74    | 49    | 58    | 183    | 328    | 292    | 272    |
| 2     | 80    | 77    | 77    | 77    | 77    | 74    | 51    | 62    | 183    | 322    | 263    | 227    |
| 3     | 78    | 77    | 77    | 77    | 74    | 74    | 49    | 65    | 180    | 500    | 238    | 216    |
| 4     | 77    | 78    | 78    | 77    | 72    | 66    | 49    | 68    | 186    | 686    | 252    | 224    |
| 5     | 80    | 78    | 78    | 77    | 74    | 61    | 49    | 66    | 188    | 602    | 346    | 224    |
| 6     | 83    | 78    | 77    | 77    | 74    | 61    | 49    | 65    | 188    | 546    | 352    | 180    |
| 7     | 81    | 78    | 77    | 77    | 72    | 62    | 52    | 71    | 193    | 510    | 343    | 178    |
| 8     | 81    | 78    | 78    | 78    | 72    | 54    | 52    | 85    | 199    | 493    | 334    | 178    |
| 9     | 81    | 78    | 80    | 78    | 71    | 51    | 52    | 92    | 204    | 451    | 319    | 180    |
| 10    | 80    | 78    | 78    | 78    | 71    | 49    | 49    | 114   | 204    | 451    | 307    | 178    |
| 11    | 81    | 78    | 78    | 77    | 72    | 48    | 52    | 142   | 202    | 500    | 289    | 178    |
| 12    | 80    | 77    | 78    | 77    | 74    | 48    | 52    | 144   | 199    | 542    | 269    | 167    |
| 13    | 80    | 78    | 78    | 77    | 72    | 49    | 53    | 152   | 202    | 510    | 258    | 175    |
| 14    | 80    | 80    | 78    | 77    | 71    | 51    | 51    | 152   | 199    | 451    | 244    | 175    |
| 15    | 80    | 78    | 78    | 75    | 72    | 49    | 53    | 147   | 202    | 444    | 238    | 175    |
| 16    | 80    | 80    | 78    | 74    | 71    | 49    | 54    | 149   | 210    | 472    | 232    | 173    |
| 17    | 80    | 77    | 78    | 74    | 72    | 51    | 52    | 144   | 216    | 493    | 232    | 173    |
| 18    | 78    | 77    | 78    | 75    | 72    | 49    | 52    | 139   | 213    | 558    | 232    | 175    |
| 19    | 81    | 78    | 78    | 74    | 71    | 51    | 54    | 139   | 216    | 578    | 213    | 173    |
| 20    | 80    | 78    | 78    | 74    | 72    | 51    | 54    | 137   | 218    | 554    | 204    | 173    |
| 21    | 80    | 77    | 75    | 75    | 74    | 49    | 52    | 134   | 221    | 514    | 202    | 170    |
| 22    | 80    | 78    | 78    | 74    | 74    | 48    | 52    | 110   | 224    | 486    | 202    | 170    |
| 23    | 77    | 77    | 78    | 74    | 74    | 49    | 52    | 99    | 224    | 430    | 199    | 170    |
| 24    | 78    | 78    | 77    | 75    | 74    | 51    | 56    | 101   | 405    | 405    | 170    | 167    |
| 25    | 80    | 80    | 77    | 75    | 74    | 51    | 57    | 105   | 746    | 402    | 137    | 170    |
| 26    | 78    | 80    | 75    | 74    | 74    | 49    | 54    | 110   | 760    | 402    | 180    | 170    |
| 27    | 80    | 80    | 77    | 75    | 74    | 49    | 53    | 132   | 730    | 364    | 180    | 170    |
| 28    | 78    | 78    | 77    | 74    | 74    | 51    | 53    | 160   | 546    | 340    | 180    | 170    |
| 29    | 78    | 77    | 77    | 72    | ----- | 49    | 52    | 173   | 381    | 310    | 183    | 167    |
| 30    | 80    | 78    | 75    | 75    | ----- | 49    | 53    | 191   | 328    | 295    | 188    | 167    |
| 31    | 80    | ----- | 75    | 77    | ----- | 51    | ----- | 186   | -----  | 295    | 263    | -----  |
| TOTAL | 2,470 | 2,342 | 2,399 | 2,347 | 2,043 | 1,668 | 1,562 | 3,692 | 8,550  | 14,234 | 7,541  | 5,485  |
| MEAN  | 79.7  | 78.1  | 77.4  | 75.7  | 73.0  | 53.8  | 52.1  | 119   | 285    | 459    | 243    | 183    |
| MAX   | 83    | 80    | 80    | 78    | 77    | 74    | 57    | 191   | 760    | 686    | 352    | 272    |
| MIN   | 77    | 77    | 75    | 72    | 71    | 48    | 49    | 58    | 180    | 295    | 137    | 167    |
| AC-FT | 4,900 | 4,650 | 4,760 | 4,660 | 4,050 | 3,310 | 3,100 | 7,320 | 16,960 | 28,230 | 14,960 | 10,880 |
| MEAN  | 55.0  | 36.3  | 27.8  | 23.3  | 20.2  | 14.6  | 23.4  | 144   | 568    | 465    | 250    | 132    |
| CFSM  | 1.06  | .70   | .53   | .45   | .39   | .28   | .45   | 2.76  | 10.90  | 8.93   | 4.80   | 2.53   |
| IN.   | 1.22  | .78   | .62   | .51   | .40   | .32   | .50   | 3.19  | 12.17  | 10.30  | 5.53   | 2.82   |
| AC-FT | 3,380 | 2,160 | 1,710 | 1,430 | 1,120 | 900   | 1,390 | 8,870 | 33,820 | 28,610 | 15,370 | 7,840  |

## OBSERVED

|             |       |        |      |     |     |       |     |    |       |         |
|-------------|-------|--------|------|-----|-----|-------|-----|----|-------|---------|
| CAL YR 1970 | TOTAL | 50,872 | MEAN | 139 | MAX | 1,340 | MIN | 27 | AC-FT | 100,900 |
| WTR YR 1971 | TOTAL | 54,333 | MEAN | 149 | MAX | 760   | MIN | 48 | AC-FT | 107,800 |

## ADJUSTED

|             |       |        |      |     |      |      |     |       |       |         |
|-------------|-------|--------|------|-----|------|------|-----|-------|-------|---------|
| CAL YR 1970 | TOTAL | 50,997 | MEAN | 140 | CFSM | 2.69 | IN. | 36.41 | AC-FT | 101,100 |
| WTR YR 1971 | TOTAL | 53,745 | MEAN | 147 | CFSM | 2.82 | IN. | 38.36 | AC-FT | 106,600 |

Adjusted for change in contents in Mystic Lake.

## YELLOWSTONE RIVER BASIN

145

06205000 Stillwater River near Absarokee, Mont.

LOCATION.--Lat 45°33'04", long 109°23'12", in NE1/4 sec.28, T.3 S., R.19 E., Stillwater County, on right bank 3 miles downstream from Rosebud Creek, 3.5 miles northeast of Absarokee, 9 miles southwest of Columbus, and at mile 10.8.

DRAINAGE AREA.--975 sq mi.

PERIOD OF RECORD.--July 1910 to September 1914 (no winter records), March 1935 to current year.

GAGE.--Water-stage recorder. Altitude of gage is 3,875 ft (from topographic map). Prior to Oct. 1, 1914, non-recording gage, and Mar. 26, 1935, to Sept. 30, 1942, nonrecording gage, at bridge 2 miles upstream at different datums.

AVERAGE DISCHARGE.--36 years (1935-71), 945 cfs (684,700 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 8,660 cfs June 23 (gage height, 6.27 ft); minimum, 218 cfs Mar. 22 (gage height, 0.95 ft); but may have been less during period of no gage-height record.

Period of record: Maximum discharge, 12,000 cfs June 15, 1967 (gage height, 7.17 ft); minimum observed, 58 cfs Apr. 2, 1936.

REMARKS.--Records good. Flow partly regulated by Mystic Lake (see p. 184). Diversions for irrigation of about 24,300 acres, of which 400 acres lies below station.

REVISIONS (WATER YEARS).--WSP 1309: 1911(M). WSP 1729: Drainage area.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT           | NOV        | DEC       | JAN     | FEB           | MAR    | APR    | MAY    | JUN     | JUL     | AUG    | SEP    |
|-------------|---------------|------------|-----------|---------|---------------|--------|--------|--------|---------|---------|--------|--------|
| 1           | 673           | 480        | 425       | 330     | 480           | 303    | 292    | 803    | 2,570   | 2,940   | 1,500  | 1,380  |
| 2           | 673           | 463        | 390       | 320     | 469           | 267    | 285    | 878    | 2,380   | 3,180   | 1,450  | 1,200  |
| 3           | 659           | 447        | 395       | 270     | 362           | 295    | 288    | 974    | 2,380   | 4,680   | 1,410  | 1,440  |
| 4           | 645           | 436        | 390       | 300     | 303           | 335    | 278    | 1,010  | 2,550   | 5,010   | 1,530  | 1,570  |
| 5           | 617           | 463        | 358       | 310     | 284           | 281    | 274    | 1,070  | 2,630   | 4,200   | 1,550  | 1,390  |
| 6           | 645           | 469        | 458       | 320     | 295           | 278    | 285    | 1,100  | 2,810   | 3,860   | 1,610  | 1,290  |
| 7           | 666           | 452        | 420       | 330     | 323           | 281    | 311    | 1,200  | 2,810   | 3,900   | 1,610  | 1,320  |
| 8           | 631           | 447        | 410       | 330     | 366           | 299    | 335    | 1,220  | 3,390   | 3,580   | 1,600  | 1,400  |
| 9           | 624           | 441        | 390       | 300     | 385           | 285    | 319    | 1,240  | 4,280   | 3,370   | 1,500  | 1,300  |
| 10          | 624           | 469        | 380       | 330     | 395           | 285    | 327    | 1,200  | 4,760   | 3,460   | 1,390  | 1,220  |
| 11          | 617           | 436        | 340       | 310     | 827           | 281    | 323    | 1,250  | 5,230   | 3,630   | 1,300  | 1,150  |
| 12          | 673           | 458        | 311       | 280     | 710           | 288    | 311    | 1,370  | 4,900   | 3,560   | 1,220  | 1,080  |
| 13          | 688           | 441        | 303       | 260     | 695           | 331    | 292    | 1,600  | 5,100   | 3,320   | 1,170  | 1,050  |
| 14          | 631           | 430        | 349       | 290     | 509           | 295    | 295    | 1,850  | 5,140   | 3,170   | 1,110  | 1,010  |
| 15          | 604           | 415        | 415       | 340     | 410           | 257    | 319    | 1,750  | 5,390   | 3,090   | 1,080  | 1,010  |
| 16          | 591           | 430        | 358       | 370     | 344           | 267    | 349    | 1,810  | 4,970   | 3,060   | 1,070  | 1,010  |
| 17          | 571           | 425        | 376       | 400     | 311           | 267    | 340    | 1,780  | 5,320   | 3,040   | 1,050  | 1,030  |
| 18          | 565           | 420        | 340       | 430     | 358           | 242    | 358    | 1,580  | 5,060   | 3,300   | 1,050  | 983    |
| 19          | 552           | 400        | 295       | 500     | 331           | 251    | 344    | 1,360  | 5,390   | 3,170   | 1,010  | 956    |
| 20          | 545           | 410        | 327       | 600     | 319           | 267    | 353    | 1,230  | 5,250   | 2,910   | 938    | 1,000  |
| 21          | 533           | 415        | 323       | 520     | 271           | 288    | 358    | 1,200  | 6,190   | 2,810   | 878    | 965    |
| 22          | 527           | 335        | 395       | 470     | 292           | 239    | 584    | 1,260  | 6,870   | 2,840   | 844    | 920    |
| 23          | 515           | 315        | 327       | 420     | 349           | 257    | 652    | 1,140  | 7,800   | 2,660   | 819    | 895    |
| 24          | 509           | 485        | 344       | 390     | 315           | 267    | 617    | 1,080  | 7,440   | 2,410   | 795    | 861    |
| 25          | 497           | 533        | 385       | 405     | 331           | 311    | 1,200  | 1,100  | 6,750   | 2,380   | 755    | 827    |
| 26          | 480           | 463        | 395       | 395     | 292           | 344    | 983    | 1,330  | 6,240   | 2,330   | 718    | 835    |
| 27          | 491           | 458        | 400       | 395     | 267           | 349    | 811    | 1,950  | 6,110   | 2,080   | 703    | 811    |
| 28          | 463           | 430        | 380       | 390     | 267           | 319    | 779    | 2,820  | 5,440   | 1,910   | 688    | 787    |
| 29          | 527           | 452        | 360       | 380     | -----         | 285    | 795    | 3,560  | 4,070   | 1,760   | 803    | 779    |
| 30          | 503           | 436        | 350       | 400     | -----         | 311    | 795    | 3,300  | 3,200   | 1,610   | 1,300  | 795    |
| 31          | 497           | -----      | 340       | 430     | -----         | 367    | -----  | 2,930  | -----   | 1,550   | 1,530  | -----  |
| TOTAL       | 18,036        | 13,154     | 11,429    | 11,545  | 10,860        | 8,992  | 13,852 | 47,945 | 142,420 | 94,770  | 35,981 | 32,264 |
| MEAN        | 582           | 438        | 369       | 372     | 388           | 290    | 462    | 1,547  | 4,747   | 3,057   | 1,161  | 1,075  |
| MAX         | 688           | 533        | 458       | 600     | 827           | 367    | 1,200  | 3,560  | 7,800   | 5,010   | 1,610  | 1,570  |
| MIN         | 463           | 315        | 295       | 260     | 267           | 239    | 274    | 803    | 2,380   | 1,550   | 688    | 779    |
| AC-FT       | 35,770        | 26,090     | 22,670    | 22,900  | 21,540        | 17,840 | 27,480 | 95,100 | 282,500 | 188,000 | 71,370 | 64,000 |
| CAL YR 1970 | TOTAL 435,168 | MEAN 1,192 | MAX 9,310 | MIN 125 | AC-FT 863,200 |        |        |        |         |         |        |        |
| WTR YR 1971 | TOTAL 441,248 | MEAN 1,209 | MAX 7,800 | MIN 239 | AC-FT 875,200 |        |        |        |         |         |        |        |

## PEAK DISCHARGE (BASE, 4,400 CFS)

| DATE | TIME | G.HT. | DISCHARGE | DATE | TIME | G.HT. | DISCHARGE |
|------|------|-------|-----------|------|------|-------|-----------|
| 6-23 | 1015 | 6.27  | 8,660     | 7-3  | 1600 | 5.14  | 5,420     |



## YELLOWSTONE RIVER BASIN

06207500 Clarks Fork Yellowstone River near Belfry, Mont.

LOCATION.--Lat 45°00'40", long 109°04'00", in E<sup>1</sup>NE<sup>1</sup>4 sec.31, T.9 S., R.22 E., Carbon County, on left bank 0.4 mile upstream from county road bridge and Big Sand Coulee, 0.8 mile north of Wyoming-Montana State line, 9.5 miles southwest of Belfry, and at mile 78.5.

DRAINAGE AREA.--1,154 sq mi.

PERIOD OF RECORD.--July 1921 to current year. Monthly discharge only for some periods, published in WSP 1309. Published as Clarks Fork at Chance prior to October 1956 and as Clarks Fork Yellowstone River at Chance October 1956 to September 1968.

GAGE.--Water-stage recorder. Altitude of gage is 3,980 ft (from topographic map). Prior to Nov. 15, 1934, nonrecording gage, and Nov. 15, 1934, to July 26, 1951, water-stage recorder at bridge 0.4 mile downstream at different datum. July 27, 1951, to Sept. 30, 1953, water-stage recorder at present site at datum 6.98 ft higher.

AVERAGE DISCHARGE.--50 years, 941 cfs (681,800 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 10,200 cfs June 23 (gage height, 8.09 ft); minimum, 168 cfs Mar. 2 (gage height, 1.05 ft).

Period of record: Maximum discharge observed, 10,900 cfs May 26, 1928 (gage height, 6.5 ft, site and datum then in use); minimum observed, 32 cfs Apr. 26, 1961, result of discharge measurement.

REMARKS.--Records good. Diversions for irrigation of about 11,100 acres above station. Records of chemical analyses for the current year are published in Part 2 of this report.

REVISIONS (WATER YEARS).--WSP 1309: 1922(M). WSP 1729: Drainage area.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT           | NOV        | DEC       | JAN     | FEB           | MAR    | APR    | MAY     | JUN     | JUL     | AUG    | SEP    |
|-------------|---------------|------------|-----------|---------|---------------|--------|--------|---------|---------|---------|--------|--------|
| 1           | 423           | 275        | 382       | 284     | 417           | 210    | 256    | 475     | 4,100   | 3,460   | 1,680  | 939    |
| 2           | 398           | 273        | 367       | 255     | 395           | 210    | 232    | 698     | 3,680   | 3,840   | 1,590  | 811    |
| 3           | 381           | 281        | 371       | 230     | 357           | 210    | 240    | 1,040   | 3,590   | 4,710   | 1,610  | 920    |
| 4           | 364           | 257        | 371       | 225     | 301           | 220    | 228    | 1,290   | 3,880   | 5,080   | 1,750  | 1,170  |
| 5           | 351           | 263        | 354       | 225     | 271           | 220    | 217    | 1,430   | 3,760   | 4,430   | 1,730  | 956    |
| 6           | 356           | 285        | 385       | 230     | 250           | 222    | 236    | 1,500   | 3,610   | 4,270   | 1,760  | 873    |
| 7           | 366           | 291        | 374       | 235     | 230           | 225    | 297    | 1,400   | 3,700   | 4,490   | 1,600  | 776    |
| 8           | 357           | 280        | 368       | 240     | 250           | 233    | 335    | 1,840   | 4,580   | 4,200   | 1,530  | 820    |
| 9           | 359           | 269        | 361       | 220     | 321           | 231    | 348    | 1,780   | 5,840   | 3,910   | 1,480  | 733    |
| 10          | 356           | 279        | 346       | 210     | 326           | 234    | 394    | 1,600   | 6,340   | 4,020   | 1,360  | 677    |
| 11          | 346           | 272        | 301       | 200     | 357           | 232    | 423    | 1,800   | 6,750   | 4,260   | 1,280  | 635    |
| 12          | 343           | 270        | 250       | 205     | 316           | 239    | 363    | 2,260   | 6,370   | 4,290   | 1,190  | 583    |
| 13          | 401           | 313        | 215       | 210     | 346           | 247    | 319    | 2,860   | 6,500   | 4,080   | 1,120  | 530    |
| 14          | 372           | 290        | 250       | 220     | 326           | 230    | 303    | 2,850   | 6,520   | 4,000   | 1,030  | 503    |
| 15          | 346           | 273        | 306       | 230     | 311           | 221    | 414    | 2,590   | 7,080   | 3,940   | 969    | 485    |
| 16          | 323           | 292        | 316       | 250     | 284           | 224    | 545    | 2,810   | 6,830   | 3,870   | 928    | 468    |
| 17          | 323           | 306        | 336       | 316     | 255           | 221    | 461    | 2,750   | 7,180   | 3,840   | 887    | 454    |
| 18          | 322           | 309        | 301       | 306     | 263           | 206    | 442    | 2,200   | 7,260   | 3,910   | 857    | 435    |
| 19          | 322           | 295        | 280       | 316     | 276           | 209    | 402    | 1,700   | 7,490   | 3,780   | 824    | 406    |
| 20          | 315           | 292        | 270       | 417     | 267           | 228    | 370    | 1,440   | 6,720   | 3,440   | 770    | 385    |
| 21          | 292           | 302        | 260       | 341     | 210           | 224    | 347    | 1,250   | 7,750   | 3,150   | 734    | 368    |
| 22          | 289           | 230        | 240       | 306     | 200           | 214    | 374    | 1,180   | 8,590   | 3,020   | 699    | 348    |
| 23          | 291           | 200        | 235       | 276     | 210           | 227    | 410    | 1,060   | 9,600   | 2,950   | 679    | 318    |
| 24          | 294           | 358        | 230       | 311     | 230           | 234    | 446    | 1,130   | 9,460   | 2,690   | 662    | 302    |
| 25          | 288           | 437        | 235       | 326     | 240           | 240    | 956    | 1,370   | 8,590   | 2,690   | 623    | 290    |
| 26          | 265           | 438        | 240       | 341     | 210           | 249    | 565    | 2,100   | 7,670   | 2,620   | 588    | 283    |
| 27          | 251           | 402        | 250       | 362     | 200           | 305    | 498    | 3,140   | 6,740   | 2,470   | 561    | 281    |
| 28          | 239           | 393        | 260       | 357     | 200           | 255    | 465    | 4,280   | 5,760   | 2,220   | 543    | 277    |
| 29          | 265           | 404        | 260       | 351     | -----         | 233    | 465    | 5,070   | 4,500   | 2,040   | 561    | 273    |
| 30          | 273           | 396        | 267       | 341     | -----         | 256    | 444    | 4,700   | 3,600   | 1,890   | 867    | 283    |
| 31          | 271           | -----      | 288       | 341     | -----         | 346    | -----  | 4,540   | -----   | 1,800   | 955    | -----  |
| TOTAL       | 10,142        | 9,225      | 9,269     | 8,677   | 7,819         | 7,255  | 11,795 | 66,133  | 184,040 | 109,360 | 33,417 | 16,582 |
| MEAN        | 327           | 308        | 299       | 280     | 279           | 234    | 393    | 2,133   | 6,135   | 3,528   | 1,078  | 553    |
| MAX         | 423           | 438        | 385       | 417     | 417           | 346    | 956    | 5,070   | 9,600   | 5,080   | 1,760  | 1,170  |
| MIN         | 239           | 200        | 215       | 200     | 200           | 206    | 217    | 475     | 3,590   | 1,800   | 543    | 273    |
| AC-FT       | 20,120        | 18,300     | 18,390    | 17,210  | 15,510        | 14,390 | 23,400 | 131,200 | 365,000 | 216,900 | 66,280 | 32,890 |
| CAL YR 1970 | TOTAL 383,722 | MEAN 1,051 | MAX 8,040 | MIN 120 | AC-FT 761,100 |        |        |         |         |         |        |        |
| WTR YR 1971 | TOTAL 473,714 | MEAN 1,298 | MAX 9,600 | MIN 200 | AC-FT 939,600 |        |        |         |         |         |        |        |

## PEAK DISCHARGE (BASE, 5,400 CFS)

| DATE | TIME | G.HT. | DISCHARGE | DATE | TIME | G.HT. | DISCHARGE |
|------|------|-------|-----------|------|------|-------|-----------|
| 6-23 | 0700 | 8.09  | 10,200    | 7-4  | 0500 | 5.63  | 5,470     |

## YELLOWSTONE RIVER BASIN

147

06207540 Silver Tip Creek near Belfry, Mont.

LOCATION.--Lat 45°09'30", long 108°58'30", in N½ sec.12, T.8 S., R.22 E., Carbon County, 2.0 miles upstream from mouth and 2.0 miles northeast of Belfry.

DRAINAGE AREA.--87.6 sq mi.

PERIOD OF RECORD.--October 1967 to current year.

GAGE.--Water-stage recorder. Altitude of gage is 3,900 ft (from topographic map). Prior to May 12, 1971, at datum 1.00 ft higher.

EXTREMES.--Current year: Maximum discharge, about 20 cfs Feb. 13; maximum gage height, 4.37 ft Feb. 13 (back-water from ice); no flow at times.

Period of record: Maximum discharge, 571 cfs June 25, 1969 (gage height, 8.56 ft); maximum gage height, 8.80 ft (from floodmark) Aug. 22, 1968; no flow at times.

REMARKS.--Records poor. Flow affected by oil recovery operations in Elk Basin oil field. No diversions above station. Records of chemical analyses, water temperatures, and suspended sediment loads for current year are published in Part 2 of this report.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY   | OCT   | NOV   | DEC  | JAN | FEB   | MAR   | APR   | MAY   | JUN   | JUL  | AUG  | SEP   |
|-------|-------|-------|------|-----|-------|-------|-------|-------|-------|------|------|-------|
| 1     | .09   | .70   | .30  |     | 0     | 0     | 2.1   | 0     | 1.9   | .53  | 0    | 1.1   |
| 2     | .10   | .50   | .40  |     | 0     | 0     | 2.5   | 0     | 4.6   | .65  | .04  | .54   |
| 3     | .50   | .18   | .50  |     | 0     | 0     | 1.4   | 0     | 1.1   | 1.3  | .05  | 2.7   |
| 4     | .66   | .64   | .40  |     | 0     | 0     | 1.3   | 0     | .75   | .75  | 0    | 7.4   |
| 5     | .62   | 1.6   | .30  |     | 0     | 0     | 1.3   | .22   | .08   | .35  | 0    | 1.5   |
| 6     | .66   | 1.0   | .40  |     | 0     | 0     | 1.5   | 0     | .04   | .20  | .88  | .92   |
| 7     | .62   | .80   | .50  |     | 0     | 0     | 1.1   | 0     | .22   | 0    | 0    | .75   |
| 8     | .62   | .66   | .50  |     | 0     | .20   | .80   | 0     | .31   | 0    | 0    | .68   |
| 9     | .70   | .85   | .40  |     | 0     | 3.0   | .40   | .16   | .32   | .19  | 0    | .58   |
| 10    | .90   | 1.1   | .35  |     | 0     | 9.0   | .30   | 0     | .03   | 0    | 0    | .32   |
| 11    | 1.2   | .75   | .20  |     | 0     | 13    | .20   | 0     | 0     | 0    | 0    | .40   |
| 12    | 1.3   | 1.1   | 0    |     | .10   | 8.0   | .30   | .15   | .05   | 0    | 0    | .05   |
| 13    | 1.3   | .85   | 0    |     | 17    | 4.5   | .40   | 0     | .01   | 0    | 0    | .36   |
| 14    | .66   | .50   | 0    |     | 16    | 3.5   | .50   | 0     | 0     | 0    | 0    | .10   |
| 15    | .34   | .62   | 0    |     | 16    | 2.5   | .46   | 0     | 0     | 0    | 0    | .44   |
| 16    | .66   | 1.2   | 0    |     | 5.0   | 1.5   | .46   | 0     | .11   | 0    | 0    | .58   |
| 17    | .66   | .85   | 0    |     | 1.0   | .50   | .46   | 0     | .19   | .07  | 0    | 1.1   |
| 18    | 1.1   | 1.0   | 0    |     | .90   | 0     | .46   | .40   | .19   | .04  | 0    | 1.1   |
| 19    | 1.1   | 1.1   | 0    |     | .70   | .10   | .42   | .38   | .38   | 0    | .05  | 1.1   |
| 20    | 1.3   | 1.4   | 0    |     | .50   | .30   | .75   | .33   | .15   | 0    | .09  | 1.4   |
| 21    | .70   | .40   | 0    |     | .40   | .20   | .80   | .33   | .06   | 0    | .04  | 1.8   |
| 22    | .62   | 0     | 0    |     | .30   | 0     | 1.4   | 4.9   | .10   | .16  | .12  | 1.2   |
| 23    | .50   | 0     | 0    |     | .20   | 0     | 1.7   | 4.7   | .18   | .43  | .12  | 1.3   |
| 24    | .66   | .05   | 0    |     | 0     | 1.0   | 1.3   | .92   | .03   | .07  | 0    | 1.5   |
| 25    | .62   | .30   | 0    |     | 0     | 2.3   | 1.6   | .56   | .02   | 0    | .24  | 1.3   |
| 26    | .46   | 0     | 0    |     | 0     | 2.3   | 1.9   | .13   | .06   | 0    | .34  | 1.5   |
| 27    | .34   | 0     | 0    |     | 0     | 2.5   | 2.2   | .09   | .29   | 0    | .25  | 1.3   |
| 28    | .58   | 0     | 0    |     | 0     | 2.1   | .54   | .02   | .40   | 0    | .44  | 1.5   |
| 29    | 1.1   | .10   | 0    |     | ----- | 2.1   | .05   | 0     | .25   | .23  | .63  | 1.4   |
| 30    | .90   | .30   | 0    |     | ----- | 2.1   | .14   | .72   | .35   | .36  | 1.9  | 1.6   |
| 31    | .90   | ----- | 0    |     | ----- | 2.5   | ----- | 1.5   | ----- | .12  | 1.1  | ----- |
| TOTAL | 22.47 | 18.55 | 4.25 | 0   | 58.10 | 63.20 | 28.74 | 15.51 | 12.17 | 5.45 | 6.29 | 37.52 |
| MEAN  | .72   | .62   | .14  | 0   | 2.08  | 2.04  | .96   | .50   | .41   | .18  | .20  | 1.25  |
| MAX   | 1.3   | 1.6   | .50  | 0   | 17    | 13    | 2.5   | 4.9   | 4.6   | 1.3  | 1.9  | 7.4   |
| MIN   | .09   | 0     | 0    | 0   | 0     | 0     | .05   | 0     | 0     | 0    | 0    | .05   |
| AC-FT | 45    | 37    | 8.4  | 0   | 115   | 125   | 57    | 31    | 24    | 11   | 12   | 74    |

CAL YR 1970 TOTAL 342.36 MEAN .94 MAX 50 MIN 0 AC-FT 679  
WTR YR 1971 TOTAL 272.25 MEAN .75 MAX 17 MIN 0 AC-FT 540

PEAK DISCHARGE (BASE, 60 CFS).--No peak above base.

## YELLOWSTONE RIVER BASIN

06208800 Clarks Fork Yellowstone River near Silesia, Mont.

LOCATION.--Lat 45°30'48", long 108°49'41", in NE $\frac{1}{4}$ SE $\frac{1}{4}$  sec.1, T.4 S., R.23 E., Carbon County, 0.5 mile downstream from Whitehorse Canal intake, 1 mile upstream from Rock Creek, 3 miles south of Silesia, and at mile 19.0.

DRAINAGE AREA.--2,093 sq mi.

PERIOD OF RECORD.--October 1969 to current year.

GAGE.--Water-stage recorder. Altitude of gage is 3,410 ft (from topographic map).

EXTREMES.--Current year: Maximum discharge, 10,200 cfs June 24 (gage height, 7.38 ft); minimum daily, 220 cfs Jan. 14.

Period of record: Maximum discharge, 10,200 cfs June 24, 1971 (gage height, 7.38 ft); minimum, 165 cfs Aug. 27, 28, 1970 (gage height, 1.38 ft).

REMARKS.--Records good except those for winter period, which are poor. Diversions for irrigation of about 42,600 acres, of which about 1,100 acres lies below station. In addition about 9,000 acres of land above station are irrigated by diversions from adjoining Rock Creek basin.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT           | NOV    | DEC        | JAN    | FEB       | MAR    | APR     | MAY     | JUN             | JUL     | AUG    | SEP    |
|-------------|---------------|--------|------------|--------|-----------|--------|---------|---------|-----------------|---------|--------|--------|
| 1           | 801           | 516    | 559        | 400    | 425       | 350    | 491     | 554     | 4,400           | 2,720   | 1,740  | 1,060  |
| 2           | 753           | 512    | 548        | 390    | 440       | 320    | 399     | 608     | 3,970           | 2,860   | 1,640  | 1,020  |
| 3           | 711           | 525    | 534        | 380    | 430       | 340    | 367     | 910     | 3,610           | 3,470   | 1,510  | 1,100  |
| 4           | 674           | 514    | 532        | 360    | 420       | 370    | 361     | 1,210   | 3,700           | 4,720   | 1,510  | 1,810  |
| 5           | 663           | 491    | 525        | 340    | 390       | 450    | 340     | 1,450   | 3,780           | 4,160   | 1,550  | 1,560  |
| 6           | 659           | 505    | 546        | 350    | 360       | 440    | 319     | 1,510   | 3,610           | 3,680   | 1,540  | 1,430  |
| 7           | 668           | 521    | 539        | 350    | 380       | 461    | 356     | 1,510   | 3,560           | 3,700   | 1,510  | 1,330  |
| 8           | 668           | 527    | 537        | 360    | 425       | 444    | 433     | 1,640   | 3,990           | 3,650   | 1,520  | 1,280  |
| 9           | 669           | 511    | 531        | 360    | 450       | 416    | 455     | 1,850   | 5,250           | 3,310   | 1,480  | 1,260  |
| 10          | 673           | 512    | 530        | 330    | 480       | 427    | 449     | 1,730   | 6,100           | 3,240   | 1,340  | 1,170  |
| 11          | 650           | 507    | 525        | 300    | 500       | 444    | 503     | 1,690   | 6,660           | 3,490   | 1,290  | 1,100  |
| 12          | 648           | 496    | 487        | 260    | 520       | 461    | 509     | 2,060   | 6,660           | 3,680   | 1,210  | 1,010  |
| 13          | 657           | 479    | 466        | 230    | 550       | 509    | 455     | 2,560   | 6,500           | 3,520   | 1,100  | 950    |
| 14          | 696           | 505    | 393        | 220    | 540       | 467    | 410     | 2,810   | 6,580           | 3,360   | 1,030  | 892    |
| 15          | 661           | 483    | 400        | 225    | 530       | 410    | 405     | 2,600   | 6,900           | 3,340   | 1,040  | 865    |
| 16          | 645           | 466    | 460        | 300    | 520       | 377    | 497     | 2,540   | 7,020           | 3,280   | 1,000  | 865    |
| 17          | 618           | 484    | 450        | 425    | 500       | 377    | 594     | 2,670   | 7,050           | 3,240   | 883    | 874    |
| 18          | 616           | 499    | 350        | 470    | 490       | 361    | 541     | 2,320   | 7,320           | 3,410   | 802    | 865    |
| 19          | 613           | 509    | 270        | 480    | 480       | 345    | 534     | 1,780   | 7,440           | 3,450   | 757    | 820    |
| 20          | 609           | 498    | 300        | 500    | 470       | 345    | 503     | 1,430   | 7,110           | 3,210   | 706    | 793    |
| 21          | 602           | 506    | 360        | 450    | 450       | 372    | 473     | 1,220   | 7,260           | 2,940   | 748    | 856    |
| 22          | 586           | 425    | 375        | 430    | 375       | 350    | 479     | 1,250   | 8,370           | 2,860   | 775    | 811    |
| 23          | 575           | 275    | 375        | 430    | 440       | 350    | 509     | 1,400   | 9,180           | 2,780   | 730    | 739    |
| 24          | 558           | 400    | 350        | 440    | 410       | 356    | 509     | 1,170   | 9,720           | 2,610   | 629    | 698    |
| 25          | 543           | 625    | 350        | 460    | 400       | 383    | 629     | 1,330   | 8,910           | 2,460   | 615    | 674    |
| 26          | 547           | 625    | 380        | 475    | 400       | 399    | 970     | 1,730   | 7,860           | 2,520   | 574    | 666    |
| 27          | 517           | 600    | 410        | 465    | 390       | 438    | 714     | 2,670   | 6,750           | 2,400   | 522    | 666    |
| 28          | 507           | 580    | 420        | 450    | 360       | 461    | 615     | 3,830   | 5,820           | 2,220   | 497    | 658    |
| 29          | 485           | 600    | 420        | 425    | -----     | 394    | 567     | 4,720   | 4,460           | 2,040   | 515    | 658    |
| 30          | 514           | 572    | 410        | 420    | -----     | 367    | 567     | 4,980   | 3,220           | 1,860   | 666    | 650    |
| 31          | 520           | -----  | 400        | 410    | -----     | 461    | -----   | 4,830   | -----           | 1,770   | 990    | -----  |
| TOTAL       | 19,306        | 15,268 | 13,732     | 11,885 | 12,525    | 12,445 | 14,953  | 64,562  | 182,760         | 95,950  | 32,419 | 29,130 |
| MEAN        | 623           | 509    | 443        | 383    | 447       | 401    | 498     | 2,083   | 6,092           | 3,095   | 1,046  | 971    |
| MAX         | 801           | 625    | 559        | 500    | 550       | 509    | 970     | 4,980   | 9,720           | 4,720   | 1,740  | 1,810  |
| MIN         | 485           | 275    | 270        | 220    | 360       | 320    | 319     | 554     | 3,220           | 1,770   | 497    | 650    |
| AC-FT       | 38,290        | 30,280 | 27,240     | 23,570 | 24,840    | 24,680 | 29,660  | 128,100 | 362,500         | 190,300 | 64,300 | 57,780 |
| CAL YR 1970 | TOTAL 416,905 |        | MEAN 1,142 |        | MAX 8,040 |        | MIN 175 |         | AC-FT 826,900   |         |        |        |
| WTR YR 1971 | TOTAL 504,935 |        | MEAN 1,383 |        | MAX 9,720 |        | MIN 220 |         | AC-FT 1,002,000 |         |        |        |

PEAK DISCHARGE (BASE, 5,300 CFS)

NOTE.--Stage-discharge relation affected by ice Dec. 15 to Mar. 6.

| DATE | TIME | G.HT. | DISCHARGE | DATE | TIME | G.HT. | DISCHARGE |
|------|------|-------|-----------|------|------|-------|-----------|
| 5-29 | 1545 | 5.35  | 5,340     | 6-24 | 1830 | 7.38  | 10,200    |

## YELLOWSTONE RIVER BASIN

149

06209500 Rock Creek near Red Lodge, Mont.

LOCATION.--Lat 45°07'15", long 109°17'45", in NW $\frac{1}{4}$  sec.20, T.8 S., R.20 E., Carbon County, on left bank at downstream side of bridge, 3 miles upstream from West Fork, and 4.5 miles southwest of Red Lodge.

DRAINAGE AREA.--124 sq mi.

PERIOD OF RECORD.--April to December 1932, May 1934 to current year. Monthly discharge only for May 1934, published in WSP 1309.

GAGE.--Water-stage recorder. Datum of gage is 6,100.52 ft above mean sea level. Prior to Oct. 1, 1937, non-recording gage at same site and datum.

AVERAGE DISCHARGE.--37 years, 171 cfs (123,900 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 1,720 cfs June 23 (gage height, 4.25 ft); minimum daily, 25 cfs Jan. 12.

Period of record: Maximum discharge, 3,110 cfs June 4, 1957 (gage height, 4.78 ft), from rating curve extended above 1,300 cfs; maximum gage height observed, 4.80 ft June 16, 1937; minimum discharge observed, 14 cfs Nov. 29, 1954, result of discharge measurement.

REMARKS.--Records good except those for winter period, which are fair. Flow partly regulated by Glacier Lake. No diversions above station.

REVISIONS.--WSP 1729: Drainage area.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT          | NOV      | DEC       | JAN    | FEB           | MAR   | APR   | MAY    | JUN    | JUL    | AUG    | SEP    |
|-------------|--------------|----------|-----------|--------|---------------|-------|-------|--------|--------|--------|--------|--------|
| 1           | 101          | 64       | 51        | 35     | 35            | 30    | 33    | 58     | 410    | 466    | 420    | 395    |
| 2           | 101          | 59       | 53        | 35     | 35            | 30    | 35    | 72     | 370    | 496    | 425    | 350    |
| 3           | 101          | 55       | 47        | 35     | 34            | 31    | 34    | 98     | 380    | 627    | 442    | 375    |
| 4           | 97           | 58       | 49        | 34     | 33            | 32    | 33    | 103    | 420    | 585    | 508    | 345    |
| 5           | 97           | 61       | 48        | 33     | 32            | 33    | 34    | 118    | 472    | 538    | 502    | 314    |
| 6           | 97           | 61       | 51        | 33     | 41            | 33    | 44    | 128    | 526    | 550    | 496    | 294    |
| 7           | 95           | 61       | 49        | 34     | 30            | 33    | 53    | 132    | 613    | 585    | 496    | 298    |
| 8           | 95           | 59       | 47        | 34     | 32            | 33    | 50    | 142    | 767    | 526    | 508    | 290    |
| 9           | 92           | 58       | 47        | 33     | 34            | 33    | 51    | 151    | 1,050  | 526    | 490    | 274    |
| 10          | 95           | 50       | 45        | 32     | 36            | 33    | 54    | 145    | 1,180  | 538    | 466    | 258    |
| 11          | 86           | 55       | 44        | 30     | 34            | 33    | 45    | 160    | 1,150  | 585    | 436    | 250    |
| 12          | 97           | 52       | 35        | 25     | 37            | 33    | 43    | 196    | 1,070  | 571    | 420    | 246    |
| 13          | 90           | 55       | 36        | 29     | 37            | 33    | 43    | 274    | 1,060  | 557    | 400    | 234    |
| 14          | 83           | 52       | 44        | 31     | 37            | 33    | 44    | 322    | 989    | 571    | 385    | 226    |
| 15          | 80           | 55       | 43        | 33     | 37            | 33    | 51    | 302    | 998    | 578    | 375    | 214    |
| 16          | 86           | 55       | 42        | 33     | 35            | 32    | 47    | 315    | 980    | 578    | 370    | 203    |
| 17          | 83           | 55       | 40        | 33     | 35            | 30    | 45    | 294    | 1,070  | 613    | 370    | 196    |
| 18          | 83           | 55       | 38        | 33     | 35            | 29    | 45    | 250    | 1,150  | 646    | 360    | 182    |
| 19          | 81           | 51       | 37        | 33     | 35            | 28    | 41    | 206    | 1,190  | 627    | 340    | 175    |
| 20          | 80           | 54       | 37        | 33     | 34            | 28    | 41    | 178    | 1,150  | 613    | 326    | 169    |
| 21          | 70           | 42       | 37        | 32     | 32            | 28    | 41    | 157    | 1,290  | 606    | 318    | 160    |
| 22          | 75           | 36       | 38        | 30     | 34            | 28    | 44    | 148    | 1,350  | 613    | 310    | 151    |
| 23          | 72           | 50       | 34        | 31     | 34            | 27    | 44    | 138    | 1,520  | 550    | 310    | 142    |
| 24          | 72           | 61       | 30        | 31     | 35            | 27    | 52    | 135    | 1,330  | 544    | 302    | 140    |
| 25          | 63           | 62       | 40        | 32     | 35            | 26    | 62    | 154    | 1,130  | 613    | 262    | 135    |
| 26          | 61           | 54       | 40        | 32     | 34            | 26    | 50    | 234    | 956    | 544    | 246    | 128    |
| 27          | 61           | 52       | 40        | 33     | 32            | 28    | 48    | 370    | 851    | 508    | 246    | 112    |
| 28          | 64           | 52       | 40        | 33     | 31            | 30    | 47    | 585    | 676    | 484    | 250    | 107    |
| 29          | 66           | 53       | 41        | 33     | -----         | 34    | 47    | 655    | 532    | 466    | 335    | 105    |
| 30          | 63           | 54       | 40        | 34     | -----         | 45    | 50    | 557    | 460    | 442    | 520    | 107    |
| 31          | 66           | -----    | 40        | 34     | -----         | 43    | ----- | 460    | -----  | 436    | 430    | -----  |
| TOTAL       | 2,584        | 1,659    | 1,317     | 1,009  | 960           | 975   | 1,352 | 7,230  | 27,090 | 17,184 | 12,064 | 6,575  |
| MEAN        | 83.4         | 55.3     | 42.5      | 32.5   | 34.5          | 31.5  | 45.1  | 233    | 903    | 554    | 389    | 219    |
| MAX         | 101          | 64       | 53        | 38     | 39            | 45    | 62    | 655    | 1,520  | 648    | 520    | 395    |
| MIN         | 61           | 36       | 35        | 25     | 30            | 26    | 33    | 58     | 370    | 436    | 246    | 105    |
| AC-FT       | 5,130        | 3,290    | 2,610     | 2,000  | 1,920         | 1,930 | 2,630 | 14,340 | 53,730 | 34,080 | 23,930 | 13,040 |
| CAL YR 1970 | TOTAL 72,525 | MEAN 199 | MAX 1,360 | MIN 18 | AC-FT 143,900 |       |       |        |        |        |        |        |
| WTR YR 1971 | TOTAL 80,005 | MEAN 219 | MAX 1,520 | MIN 25 | AC-FT 158,700 |       |       |        |        |        |        |        |

## PEAK DISCHARGE (BASE, 660 CFS)

NOTE.--Stage-discharge relation affected by ice Jan. 3 to Feb. 10.

| DATE | TIME | G.HT. | DISCHARGE | DATE | TIME | G.HT. | DISCHARGE |
|------|------|-------|-----------|------|------|-------|-----------|
| 5-29 | 0015 | 3.30  | 746       | 7-18 | 0700 | 3.12  | 662       |
| 6-23 | 0030 | 4.25  | 1,720     |      |      |       |           |

## YELLOWSTONE RIVER BASIN

06211000 Red Lodge Creek above Cooney Reservoir, near Boyd, Mont.

LOCATION.--Lat 45°26'16", long 109°15'11", in SE 1/4 sec. 33, T.4 S., R.20 E., Carbon County, on right bank 0.6 mile upstream from Cooney Reservoir, 9 miles west of Boyd.

DRAINAGE AREA.--143 sq mi.

PERIOD OF RECORD.--May 1937 to current year (no winter records for most years).

GAGE.--Water-stage recorder. Datum of gage is 4,248.0 ft above mean sea level.

EXTREMES.--Current year: Maximum discharge recorded, 361 cfs May 31 (gage height, 2.78 ft); minimum recorded, 10 cfs Aug. 11 (gage height, 0.94 ft).

Period of record: Maximum discharge, 2,260 cfs June 15, 1967 (gage height, 7.00 ft), from rating curve extended above 1,200 cfs on basis of contracted-opening measurement of peak flow; no flow for many days in 1949.

REMARKS.--Records fair. Some return flow from lands irrigated by water diverted from Rock Creek and East Rosebud Creek basins. Diversions for irrigation of about 5,100 acres above station.

REVISIONS (WATER YEARS).--WSP 1309: 1937(M). WSP 1729: Drainage area.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY   | OCT   | NOV   | DEC | JAN | FEB   | MAR | APR   | MAY    | JUN    | JUL   | AUG   | SEP   |
|-------|-------|-------|-----|-----|-------|-----|-------|--------|--------|-------|-------|-------|
| 1     | 71    | 42    |     |     |       | -   | 71    | 212    | 239    | 134   | 50    | 72    |
| 2     | 71    | 36    |     |     |       | -   | 62    | 233    | 229    | 134   | 46    | 68    |
| 3     | 71    | 36    |     |     |       | -   | 66    | 254    | 208    | 184   | 34    | 112   |
| 4     | 68    | 34    |     |     |       | -   | 56    | 254    | 208    | 165   | 30    | 155   |
| 5     | 64    | 42    |     |     |       | -   | 58    | 278    | 208    | 148   | 24    | 97    |
| 6     | 67    | 41    |     |     |       | -   | 82    | 250    | 210    | 146   | 20    | 78    |
| 7     | 74    | 40    |     |     |       | -   | 134   | 237    | 210    | 153   | 18    | 80    |
| 8     | 74    | 38    |     |     |       | -   | 166   | 226    | 212    | 144   | 18    | 94    |
| 9     | 74    | -     |     |     |       | -   | 124   | 214    | 231    | 140   | 16    | 86    |
| 10    | 76    | -     |     |     |       | -   | 138   | 196    | 237    | 127   | 14    | 78    |
| 11    | 74    | -     |     |     |       | -   | 131   | 194    | 252    | 116   | 15    | 64    |
| 12    | 83    | -     |     |     |       | -   | 94    | 190    | 250    | 116   | 16    | 58    |
| 13    | 100   | -     |     |     |       | -   | 77    | 190    | 235    | 100   | 21    | 57    |
| 14    | 82    | -     |     |     |       | -   | 86    | 198    | 220    | 94    | 22    | 56    |
| 15    | 78    | -     |     |     |       | -   | 100   | 184    | 206    | 84    | 24    | 57    |
| 16    | 77    | -     |     |     |       | -   | 102   | 174    | 196    | 74    | 27    | 62    |
| 17    | 74    | -     |     |     |       | -   | 92    | 168    | 198    | 70    | 27    | 71    |
| 18    | 71    | -     |     |     |       | -   | 94    | 159    | 178    | 72    | 24    | 76    |
| 19    | 71    | -     |     |     |       | -   | 89    | 157    | 159    | 74    | 26    | 71    |
| 20    | 70    | -     |     |     |       | -   | 92    | 140    | 159    | 67    | 27    | 77    |
| 21    | 68    | -     |     |     |       | -   | 94    | 134    | 161    | 70    | 26    | 83    |
| 22    | 66    | -     |     |     |       | -   | 180   | 190    | 163    | 66    | 27    | 83    |
| 23    | 66    | -     |     |     |       | -   | 190   | 208    | 165    | 63    | 32    | 80    |
| 24    | 64    | -     |     |     |       | -   | 165   | 151    | 155    | 47    | 26    | 74    |
| 25    | 63    | -     |     |     |       | -   | 258   | 140    | 157    | 42    | 27    | 70    |
| 26    | 56    | -     |     |     |       | -   | 233   | 138    | 159    | 43    | 31    | 68    |
| 27    | 45    | -     |     |     |       | -   | 212   | 142    | 172    | 40    | 24    | 68    |
| 28    | 44    | -     |     |     |       | -   | 192   | 151    | 180    | 41    | 21    | 63    |
| 29    | 45    | -     |     |     | ----- | 61  | 204   | 172    | 159    | 54    | 36    | 62    |
| 30    | 44    | -     |     |     | ----- | 99  | 200   | 224    | 144    | 51    | 97    | 63    |
| 31    | 43    | ----- |     |     | ----- | 164 | ----- | 306    | -----  | 51    | 83    | ----- |
| TOTAL | 2,094 | -     |     |     |       | -   | 3,842 | 6,064  | 5,860  | 2,910 | 929   | 2,283 |
| MEAN  | 67.5  | -     |     |     |       | -   | 128   | 196    | 195    | 93.9  | 30.0  | 76.1  |
| MAX   | 100   | -     |     |     |       | -   | 258   | 306    | 252    | 184   | 97    | 155   |
| MIN   | 43    | -     |     |     |       | -   | 56    | 134    | 144    | 40    | 14    | 56    |
| AC-FT | 4,150 | -     |     |     |       | -   | 7,620 | 12,030 | 11,620 | 5,770 | 1,840 | 4,530 |

CAL YR 1970 TOTAL - MEAN - MAX - MIN - AC-FT -  
 WTR YR 1971 TOTAL - MEAN - MAX - MIN - AC-FT -



## YELLOWSTONE RIVER BASIN

151

06211500 Willow Creek near Boyd, Mont.

LOCATION.--Lat 45°25'20", long 109°13'47", in NE $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$  sec.2, T.5 S., R.20 E., Carbon County, on left bank 0.5 mile upstream from Cooney Reservoir and 8 miles west of Boyd.

DRAINAGE AREA.--53.3 sq mi.

PERIOD OF RECORD.--June 1937 to current year (no winter records for most years).

GAGE.--Water-stage recorder. Altitude of gage is 4,260 ft (from topographic map). Prior to Apr. 23, 1948, at site 0.5 mile downstream at different datum.

EXTREMES.--Current year: Maximum discharge recorded, 148 cfs Sept. 4 (gage height, 3.14 ft); minimum recorded, 18 cfs June 17.

Period of record: Maximum discharge, 1,720 cfs June 15, 1967 (gage height, 7.08 ft) from rating curve extended above 400 cfs on basis of slope-area measurement of peak flow; maximum gage height, 7.24 ft May 29, 1942 (backwater from Cooney Reservoir), site and datum then in use; no flow May 29, 30, 1969.

REMARKS.--Records good. Diversions for irrigation of about 1,800 acres above station. Some return flow from lands irrigated by water diverted from Rock Creek basin.

REVISIONS.--WSP 1729: Drainage area.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY   | OCT   | NOV   | DEC | JAN | FEB | MAR | APR   | MAY   | JUN   | JUL   | AUG   | SEP   |
|-------|-------|-------|-----|-----|-----|-----|-------|-------|-------|-------|-------|-------|
| 1     | 41    | 29    |     |     |     | -   | 31    | 60    | 37    | 43    | 57    | 54    |
| 2     | 40    | 28    |     |     |     | -   | 35    | 60    | 33    | 42    | 57    | 57    |
| 3     | 38    | 29    |     |     |     | -   | 35    | 60    | 31    | 70    | 44    | 82    |
| 4     | 37    | 31    |     |     |     | -   | 29    | 59    | 31    | 71    | 47    | 118   |
| 5     | 36    | 28    |     |     |     | -   | 24    | 63    | 29    | 63    | 48    | 73    |
| 6     | 36    | 29    |     |     |     | -   | 24    | 59    | 28    | 60    | 53    | 62    |
| 7     | 37    | 32    |     |     |     | -   | 47    | 50    | 30    | 57    | 53    | 62    |
| 8     | 33    | 32    |     |     |     | -   | 63    | 47    | 31    | 65    | 50    | 62    |
| 9     | 33    | 32    |     |     |     | -   | 74    | 44    | 33    | 70    | 50    | 57    |
| 10    | 33    | -     |     |     |     | -   | 35    | 42    | 32    | 65    | 44    | 54    |
| 11    | 34    | -     |     |     |     | -   | 30    | 38    | 34    | 60    | 44    | 52    |
| 12    | 43    | -     |     |     |     | -   | 50    | 37    | 34    | 65    | 47    | 47    |
| 13    | 50    | -     |     |     |     | -   | 37    | 36    | 34    | 60    | 45    | 47    |
| 14    | 41    | -     |     |     |     | -   | 45    | 37    | 36    | 56    | 42    | 45    |
| 15    | 34    | -     |     |     |     | -   | 50    | 40    | 34    | 56    | 42    | 47    |
| 16    | 34    | -     |     |     |     | -   | 54    | 40    | 27    | 62    | 43    | 50    |
| 17    | 37    | -     |     |     |     | -   | 47    | 37    | 20    | 67    | 42    | 59    |
| 18    | 35    | -     |     |     |     | -   | 49    | 36    | 23    | 70    | 42    | 56    |
| 19    | 35    | -     |     |     |     | -   | 40    | 38    | 26    | 75    | 36    | 56    |
| 20    | 34    | -     |     |     |     | -   | 40    | 34    | 29    | 65    | 34    | 56    |
| 21    | 34    | -     |     |     |     | -   | 33    | 33    | 29    | 60    | 35    | 57    |
| 22    | 33    | -     |     |     |     | -   | 76    | 42    | 21    | 63    | 34    | 56    |
| 23    | 33    | -     |     |     |     | -   | 67    | 50    | 23    | 67    | 30    | 56    |
| 24    | 33    | -     |     |     |     | -   | 62    | 34    | 22    | 63    | 28    | 50    |
| 25    | 31    | -     |     |     |     | -   | 84    | 31    | 20    | 62    | 30    | 47    |
| 26    | 31    | -     |     |     |     | -   | 67    | 31    | 22    | 56    | 30    | 45    |
| 27    | 33    | -     |     |     |     | -   | 60    | 31    | 33    | 54    | 30    | 44    |
| 28    | 31    | -     |     |     |     | -   | 54    | 27    | 44    | 71    | 30    | 43    |
| 29    | 31    | -     |     |     |     | 21  | 52    | 27    | 47    | 80    | 31    | 42    |
| 30    | 30    | -     |     |     |     | 32  | 67    | 33    | 41    | 71    | 70    | 43    |
| 31    | 29    | ----- |     |     |     | 78  | ----- | 59    | ----- | 62    | 57    | ----- |
| TOTAL | 1,117 | -     |     |     |     | -   | 1,601 | 1,320 | 914   | 1,951 | 1,325 | 1,679 |
| MEAN  | 36.0  | -     |     |     |     | -   | 53.4  | 42.6  | 30.5  | 62.9  | 42.7  | 56.0  |
| MAX   | 50    | -     |     |     |     | -   | 83    | 63    | 47    | 80    | 70    | 118   |
| MIN   | 29    | -     |     |     |     | -   | 24    | 27    | 20    | 42    | 28    | 42    |
| AC-FT | 2,220 | -     |     |     |     | -   | 3,180 | 2,620 | 1,810 | 3,870 | 2,630 | 3,330 |

|             |       |   |      |   |     |   |     |   |       |   |
|-------------|-------|---|------|---|-----|---|-----|---|-------|---|
| CAL YR 1970 | TOTAL | - | MEAN | - | MAX | - | MIN | - | AC-FT | - |
| WTR YR 1971 | TOTAL | - | MEAN | - | MAX | - | MIN | - | AC-FT | - |

## PEAK DISCHARGE (BASE, 90 CFS, REVISED)

| DATE | TIME  | G.HT. | DISCHARGE | DATE | TIME | G.HT. | DISCHARGE |
|------|-------|-------|-----------|------|------|-------|-----------|
| 3-31 | 0300  | 3.17  | 133       | 4-25 | 1345 | 3.08  | 133       |
| 4-11 | a0800 | 2.94  | 104       | 9-4  | 0300 | 3.14  | 148       |
| 4-22 | 2000  | 2.90  | 59        |      |      |       |           |

a About.



06214500 Yellowstone River at Billings, Mont.

LOCATION.--Lat 45°47'48", long 108°28'12", in NE 1/4 sec. 34, T.1 N., R.26 E., Yellowstone County, on left bank 30 ft downstream from bridge on U.S. Highway 87, 1 mile northeast of Billings, 10 miles upstream from Pryor Creek, and at mile 346.0.

DRAINAGE AREA.--11,795 sq mi.

PERIOD OF RECORD.--May 1904 to December 1905 (gage heights only January to March, December 1905), August 1928 to current year. Monthly discharge only for some periods, published in WSP 1309. Published as "near Billings" 1904-5.

GAGE.--Water-stage recorder. Datum of gage is 3,081.36 ft above mean sea level. May 1904 to December 1905, nonrecording gage at bridge 30 ft upstream at different datum. Aug. 24, 1928, to June 30, 1932, nonrecording gage at bridge 30 ft upstream at datum 2.0 ft higher. July 1, 1932, to Oct. 12, 1937, water-stage recorder at old diversion dam 3 miles upstream at different datum. Oct. 13, 1937, to Jan. 9, 1963, water-stage recorder at present site at datum 2.0 ft higher. Jan. 10, 1963, to Dec. 2, 1967, water-stage recorder at city of Billings Water Department intake, 1.8 miles upstream at datum 3,096.09 ft above mean sea level.

AVERAGE DISCHARGE.--43 years (1928-71), 6,820 cfs (4,941,000 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 53,800 cfs June 25 (gage height, 12.99 ft); minimum daily, 1,630 cfs Jan. 13.

Period of record: Maximum discharge, 66,100 cfs June 16, 1967 (gage height, 14.76 ft, present datum), from floodmark. Gage height at site used Jan. 10, 1963, to Dec. 2, 1967, 10.47 ft from inside gage, 12.20 ft from outside floodmark; minimum, 430 cfs Dec. 12, 1932.

REMARKS.--Records good. Diversions for irrigation of about 350,000 acres above station. Records of chemical analyses and water temperatures for the current year are published in Part 2 of this report.

REVISIONS (WATER YEARS).--WRD Mont. 1968: 1967(M).

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT             | NOV     | DEC        | JAN     | FEB        | MAR     | APR       | MAY     | JUN             | JUL     | AUG     | SEP     |
|-------------|-----------------|---------|------------|---------|------------|---------|-----------|---------|-----------------|---------|---------|---------|
| 1           | 5,540           | 4,280   | 4,050      | 3,200   | 4,100      | 2,790   | 4,240     | 6,540   | 28,400          | 27,800  | 11,100  | 8,620   |
| 2           | 5,390           | 4,220   | 3,990      | 2,800   | 5,500      | 2,660   | 3,860     | 6,810   | 26,400          | 26,400  | 10,600  | 7,500   |
| 3           | 5,230           | 4,220   | 3,780      | 2,400   | 5,000      | 2,620   | 3,410     | 7,720   | 23,600          | 29,000  | 10,100  | 7,420   |
| 4           | 5,090           | 4,100   | 3,740      | 2,500   | 4,160      | 3,180   | 3,310     | 9,040   | 23,300          | 34,400  | 9,930   | 9,070   |
| 5           | 4,930           | 4,010   | 3,540      | 2,190   | 3,760      | 3,260   | 3,310     | 10,300  | 23,700          | 32,400  | 9,960   | 8,980   |
| 6           | 4,960           | 4,050   | 3,500      | 1,920   | 3,120      | 3,110   | 3,190     | 10,900  | 23,600          | 29,000  | 9,710   | 8,380   |
| 7           | 5,000           | 4,100   | 3,500      | 1,920   | 2,630      | 3,040   | 3,350     | 11,300  | 24,300          | 28,100  | 9,680   | 8,090   |
| 8           | 5,090           | 4,140   | 3,430      | 2,300   | 2,760      | 3,190   | 3,860     | 11,900  | 24,900          | 27,400  | 9,800   | 8,090   |
| 9           | 5,020           | 4,070   | 3,500      | 2,400   | 3,010      | 3,290   | 4,300     | 13,200  | 29,700          | 25,300  | 9,550   | 8,070   |
| 10          | 5,160           | 4,160   | 3,600      | 2,400   | 3,520      | 3,450   | 4,320     | 13,600  | 35,400          | 24,500  | 8,950   | 7,610   |
| 11          | 5,110           | 4,160   | 3,540      | 2,200   | 4,420      | 3,520   | 4,420     | 13,200  | 39,200          | 24,900  | 8,500   | 7,160   |
| 12          | 5,230           | 4,090   | 3,410      | 1,810   | 5,870      | 3,480   | 4,510     | 13,800  | 40,800          | 24,900  | 8,180   | 6,780   |
| 13          | 5,540           | 3,970   | 3,230      | 1,630   | 6,540      | 3,430   | 4,240     | 15,600  | 39,100          | 23,600  | 7,780   | 6,430   |
| 14          | 5,470           | 4,030   | 2,940      | 1,800   | 6,590      | 3,430   | 3,990     | 18,400  | 39,400          | 22,200  | 7,470   | 6,190   |
| 15          | 5,270           | 3,930   | 2,700      | 2,200   | 5,920      | 3,310   | 3,820     | 18,700  | 39,800          | 21,400  | 7,360   | 6,030   |
| 16          | 5,090           | 3,840   | 3,200      | 2,800   | 5,040      | 3,110   | 4,050     | 17,100  | 41,200          | 20,600  | 7,220   | 6,030   |
| 17          | 4,930           | 3,820   | 3,400      | 3,710   | 4,380      | 3,040   | 4,670     | 18,100  | 40,700          | 20,100  | 6,890   | 6,140   |
| 18          | 4,890           | 3,900   | 3,400      | 3,910   | 3,990      | 2,990   | 4,610     | 17,400  | 41,900          | 20,300  | 6,650   | 6,190   |
| 19          | 4,870           | 3,910   | 2,600      | 4,320   | 3,840      | 2,870   | 4,590     | 14,700  | 41,400          | 20,000  | 6,490   | 5,970   |
| 20          | 4,870           | 3,880   | 2,000      | 4,510   | 3,820      | 2,860   | 4,440     | 12,300  | 42,800          | 18,600  | 6,320   | 6,030   |
| 21          | 4,800           | 3,840   | 2,200      | 4,720   | 3,520      | 2,940   | 4,340     | 11,200  | 41,700          | 17,500  | 6,140   | 6,270   |
| 22          | 4,720           | 3,670   | 2,600      | 4,420   | 3,180      | 2,970   | 4,440     | 11,400  | 44,900          | 17,200  | 6,050   | 6,050   |
| 23          | 4,670           | 3,210   | 2,450      | 3,590   | 3,190      | 2,870   | 5,350     | 11,900  | 48,300          | 16,800  | 5,870   | 5,790   |
| 24          | 4,610           | 3,020   | 2,200      | 3,180   | 3,410      | 2,920   | 5,590     | 11,300  | 52,900          | 16,000  | 5,540   | 5,570   |
| 25          | 4,550           | 4,070   | 2,000      | 3,260   | 3,560      | 3,060   | 6,240     | 11,100  | 51,900          | 15,300  | 5,470   | 5,420   |
| 26          | 4,610           | 4,420   | 2,450      | 3,520   | 3,430      | 3,260   | 8,590     | 11,900  | 47,800          | 14,900  | 5,200   | 5,350   |
| 27          | 4,420           | 4,380   | 2,600      | 3,590   | 3,020      | 3,360   | 7,890     | 15,000  | 44,900          | 14,000  | 5,040   | 5,350   |
| 28          | 4,490           | 4,180   | 2,800      | 4,100   | 2,840      | 3,650   | 7,140     | 20,700  | 46,100          | 13,200  | 4,910   | 5,300   |
| 29          | 4,380           | 4,120   | 2,900      | 4,320   | -----      | 3,710   | 6,700     | 27,600  | 40,500          | 12,500  | 5,000   | 5,230   |
| 30          | 4,440           | 4,160   | 3,200      | 4,070   | -----      | 3,360   | 6,570     | 32,600  | 32,700          | 11,900  | 6,000   | 5,230   |
| 31          | 4,360           | -----   | 3,200      | 3,700   | -----      | 3,720   | -----     | 31,200  | -----           | 11,400  | 8,860   | -----   |
| TOTAL       | 152,730         | 119,950 | 95,650     | 95,390  | 114,120    | 98,450  | 143,340   | 456,510 | 1,121,3M        | 661,600 | 236,320 | 200,340 |
| MEAN        | 4,927           | 3,998   | 3,085      | 3,077   | 4,076      | 3,176   | 4,778     | 14,730  | 37,380          | 21,340  | 7,623   | 6,678   |
| MAX         | 5,540           | 4,420   | 4,050      | 4,720   | 6,590      | 3,720   | 8,590     | 32,600  | 52,900          | 34,400  | 11,100  | 9,070   |
| MIN         | 4,360           | 3,020   | 2,000      | 1,630   | 2,630      | 2,620   | 3,190     | 6,540   | 23,300          | 11,400  | 4,910   | 5,230   |
| AC-FT       | 302,900         | 237,900 | 189,700    | 189,200 | 226,400    | 195,300 | 284,300   | 905,500 | 2,224M          | 1,312M  | 468,700 | 397,400 |
| CAL YR 1970 | TOTAL 3,187,800 |         | MEAN 8,734 |         | MAX 47,800 |         | MIN 1,100 |         | AC-FT 6,323,000 |         |         |         |
| WTR YR 1971 | TOTAL 3,495,700 |         | MEAN 9,577 |         | MAX 52,900 |         | MIN 1,630 |         | AC-FT 6,934,000 |         |         |         |

## YELLOWSTONE RIVER BASIN

06215000 Pryor Creek above Pryor, Mont.

LOCATION (revised).--Lat 45°20'26", long 108°34'07", in SW 1/4 sec. 6, T. 6 S., R. 26 E., Big Horn County, on right bank 1.2 miles upstream from headworks of Pryor Ditch No. 1 and 6.7 miles south of Pryor.

DRAINAGE AREA.--39.6 sq mi.

PERIOD OF RECORD.--April 1921 to October 1924 (no winter records), October 1966 to current year. Monthly discharge only for some periods, published in WSP 1309.

GAGE.--Water-stage recorder. Altitude of gage is 4,440 ft (from topographic map). Prior to Oct. 1, 1966, water-stage recorder 1 mile downstream at different datum.

AVERAGE DISCHARGE.--5 years, 8.58 cfs (6,220 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 41 cfs May 14 (gage height, 2.53 ft); maximum gage height, 3.20 ft Jan. 16 (backwater from ice); no flow Nov. 22, 23, Jan. 11-14, 18, Aug. 27-29.

Period of record: Maximum discharge, 575 cfs June 26, 1969 (gage height, 4.23 ft); no flow at times in 1969, 1970 and 1971.

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

REVISIONS (WATER YEARS).--WSP 1509: 1923.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT                                                 | NOV   | DEC   | JAN  | FEB   | MAR   | APR   | MAY   | JUN   | JUL  | AUG   | SEP   |
|-------------|-----------------------------------------------------|-------|-------|------|-------|-------|-------|-------|-------|------|-------|-------|
| 1           | .80                                                 | 1.4   | 2.2   | .10  | .10   | 1.4   | 1.1   | 2.9   | 20    | 3.2  | 1.4   | .10   |
| 2           | .80                                                 | 1.4   | 7.5   | .10  | .10   | 1.3   | 1.2   | 4.8   | 18    | 3.2  | 1.2   | .10   |
| 3           | .80                                                 | 1.4   | 3.5   | .10  | .10   | 2.5   | .40   | 9.7   | 17    | 3.2  | 1.2   | 2.6   |
| 4           | .80                                                 | 1.6   | 3.0   | .10  | .10   | 2.0   | .62   | 17    | 14    | 2.9  | 1.0   | 1.6   |
| 5           | .80                                                 | 1.4   | 2.0   | .10  | .10   | 1.7   | .42   | 19    | 13    | 2.9  | 1.0   | .80   |
| 6           | 2.2                                                 | 1.4   | .80   | .20  | .10   | 2.3   | .14   | 27    | 12    | 3.2  | .80   | .40   |
| 7           | 2.2                                                 | 1.4   | .60   | .20  | .10   | 2.4   | .19   | 29    | 11    | 2.9  | .80   | .60   |
| 8           | 1.6                                                 | 1.2   | .80   | .30  | .30   | .53   | .29   | 34    | 10    | 2.9  | .80   | .40   |
| 9           | 1.9                                                 | 1.4   | .80   | .10  | .50   | .51   | .28   | 35    | 9.5   | 2.9  | 1.0   | .20   |
| 10          | 2.9                                                 | 2.2   | .80   | .10  | .80   | .39   | .55   | 32    | 9.0   | 2.6  | .60   | .15   |
| 11          | 1.9                                                 | 1.9   | .80   | 0    | 1.5   | .44   | .97   | 31    | 9.0   | 2.2  | .60   | .10   |
| 12          | 2.2                                                 | 1.4   | .80   | 0    | 2.5   | 1.6   | .99   | 33    | 8.0   | 2.2  | .60   | .15   |
| 13          | 2.2                                                 | 1.2   | .80   | 0    | 4.3   | .78   | 1.5   | 36    | 7.0   | 2.6  | .60   | .10   |
| 14          | 1.9                                                 | 1.2   | .70   | 0    | 3.5   | .53   | .41   | 37    | 6.6   | 2.2  | .40   | .20   |
| 15          | 1.4                                                 | 1.2   | .70   | .10  | 1.7   | .42   | .79   | 33    | 6.2   | 1.9  | .40   | .40   |
| 16          | .80                                                 | 1.2   | .50   | .50  | 1.3   | .78   | .95   | 30    | 5.8   | 1.6  | .30   | .80   |
| 17          | 1.0                                                 | 1.0   | .20   | .60  | 2.3   | 2.5   | .54   | 27    | 5.8   | 1.4  | .30   | 1.0   |
| 18          | 1.2                                                 | 1.6   | .20   | 0    | .62   | 1.6   | .72   | 23    | 5.4   | 1.4  | .20   | .80   |
| 19          | 1.2                                                 | 1.4   | .10   | .10  | .60   | .97   | .80   | 20    | 5.0   | 1.4  | .30   | .60   |
| 20          | 1.4                                                 | 1.0   | .10   | .10  | .60   | .95   | 1.1   | 17    | 4.2   | 1.6  | .20   | 1.6   |
| 21          | 1.4                                                 | .20   | .10   | .10  | .60   | .60   | 1.6   | 16    | 3.8   | 1.4  | .10   | 1.4   |
| 22          | 1.6                                                 | 0     | .20   | .50  | 1.5   | .50   | 2.1   | 19    | 3.5   | 1.6  | .10   | 1.2   |
| 23          | 1.4                                                 | 0     | .20   | .60  | 3.9   | .40   | 1.4   | 17    | 3.8   | 1.4  | .10   | .80   |
| 24          | 1.4                                                 | .80   | .20   | .50  | 1.1   | .32   | 1.6   | 19    | 3.8   | 1.6  | .15   | .60   |
| 25          | 2.2                                                 | 1.7   | .20   | .30  | 4.5   | .28   | 3.1   | 19    | 3.8   | 1.4  | .10   | .80   |
| 26          | 2.2                                                 | 1.5   | .20   | .10  | 2.5   | 1.4   | 3.6   | 18    | 3.8   | 1.6  | .05   | 1.0   |
| 27          | 2.2                                                 | 1.0   | .20   | .10  | 1.9   | .73   | 3.7   | 19    | 3.8   | 1.9  | 0     | 1.2   |
| 28          | 1.9                                                 | .90   | .20   | .30  | 1.5   | .44   | 3.2   | 20    | 4.2   | 2.2  | 0     | 1.2   |
| 29          | 1.9                                                 | 1.0   | .20   | .40  | ----- | .33   | 2.9   | 20    | 3.8   | 1.9  | 0     | 1.2   |
| 30          | 1.4                                                 | 1.2   | .10   | .30  | ----- | .38   | 2.6   | 22    | 3.5   | 1.6  | .15   | 1.6   |
| 31          | 1.4                                                 | ----- | .10   | .10  | ----- | 1.9   | ----- | 23    | ----- | 1.6  | .15   | ----- |
| TOTAL       | 49.00                                               | 36.20 | 28.80 | 6.10 | 38.72 | 32.88 | 39.76 | 709.4 | 234.3 | 66.6 | 14.60 | 23.70 |
| MEAN        | 1.58                                                | 1.21  | .93   | .20  | 1.38  | 1.06  | 1.33  | 22.9  | 7.81  | 2.15 | .47   | .79   |
| MAX         | 2.9                                                 | 2.2   | 7.5   | .60  | 4.5   | 2.5   | 3.7   | 37    | 20    | 3.2  | 1.4   | 2.6   |
| MIN         | .80                                                 | 0     | .10   | 0    | .10   | .28   | .14   | 2.9   | 3.5   | 1.4  | 0     | .10   |
| AC-FT       | 97                                                  | 72    | 57    | 12   | 77    | 65    | 79    | 1,410 | 465   | 132  | 29    | 47    |
| CAL YR 1970 | TOTAL 5,405.77 MEAN 14.8 MAX 330 MIN 0 AC-FT 10,720 |       |       |      |       |       |       |       |       |      |       |       |
| WTR YR 1971 | TOTAL 1,280.06 MEAN 3.51 MAX 37 MIN 0 AC-FT 2,540   |       |       |      |       |       |       |       |       |      |       |       |

## PEAK DISCHARGE (BASE, 30 CFS)

| DATE | TIME | G.HT. | DISCHARGE | DATE | TIME | G.HT. | DISCHARGE |
|------|------|-------|-----------|------|------|-------|-----------|
| 5-8  | 2300 | 2.49  | 37        | 5-14 | 0030 | 2.53  | 41        |

NOTE.--Stage-discharge relation affected by ice Dec. 9 to Feb. 12.

## 155

LOCATION.--Lat 45°26'06", long 108°32'01", in NE1/4 sec.5, T.5 S., R.26 E., Big Horn County, on left bank at Pryor, 2 miles downstream from Lost Creek.

PERIOD OF RECORD.--June 1921 to September 1924 (no winter records), October 1966 to current year. Monthly discharge only for some periods, published in WSP 1309.

EXTREMES.--Current year: Maximum discharge, 2.91 cfs Feb. 13 (gage height, 4.96 ft); minimum, 14 cfs July 23 (gage height, 2.25 ft).

Period of record: Maximum discharge, 468 cfs June 26, 1969 (gage height, 6.13 ft); minimum observed, 3.4 cfs June 24, 25, 1921 (gage height, 0.86 ft, site and datum then in use).

REVISIONS.--WSP 1729: Drainage area.

| DAY         | OCT          | NOV   | DEC       | JAN     | FEB    | MAR          | APR   | MAY   | JUN   | JUL   | AUG   | SEP   |
|-------------|--------------|-------|-----------|---------|--------|--------------|-------|-------|-------|-------|-------|-------|
| 1           | 33           | 38    | 46        | 41      | 38     | 42           | 46    | 48    | 45    | 20    | 20    | 26    |
| 2           | 34           | 38    | 46        | 39      | 38     | 41           | 46    | 47    | 44    | 21    | 20    | 26    |
| 3           | 34           | 38    | 46        | 38      | 38     | 43           | 48    | 46    | 42    | 22    | 23    | 31    |
| 4           | 35           | 38    | 45        | 38      | 38     | 43           | 46    | 50    | 37    | 22    | 23    | 35    |
| 5           | 35           | 39    | 43        | 38      | 38     | 42           | 46    | 62    | 36    | 21    | 24    | 29    |
| 6           | 37           | 38    | 46        | 38      | 30     | 42           | 46    | 73    | 35    | 21    | 25    | 28    |
| 7           | 37           | 38    | 46        | 41      | 36     | 42           | 46    | 79    | 35    | 21    | 26    | 28    |
| 8           | 37           | 38    | 46        | 41      | 35     | 43           | 46    | 79    | 35    | 20    | 26    | 29    |
| 9           | 37           | 38    | 45        | 41      | 36     | 44           | 45    | 82    | 35    | 20    | 26    | 32    |
| 10          | 41           | 41    | 45        | 36      | 38     | 50           | 44    | 80    | 34    | 22    | 22    | 31    |
| 11          | 40           | 40    | 45        | 34      | 41     | 58           | 44    | 73    | 32    | 22    | 21    | 31    |
| 12          | 40           | 39    | 44        | 32      | 53     | 54           | 43    | 68    | 32    | 22    | 23    | 30    |
| 13          | 41           | 38    | 43        | 32      | 193    | 58           | 43    | 71    | 33    | 17    | 23    | 30    |
| 14          | 40           | 38    | 43        | 35      | 143    | 49           | 43    | 76    | 32    | 17    | 24    | 29    |
| 15          | 39           | 38    | 43        | 41      | 73     | 46           | 43    | 75    | 31    | 17    | 25    | 30    |
| 16          | 39           | 38    | 43        | 42      | 54     | 45           | 44    | 70    | 27    | 17    | 25    | 30    |
| 17          | 38           | 38    | 44        | 42      | 46     | 44           | 43    | 68    | 29    | 16    | 26    | 31    |
| 18          | 38           | 38    | 42        | 42      | 46     | 43           | 43    | 63    | 29    | 17    | 28    | 31    |
| 19          | 39           | 33    | 39        | 43      | 43     | 43           | 43    | 53    | 24    | 17    | 28    | 31    |
| 20          | 39           | 38    | 43        | 64      | 43     | 44           | 44    | 43    | 23    | 16    | 29    | 32    |
| 21          | 39           | 38    | 43        | 47      | 41     | 45           | 45    | 38    | 25    | 18    | 28    | 33    |
| 22          | 39           | 34    | 42        | 43      | 42     | 43           | 46    | 60    | 28    | 16    | 26    | 31    |
| 23          | 38           | 36    | 40        | 41      | 42     | 44           | 47    | 62    | 23    | 15    | 26    | 25    |
| 24          | 38           | 38    | 43        | 41      | 42     | 44           | 46    | 50    | 23    | 16    | 26    | 27    |
| 25          | 38           | 38    | 41        | 41      | 43     | 46           | 47    | 49    | 19    | 20    | 27    | 28    |
| 26          | 38           | 37    | 41        | 40      | 42     | 46           | 50    | 46    | 19    | 26    | 27    | 29    |
| 27          | 38           | 36    | 41        | 40      | 41     | 50           | 62    | 46    | 19    | 24    | 30    | 29    |
| 28          | 38           | 36    | 41        | 41      | 41     | 48           | 64    | 46    | 22    | 23    | 26    | 30    |
| 29          | 39           | 36    | 41        | 43      | -----  | 45           | 55    | 41    | 22    | 22    | 26    | 31    |
| 30          | 39           | 41    | 41        | 42      | -----  | 46           | 51    | 46    | 23    | 21    | 29    | 32    |
| 31          | 38           | ----- | 41        | 38      | -----  | 50           | ----- | 51    | ----- | 20    | 29    | ----- |
| TOTAL       | 1,175        | 1,136 | 1,338     | 1,255   | 1,442  | 1,423        | 1,405 | 1,841 | 893   | 609   | 787   | 895   |
| MEAN        | 37.9         | 37.9  | 43.2      | 40.5    | 51.5   | 45.9         | 46.8  | 59.4  | 29.8  | 19.6  | 25.4  | 29.8  |
| MAX         | 41           | 41    | 46        | 64      | 193    | 58           | 64    | 82    | 45    | 26    | 30    | 35    |
| MIN         | 33           | 34    | 39        | 32      | 35     | 41           | 43    | 38    | 19    | 15    | 20    | 25    |
| AC-FT       | 2,330        | 2,250 | 2,650     | 2,490   | 2,860  | 2,820        | 2,790 | 3,650 | 1,770 | 1,210 | 1,560 | 1,780 |
| CAL YR 1970 | TOTAL 17,381 |       | MEAN 47.6 | MAX 310 | MIN 19 | AC-FT 34,480 |       |       |       |       |       |       |
| WTR YR 1971 | TOTAL 14,199 |       | MEAN 38.9 | MAX 193 | MIN 15 | AC-FT 28,160 |       |       |       |       |       |       |



## YELLOWSTONE RIVER BASIN

06217750 Fly Creek at Pompeys Pillar, Mont.

LOCATION.--Lat 45°59'33", long 107°57'07", in NW 1/4 sec. 23, T.3 N., R.30 E., Yellowstone County, on right bank at county bridge at Pompeys Pillar and 0.5 mile upstream from mouth.

DRAINAGE AREA.--285 sq mi.

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

GAGE.--Nonrecording gage. Altitude of gage is 2,870 ft (from topographic map).

EXTREMES.--Current year: Maximum discharge, 2,680 cfs Feb. 14 (gage height, 9.23 ft, from floodmark); minimum daily, 4.6 cfs Dec. 19, 20, 23, Jan. 8, 14, 18, 19, 22.

Period of record: Maximum discharge, 2,680 cfs Feb. 14, 1971 (gage height, 9.23 ft, from floodmark); minimum daily, 1.7 cfs Dec. 29, 1968.

REMARKS.--Records fair except those for period of backwater from Yellowstone River, which are poor. Flow affected by waste water from irrigation ditches and by return flow from irrigated areas upstream. Records of chemical analyses and water temperatures for the current year are published in Part 2 of this report.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT            | NOV   | DEC   | JAN   | FEB     | MAR   | APR   | MAY     | JUN   | JUL   | AUG   | SEP   |
|-------------|----------------|-------|-------|-------|---------|-------|-------|---------|-------|-------|-------|-------|
| 1           | 64             | 9.8   | 7.1   | 5.6   | 31      | 20    | 12    | 7.6     | 80    | 40    | 79    | 90    |
| 2           | 39             | 8.8   | 6.6   | 5.6   | 26      | 16    | 12    | 7.1     | 70    | 40    | 80    | 91    |
| 3           | 26             | 9.3   | 5.6   | 5.6   | 22      | 17    | 12    | 6.6     | 60    | 40    | 82    | 90    |
| 4           | 25             | 8.8   | 6.6   | 5.6   | 21      | 17    | 9.8   | 7.6     | 50    | 45    | 75    | 91    |
| 5           | 24             | 8.8   | 5.1   | 5.1   | 17      | 20    | 11    | 6.0     | 33    | 50    | 74    | 89    |
| 6           | 17             | 9.3   | 6.6   | 5.1   | 17      | 18    | 10    | 12      | 49    | 49    | 71    | 80    |
| 7           | 15             | 9.3   | 6.6   | 5.1   | 13      | 15    | 10    | 57      | 73    | 45    | 64    | 79    |
| 8           | 15             | 9.3   | 6.6   | 4.6   | 12      | 15    | 11    | 41      | 75    | 45    | 60    | 76    |
| 9           | 15             | 9.3   | 6.6   | 5.1   | 12      | 25    | 9.8   | 43      | 80    | 40    | 58    | 75    |
| 10          | 15             | 11    | 5.6   | 5.1   | 8.2     | 42    | 8.2   | 40      | 80    | 40    | 44    | 70    |
| 11          | 13             | 9.3   | 6.0   | 5.6   | 40      | 34    | 7.6   | 38      | 85    | 40    | 40    | 66    |
| 12          | 13             | 9.3   | 6.0   | 5.6   | 372     | 25    | 8.8   | 60      | 90    | 35    | 50    | 53    |
| 13          | 14             | 8.8   | 5.6   | 5.6   | 890     | 20    | 7.1   | 49      | 90    | 34    | 52    | 56    |
| 14          | 12             | 8.2   | 5.1   | 4.6   | 1,950   | 22    | 6.6   | 39      | 95    | 35    | 56    | 55    |
| 15          | 12             | 8.8   | 6.6   | 5.6   | 1,750   | 17    | 8.2   | 39      | 96    | 36    | 44    | 56    |
| 16          | 12             | 9.3   | 6.0   | 5.6   | 670     | 15    | 8.2   | 36      | 90    | 32    | 38    | 60    |
| 17          | 12             | 7.6   | 5.1   | 5.1   | 314     | 14    | 8.2   | 33      | 80    | 30    | 52    | 62    |
| 18          | 12             | 8.2   | 5.6   | 4.6   | 129     | 13    | 8.8   | 31      | 70    | 32    | 33    | 61    |
| 19          | 12             | 8.2   | 4.6   | 4.6   | 61      | 12    | 8.8   | 34      | 65    | 49    | 29    | 60    |
| 20          | 11             | 8.2   | 4.6   | 5.6   | 46      | 13    | 8.8   | 30      | 60    | 38    | 32    | 57    |
| 21          | 12             | 7.1   | 6.6   | 5.1   | 30      | 12    | 8.2   | 26      | 52    | 38    | 28    | 58    |
| 22          | 11             | 6.0   | 6.6   | 4.6   | 24      | 9.8   | 8.8   | 33      | 50    | 40    | 26    | 56    |
| 23          | 11             | 6.0   | 4.6   | 5.1   | 26      | 11    | 7.6   | 39      | 50    | 34    | 30    | 57    |
| 24          | 10             | 8.8   | 7.6   | 6.6   | 31      | 11    | 7.6   | 43      | 45    | 42    | 34    | 60    |
| 25          | 10             | 7.1   | 6.6   | 18    | 86      | 12    | 7.6   | 56      | 45    | 49    | 34    | 60    |
| 26          | 10             | 6.0   | 5.1   | 15    | 41      | 12    | 7.6   | 52      | 45    | 65    | 40    | 51    |
| 27          | 11             | 7.1   | 5.6   | 13    | 19      | 13    | 9.8   | 58      | 40    | 67    | 41    | 51    |
| 28          | 9.8            | 6.6   | 5.1   | 23    | 18      | 12    | 9.8   | 57      | 40    | 66    | 46    | 58    |
| 29          | 9.3            | 6.6   | 5.1   | 249   | -----   | 12    | 9.8   | 70      | 41    | 67    | 51    | 56    |
| 30          | 9.8            | 6.6   | 5.6   | 402   | -----   | 10    | 7.6   | 80      | 40    | 80    | 64    | 51    |
| 31          | 11             | ----- | 5.1   | 129   | -----   | 12    | ----- | 90      | ----- | 78    | 78    | ----- |
| TOTAL       | 492.9          | 247.5 | 181.8 | 975.4 | 6,676.2 | 516.8 | 271.3 | 1,220.9 | 1,919 | 1,421 | 1,585 | 1,975 |
| MEAN        | 15.9           | 8.25  | 5.86  | 31.5  | 238     | 16.7  | 9.04  | 39.4    | 64.0  | 45.8  | 51.1  | 65.8  |
| MAX         | 64             | 11    | 7.6   | 402   | 1,950   | 42    | 12    | 90      | 96    | 80    | 82    | 91    |
| MIN         | 9.3            | 6.0   | 4.6   | 4.6   | 8.2     | 9.8   | 6.6   | 6.0     | 33    | 30    | 26    | 51    |
| AC-FT       | 578            | 491   | 361   | 1,930 | 13,240  | 1,030 | 538   | 2,420   | 3,810 | 2,820 | 3,140 | 3,920 |
| CAL YR 1970 | TOTAL 10,777.4 |       |       |       |         |       |       |         |       |       |       |       |
| WTR YR 1971 | TOTAL 17,482.8 |       |       |       |         |       |       |         |       |       |       |       |
|             | MEAN 29.5      |       |       |       |         |       |       |         |       |       |       |       |
|             | MAX 110        |       |       |       |         |       |       |         |       |       |       |       |
|             | MIN 2.8        |       |       |       |         |       |       |         |       |       |       |       |
|             | AC-FT 21,380   |       |       |       |         |       |       |         |       |       |       |       |
|             | AC-FT 34,680   |       |       |       |         |       |       |         |       |       |       |       |

## PEAK DISCHARGE (BASE, 200 CFS)

| DATE | TIME | G.HT. | DISCHARGE | DATE | TIME | G.HT. | DISCHARGE |
|------|------|-------|-----------|------|------|-------|-----------|
| 1-30 | --   | a3.75 | a500      | 2-14 | 2130 | 9.23  | 2,680     |

a About.

NOTE.--Stage-discharge relation affected by backwater from Yellowstone River May 29 to July 14.

06279500 Bighorn River at Kane, Wyo.

LOCATION.--Lat 44°45'31", long 108°10'51", in NW 1/4 sec. 9, T. 55 N., R. 94 W., Big Horn County, on right bank 180 ft upstream from Bighorn Canyon National Recreation Area boundary, 0.5 mile upstream from normal high-water line of Bighorn Lake at elevation 3,660 ft, 1.3 miles upstream from Five Springs Creek, and 5.9 miles south of Kane.

DRAINAGE AREA.--15,765 sq mi. Area at sites used prior to May 17, 1956, 15,846 sq mi.

PERIOD OF RECORD.--August 1928 to current year.

GAGE.--Water-stage recorder. Altitude of gage is 3,660 ft (from topographic map). Aug. 29, 1928, to Apr. 25, 1932, nonrecording gage, and Apr. 25, 1932, to May 16, 1956, water-stage recorder, at site 12.5 miles downstream at different datum.

AVERAGE DISCHARGE.--43 years, 2,260 cfs (1,637,000 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 11,500 cfs June 26 (gage height, 6.53 ft); minimum daily, 1,030 cfs Aug. 25.

Period of record: Maximum discharge, 25,200 cfs June 16, 1935 (gage height, 11.10 ft, site and datum then in use); minimum daily, 179 cfs July 22, 1934.

Maximum stage known, 14.8 ft Sept. 30, 1923, site and datum in use April 1932 to May 1956.

REMARKS.--Records fair except those for period of no gage-height record, which are poor. Some regulation by Boysen Reservoir since October 1951. Diversions for irrigation of about 376,000 acres above station. Records of chemical analyses and water temperatures for the current year are published in Part 2 of this report.

REVISIONS (WATER YEARS).--WSP 1309: 1929(M). WSP 1509: 1929. WSP 1709: Drainage area.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY   | CCT    | NOV    | DEC     | JAN    | FEB     | MAR     | APR     | MAY     | JUN     | JUL     | AUG    | SEP     |
|-------|--------|--------|---------|--------|---------|---------|---------|---------|---------|---------|--------|---------|
| 1     | 1,190  | 1,570  | 1,810   | 1,540  | 1,750   | 2,300   | 2,590   | 2,220   | 7,430   | 9,420   | 2,400  | 2,400   |
| 2     | 1,180  | 1,530  | 1,780   | 1,600  | 1,700   | 2,300   | 2,420   | 2,200   | 6,510   | 8,960   | 2,380  | 2,060   |
| 3     | 1,160  | 1,530  | 1,790   | 1,600  | 1,600   | 2,300   | 2,420   | 2,200   | 5,980   | 8,420   | 2,380  | 1,960   |
| 4     | 1,170  | 1,490  | 1,760   | 1,540  | 1,600   | 2,300   | 2,470   | 2,250   | 5,800   | 7,830   | 2,090  | 2,400   |
| 5     | 1,130  | 1,500  | 1,750   | 1,450  | 1,600   | 2,300   | 2,440   | 2,420   | 5,750   | 7,810   | 1,980  | 2,520   |
| 6     | 1,110  | 1,530  | 1,750   | 1,450  | 1,600   | 2,400   | 2,410   | 2,690   | 5,230   | 7,590   | 1,920  | 2,350   |
| 7     | 1,130  | 1,560  | 1,760   | 1,400  | 1,700   | 2,400   | 2,470   | 2,980   | 5,030   | 7,430   | 1,890  | 2,290   |
| 8     | 1,200  | 1,560  | 1,790   | 1,400  | 1,800   | 2,500   | 2,540   | 2,850   | 4,810   | 7,370   | 1,900  | 2,250   |
| 9     | 1,220  | 1,560  | 1,830   | 1,400  | 1,900   | 2,950   | 2,500   | 2,670   | 5,230   | 6,870   | 1,890  | 2,300   |
| 10    | 1,280  | 1,520  | 1,920   | 1,450  | 2,000   | 2,950   | 2,500   | 2,670   | 6,110   | 5,350   | 1,880  | 2,220   |
| 11    | 1,320  | 1,500  | 1,800   | 1,450  | 2,100   | 2,980   | 2,500   | 2,610   | 6,570   | 5,170   | 1,350  | 2,160   |
| 12    | 1,320  | 1,490  | 1,700   | 1,450  | 2,300   | 3,020   | 2,520   | 2,560   | 7,100   | 5,190   | 1,210  | 2,060   |
| 13    | 1,450  | 1,500  | 1,620   | 1,450  | 2,500   | 3,190   | 2,500   | 2,560   | 6,800   | 4,520   | 1,160  | 1,960   |
| 14    | 1,500  | 1,530  | 1,600   | 1,450  | 2,600   | 3,020   | 2,500   | 2,850   | 7,170   | 3,190   | 1,140  | 1,850   |
| 15    | 1,460  | 1,480  | 1,600   | 1,400  | 2,650   | 2,800   | 2,500   | 3,140   | 6,970   | 3,250   | 1,130  | 1,800   |
| 16    | 1,450  | 1,480  | 1,600   | 1,350  | 2,700   | 2,640   | 2,460   | 3,050   | 6,840   | 3,410   | 1,110  | 1,850   |
| 17    | 1,530  | 1,500  | 1,600   | 1,370  | 2,750   | 2,620   | 2,460   | 3,020   | 6,930   | 3,410   | 1,070  | 1,920   |
| 18    | 1,500  | 1,530  | 1,700   | 1,400  | 2,800   | 2,520   | 2,420   | 2,880   | 7,500   | 3,480   | 1,040  | 1,980   |
| 19    | 1,460  | 1,710  | 1,740   | 1,450  | 2,700   | 2,540   | 2,410   | 2,690   | 7,320   | 3,500   | 1,080  | 2,060   |
| 20    | 1,450  | 1,790  | 1,700   | 1,500  | 2,600   | 2,560   | 2,420   | 2,470   | 6,780   | 3,430   | 1,070  | 2,080   |
| 21    | 1,450  | 1,780  | 1,600   | 1,550  | 2,600   | 2,610   | 2,470   | 2,340   | 6,340   | 3,440   | 1,060  | 2,130   |
| 22    | 1,460  | 1,720  | 1,500   | 1,600  | 2,600   | 2,530   | 2,460   | 2,280   | 6,680   | 3,860   | 1,040  | 2,180   |
| 23    | 1,460  | 1,710  | 1,500   | 1,600  | 2,400   | 2,500   | 2,480   | 2,620   | 8,750   | 3,890   | 1,080  | 2,130   |
| 24    | 1,450  | 1,660  | 1,500   | 1,550  | 2,300   | 2,530   | 2,380   | 2,640   | 9,940   | 3,930   | 1,040  | 2,110   |
| 25    | 1,450  | 1,800  | 1,500   | 1,580  | 2,300   | 2,860   | 2,340   | 2,540   | 10,400  | 3,910   | 1,030  | 2,090   |
| 26    | 1,450  | 1,920  | 1,500   | 1,650  | 2,400   | 2,740   | 2,500   | 2,580   | 10,500  | 4,010   | 1,060  | 2,060   |
| 27    | 1,450  | 1,800  | 1,500   | 1,700  | 2,400   | 2,780   | 2,770   | 2,770   | 10,700  | 4,120   | 1,060  | 2,040   |
| 28    | 1,450  | 1,780  | 1,500   | 1,750  | 2,300   | 2,780   | 2,560   | 3,460   | 10,500  | 3,880   | 1,060  | 2,040   |
| 29    | 1,520  | 1,780  | 1,500   | 1,750  | -----   | 2,780   | 2,380   | 6,060   | 10,100  | 3,050   | 1,100  | 2,060   |
| 30    | 1,530  | 1,800  | 1,500   | 1,750  | -----   | 2,660   | 2,250   | 8,520   | 9,660   | 2,950   | 2,060  | 2,090   |
| 31    | 1,540  | -----  | 1,500   | 1,750  | -----   | 2,610   | -----   | 8,320   | -----   | 2,620   | 4,790  | -----   |
| TOTAL | 42,420 | 48,610 | 51,200  | 47,330 | 62,250  | 81,970  | 74,040  | 97,110  | 221,430 | 155,260 | 48,450 | 63,400  |
| MEAN  | 1,368  | 1,620  | 1,652   | 1,527  | 2,223   | 2,644   | 2,468   | 3,133   | 7,381   | 5,008   | 1,563  | 2,113   |
| MAX   | 1,540  | 1,920  | 1,920   | 1,750  | 2,800   | 3,190   | 2,770   | 8,520   | 10,700  | 9,420   | 4,790  | 2,520   |
| MIN   | 1,110  | 1,480  | 1,500   | 1,350  | 1,600   | 2,300   | 2,250   | 2,200   | 4,810   | 2,620   | 1,030  | 1,800   |
| AC-FT | 84,140 | 96,420 | 101,600 | 93,880 | 123,500 | 162,600 | 146,900 | 192,600 | 439,200 | 308,000 | 96,100 | 125,800 |

CAL YR 1970 TOTAL 697,513 MEAN 1,911 MAX 4,990 MIN 491 AC-FT 1,384,000  
WTR YR 1971 TOTAL 993,470 MEAN 2,722 MAX 10,700 MIN 1,030 AC-FT 1,971,000

NOTE.--No gage-height record Dec. 11 to Mar. 7.

06286400 Bighorn Lake near St. Xavier, Mont.

LOCATION.--Lat 45°18'27", long 107°57'26", in SW $\frac{1}{4}$ SE $\frac{1}{4}$  sec.18, T.6 S., R.31 E., Big Horn County, in block 13 of Yellowtail Dam, 1.3 miles upstream from Grapevine Creek, 15.5 miles southeast of St. Xavier, and at mile 81.0.

DRAINAGE AREA.--19,626 sq mi.

PERIOD OF RECORD.--November 1965 to current year (monthend contents only). Prior to October 1969, published as "Yellowtail Reservoir."

GAGE.--Water-stage recorder in powerhouse control room. Datum of gage is at mean sea level (levels by Bureau of Reclamation).

EXTREMES.--Current year: Maximum daily contents, 1,075,000 acre-ft Oct. 24 (elevation, 3,638.24 ft); minimum, 698,400 acre-ft May 28 (elevation, 3,591.16 ft).

Period of record: Maximum contents, 1,346,000 acre-ft July 6, 1967 (elevation, 3,656.43 ft); minimum since first filling, 660,700 acre-ft Mar. 11, 1970 (elevation, 3,584.45 ft).

REMARKS.--Reservoir is formed by thin concrete-arch dam; construction began in 1961; completed in 1967. Storage began Nov. 3, 1965. Usable capacity, 1,356,000 acre-ft between elevation 3,296.5 ft (river outlet invert) and 3,657.0 ft (top of flood control). Elevation of spillway crest, 3,593 ft. Normal maximum operating level, 1,097,000 acre-ft (elevation, 3,640 ft). Minimum operating level, 483,400 acre-ft (elevation, 3,547 ft). Dead storage, 18,970 acre-ft below elevation 3,296.5 ft. Figures given herein represent usable contents. Water is used for power production, flood control, irrigation and recreation.

COOPERATION.--Elevations and capacity table furnished by Bureau of Reclamation.

## MONTHEND ELEVATION AND CONTENTS, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| Date                  | Elevation<br>(feet)† | Contents<br>(acre-feet) | Change in contents<br>(acre-feet) |
|-----------------------|----------------------|-------------------------|-----------------------------------|
| Sept. 30 . . . . .    | 3,636.18             | 1,051,000               | -                                 |
| Oct. 31 . . . . .     | 3,638.07             | 1,073,000               | +22,000                           |
| Nov. 30 . . . . .     | 3,636.87             | 1,059,000               | -14,000                           |
| Dec. 31 . . . . .     | 3,628.82             | 973,300                 | -85,700                           |
| CAL YR 1970 . . . . . | -                    | -                       | +182,500                          |
| Jan. 31 . . . . .     | 3,622.54             | 916,900                 | -56,400                           |
| Feb. 28 . . . . .     | 3,622.02             | 912,500                 | -4,400                            |
| Mar. 31 . . . . .     | 3,615.65             | 862,500                 | -50,000                           |
| Apr. 30 . . . . .     | 3,603.67             | 776,600                 | -85,900                           |
| May 31 . . . . .      | 3,596.60             | 731,000                 | -45,600                           |
| June 30 . . . . .     | 3,622.01             | 912,500                 | +181,500                          |
| July 31 . . . . .     | 3,636.34             | 1,053,000               | +140,500                          |
| Aug. 31 . . . . .     | 3,633.35             | 1,019,000               | -34,000                           |
| Sept. 30 . . . . .    | 3,638.09             | 1,073,000               | +54,000                           |
| WTR YR 1971 . . . . . | -                    | -                       | +22,000                           |

† Readings made at 2400 hours.

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LOCATION.--Lat 45°19'00", long 107°55'05", in NW¼ sec.16, T.6 S., R.31 E., Big Horn County, on right bank 800 ft downstream from Yellowtail afterbay dam, 1,500 ft downstream from Lime Kiln Creek, and 14 miles south-west of St. Xavier.

PERIOD OF RECORD.--October 1934 to current year.

AVERAGE DISCHARGE.--37 years, 3,552 cfs (2,552,000 acre-ft per year), unadjusted.

Period of record: Maximum discharge, 37,400 cfs June 16, 1935; minimum observed, 49 cfs Mar. 29, 1966, result of discharge measurement (dam closure); minimum daily, 112 cfs Apr. 2, 1967.

REMARKS.--Records good. Figures of discharge given herein are sum of river flow and flow of Bighorn Canal. Some regulation by 14 reservoirs in Wyoming with combined capacity of 1,400,000 acre ft and complete regulation by Bighorn Lake (see p. 158) since Nov. 3, 1965. Diversions for irrigation of about 375,000 acres above station. Records of chemical analyses and water temperatures for the current year are published in Part 2 of this report.

| DAY | OCT   | NOV   | DEC   | JAN   | FEB   | MAR   | APR   | MAY   | JUN   | JUL   | AUG   | SEP   |
|-----|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1   | 1,710 | 3,060 | 2,770 | 4,640 | 3,550 | 4,040 | 5,280 | 5,640 | 7,820 | 7,760 | 5,060 | 2,800 |
| 2   | 2,430 | 3,270 | 2,770 | 4,660 | 3,540 | 4,040 | 5,030 | 5,640 | 8,180 | 7,660 | 4,240 | 2,810 |
| 3   | 2,510 | 3,440 | 2,770 | 4,660 | 3,540 | 4,020 | 5,360 | 5,660 | 8,180 | 6,580 | 3,620 | 2,740 |
| 4   | 2,510 | 3,430 | 2,760 | 4,640 | 3,540 | 4,040 | 5,380 | 5,660 | 8,200 | 6,510 | 3,650 | 2,590 |
| 5   | 2,510 | 3,430 | 2,750 | 4,640 | 3,540 | 4,250 | 5,460 | 5,680 | 7,600 | 6,450 | 3,660 | 2,520 |
| 6   | 2,490 | 3,430 | 2,750 | 4,640 | 3,540 | 4,460 | 5,760 | 5,680 | 7,530 | 6,610 | 3,690 | 2,230 |
| 7   | 2,510 | 3,410 | 3,020 | 4,070 | 3,540 | 4,460 | 5,760 | 5,000 | 7,980 | 6,120 | 3,710 | 2,670 |
| 8   | 2,480 | 2,970 | 3,730 | 3,620 | 3,660 | 4,460 | 5,480 | 5,680 | 7,930 | 6,020 | 3,660 | 2,650 |
| 9   | 2,510 | 3,380 | 3,730 | 3,620 | 3,820 | 4,460 | 5,480 | 5,680 | 8,000 | 6,020 | 3,650 | 2,560 |
| 10  | 2,430 | 3,410 | 3,730 | 3,620 | 3,880 | 4,460 | 5,830 | 5,680 | 8,080 | 6,120 | 3,670 | 2,570 |
| 11  | 2,490 | 3,400 | 3,730 | 3,620 | 3,960 | 4,440 | 5,850 | 5,700 | 8,190 | 6,140 | 3,780 | 2,570 |
| 12  | 2,820 | 3,400 | 3,730 | 3,610 | 4,170 | 4,440 | 5,870 | 6,180 | 8,130 | 6,110 | 3,940 | 2,570 |
| 13  | 2,630 | 3,400 | 3,730 | 3,610 | 4,270 | 4,440 | 5,800 | 7,310 | 8,050 | 6,580 | 3,990 | 2,570 |
| 14  | 2,640 | 3,380 | 4,020 | 3,610 | 4,270 | 4,440 | 5,890 | 7,650 | 8,100 | 6,920 | 3,360 | 2,570 |
| 15  | 2,600 | 3,380 | 4,220 | 3,620 | 4,270 | 4,440 | 5,890 | 7,670 | 8,040 | 7,170 | 3,470 | 2,570 |
| 16  | 2,390 | 3,410 | 4,220 | 3,610 | 3,240 | 4,440 | 5,890 | 7,690 | 8,020 | 7,190 | 3,580 | 2,530 |
| 17  | 2,390 | 3,410 | 4,510 | 3,610 | 1,860 | 4,200 | 5,890 | 7,720 | 8,060 | 6,350 | 3,400 | 2,580 |
| 18  | 2,390 | 2,840 | 4,730 | 3,610 | 1,860 | 3,800 | 4,680 | 7,750 | 7,520 | 5,900 | 3,640 | 2,580 |
| 19  | 2,640 | 2,810 | 4,710 | 3,610 | 2,440 | 4,090 | 4,920 | 8,230 | 7,880 | 5,990 | 3,680 | 2,580 |
| 20  | 3,020 | 2,790 | 4,710 | 3,600 | 2,860 | 4,480 | 4,510 | 8,370 | 7,920 | 5,610 | 3,100 | 2,580 |
| 21  | 3,240 | 2,790 | 4,710 | 3,600 | 2,860 | 4,550 | 5,130 | 8,240 | 7,970 | 5,980 | 2,660 | 2,590 |
| 22  | 1,050 | 2,790 | 4,710 | 3,600 | 3,370 | 4,550 | 5,580 | 8,220 | 7,420 | 4,950 | 2,680 | 2,590 |
| 23  | 907   | 3,160 | 4,690 | 3,580 | 3,300 | 4,550 | 5,580 | 8,180 | 8,090 | 5,570 | 2,680 | 2,590 |
| 24  | 2,990 | 3,450 | 4,660 | 3,580 | 3,840 | 4,980 | 5,580 | 8,190 | 8,070 | 4,940 | 2,680 | 2,580 |
| 25  | 3,060 | 3,270 | 4,660 | 3,570 | 3,840 | 5,200 | 5,580 | 8,190 | 8,040 | 4,540 | 2,700 | 2,590 |
| 26  | 3,060 | 2,790 | 4,660 | 3,570 | 3,930 | 5,220 | 5,870 | 8,170 | 8,120 | 5,010 | 2,700 | 2,610 |
| 27  | 3,060 | 2,770 | 4,680 | 3,570 | 4,040 | 5,220 | 5,680 | 8,020 | 8,120 | 5,100 | 2,700 | 2,610 |
| 28  | 3,060 | 2,770 | 4,660 | 3,550 | 4,040 | 5,260 | 5,620 | 7,310 | 7,910 | 5,010 | 2,700 | 2,610 |
| 29  | 3,060 | 2,770 | 4,640 | 3,550 | ----- | 5,260 | 5,640 | 7,190 | 7,890 | 4,730 | 2,720 | 2,610 |
| 30  | 3,060 | 2,760 | 4,640 | 3,570 | ----- | 5,260 | 5,640 | 7,290 | 7,820 | 4,500 | 2,720 | 2,600 |
| 31  | 3,060 | ----- | 4,640 | 3,550 | ----- | 5,200 | ----- | 7,280 | ----- | 5,080 | 2,77  |       |

06287500 Soap Creek near St. Xavier, Mont.

LOCATION.--Lat 45°19'38", long 107°46'10", in NE¼ sec.10, T.6 S., R.32 E., Big Horn County, on left bank 6 miles upstream from mouth and 9.5 miles southwest of St. Xavier.

DRAINAGE AREA.--98.3 sq mi.

PERIOD OF RECORD.--September 1911 to June 1912 (fragmentary daily discharge only), May to November 1913, March 1939 to September 1953, October 1967 to current year. April 1914 to September 1924 at sites about 5 miles downstream; records not equivalent owing to diversions.

GAGE.--Water-stage recorder. Altitude of gage is 3,250 ft (from topographic map). Prior to Mar. 26, 1939, non-recording gage at site 0.5 mile downstream at different datum.

AVERAGE DISCHARGE.--18 years (1939-53, 1967-71), 30.3 cfs (21,950 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, about 300 cfs Feb. 11; maximum gage height, 12.45 ft Feb. 11 (backwater from ice); minimum discharge, 14 cfs Aug. 15, but may have been less during periods of ice effect.

Period of record: Maximum discharge, 2,980 cfs July 18, 1969 (gage height, 14.55 ft, from floodmark), from rating curve extended above 610 cfs on basis of slope-area measurement at gage height 14.96 ft; minimum daily, 1.0 cfs Jan. 24, 25, 1952.

Flood of Apr. 28, 1963 reached a stage of 14.96 ft, from floodmark (discharge, 4,170 cfs, from slope-area measurement of peak flow).

REMARKS.--Records fair except those for winter period, which are poor. Diversions for irrigation of about 1,100 acres above station.

REVISIONS (WATER YEARS).--WSP 1309: 1940(M). WSP 1729: Drainage area.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT          | NOV       | DEC     | JAN    | FEB          | MAR   | APR   | MAY   | JUN   | JUL   | AUG   | SEP   |
|-------------|--------------|-----------|---------|--------|--------------|-------|-------|-------|-------|-------|-------|-------|
| 1           | 28           | 33        | 28      | 29     | 28           | 22    | 46    | 65    | 43    | 30    | 22    | 23    |
| 2           | 30           | 33        | 26      | 27     | 25           | 22    | 49    | 62    | 42    | 30    | 22    | 22    |
| 3           | 32           | 33        | 26      | 25     | 23           | 24    | 48    | 61    | 38    | 31    | 22    | 25    |
| 4           | 34           | 33        | 25      | 23     | 22           | 30    | 42    | 62    | 35    | 31    | 22    | 32    |
| 5           | 31           | 33        | 23      | 20     | 20           | 28    | 42    | 62    | 34    | 30    | 21    | 24    |
| 6           | 32           | 34        | 22      | 19     | 17           | 25    | 39    | 60    | 33    | 29    | 21    | 23    |
| 7           | 33           | 34        | 23      | 20     | 16           | 25    | 39    | 56    | 33    | 28    | 19    | 28    |
| 8           | 31           | 34        | 25      | 26     | 19           | 30    | 42    | 53    | 33    | 28    | 16    | 30    |
| 9           | 33           | 34        | 26      | 27     | 22           | 41    | 41    | 50    | 33    | 29    | 17    | 25    |
| 10          | 36           | 36        | 25      | 26     | 26           | 57    | 39    | 48    | 32    | 28    | 17    | 23    |
| 11          | 35           | 40        | 22      | 25     | 250          | 63    | 42    | 44    | 33    | 27    | 17    | 23    |
| 12          | 37           | 30        | 23      | 23     | 180          | 47    | 39    | 42    | 34    | 27    | 17    | 23    |
| 13          | 42           | 29        | 23      | 20     | 220          | 49    | 38    | 42    | 32    | 27    | 17    | 23    |
| 14          | 34           | 30        | 24      | 17     | 150          | 39    | 36    | 42    | 32    | 27    | 15    | 23    |
| 15          | 32           | 30        | 25      | 20     | 110          | 34    | 37    | 40    | 32    | 26    | 15    | 24    |
| 16          | 32           | 30        | 21      | 34     | 90           | 31    | 38    | 39    | 32    | 26    | 16    | 24    |
| 17          | 32           | 30        | 19      | 39     | 80           | 31    | 36    | 38    | 32    | 25    | 17    | 25    |
| 18          | 31           | 30        | 17      | 33     | 65           | 30    | 36    | 38    | 32    | 25    | 16    | 25    |
| 19          | 31           | 29        | 16      | 30     | 55           | 31    | 37    | 39    | 32    | 25    | 16    | 24    |
| 20          | 31           | 29        | 17      | 43     | 45           | 32    | 38    | 37    | 32    | 25    | 17    | 26    |
| 21          | 31           | 31        | 17      | 35     | 40           | 35    | 40    | 36    | 31    | 25    | 17    | 30    |
| 22          | 32           | 29        | 18      | 30     | 35           | 29    | 91    | 72    | 32    | 25    | 17    | 26    |
| 23          | 32           | 25        | 19      | 28     | 32           | 32    | 94    | 89    | 32    | 25    | 17    | 25    |
| 24          | 32           | 30        | 20      | 32     | 35           | 34    | 60    | 47    | 31    | 24    | 17    | 24    |
| 25          | 33           | 35        | 23      | 29     | 38           | 50    | 120   | 40    | 31    | 23    | 17    | 24    |
| 26          | 33           | 32        | 24      | 29     | 35           | 42    | 170   | 37    | 31    | 23    | 17    | 24    |
| 27          | 32           | 30        | 26      | 32     | 29           | 47    | 108   | 35    | 31    | 22    | 18    | 24    |
| 28          | 31           | 29        | 27      | 38     | 24           | 47    | 81    | 34    | 32    | 23    | 18    | 24    |
| 29          | 31           | 30        | 28      | 55     | -----        | 41    | 87    | 34    | 32    | 24    | 21    | 24    |
| 30          | 32           | 32        | 29      | 43     | -----        | 37    | 70    | 41    | 31    | 23    | 26    | 24    |
| 31          | 32           | -----     | 30      | 33     | -----        | 44    | ----- | 67    | ----- | 22    | 25    | ----- |
| TOTAL       | 1,008        | 947       | 717     | 910    | 1,731        | 1,129 | 1,725 | 1,512 | 993   | 813   | 572   | 744   |
| MEAN        | 32.5         | 31.6      | 23.1    | 29.4   | 61.8         | 36.4  | 57.5  | 48.8  | 33.1  | 26.2  | 18.5  | 24.8  |
| MAX         | 42           | 40        | 30      | 55     | 250          | 63    | 170   | 89    | 43    | 31    | 26    | 32    |
| MIN         | 28           | 25        | 16      | 17     | 16           | 22    | 36    | 34    | 31    | 22    | 15    | 22    |
| AC-FT       | 2,000        | 1,880     | 1,420   | 1,800  | 3,430        | 2,240 | 3,420 | 3,000 | 1,970 | 1,610 | 1,130 | 1,480 |
| CAL YR 1970 | TOTAL 19,256 | MEAN 52.8 | MAX 520 | MIN 16 | AC-FT 38,190 |       |       |       |       |       |       |       |
| WTR YR 1971 | TOTAL 12,801 | MEAN 35.1 | MAX 250 | MIN 15 | AC-FT 25,390 |       |       |       |       |       |       |       |

PEAK DISCHARGE (BASE, 200 CFS)

NOTE.--Stage-discharge relation affected by ice Dec. 5 to Mar. 8.

DATE TIME G.HT. DISCHARGE DATE TIME G.HT. DISCHARGE

2-11 -- -- a300

a About.



06288000 Rotten Grass Creek near St. Xavier, Mont.

LOCATION.--Lat 45°24'44", long 107°40'57", in NE¼ sec.7, T.5 S., R.33 E., Big Horn County, on right bank 25 ft downstream from county bridge, 3.8 miles southeast of St. Xavier, and 11 miles upstream from mouth.

DRAINAGE AREA.--147 sq mi. Area at site used prior to Oct. 1, 1967, 160 sq mi.

PERIOD OF RECORD.--September 1911 to September 1912 (fragmentary discharge records only), June 1913 to September 1919 (no winter records), October 1919 to November 1922, fragmentary discharge records only (published as Rottengrass Creek). October 1967 to current year. Monthly discharge only for some periods, published in WSP 1309.

GAGE.--Water-stage recorder. Altitude of gage is 3,150 ft (from topographic map). Prior to Oct. 1, 1967, nonrecording gage at site 4 miles downstream at different datum.

EXTREMES.--Current year: Maximum discharge, about 500 cfs Feb. 14; maximum gage height, 7.61 ft Feb. 13 (backwater from ice); minimum discharge, 7.0 cfs Aug. 28, 29, but may have been less during period of ice effect.

Period of record: Maximum discharge, 688 cfs June 9, 1968 (gage height, 7.31 ft); no flow at times.

REMARKS.--Records good except those for winter period, which are poor. Several small diversions for irrigation above station during periods of adequate flow.

REVISIONS.--WSP 1729: Drainage area.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT                                                   | NOV   | DEC  | JAN   | FEB   | MAR   | APR   | MAY   | JUN   | JUL   | AUG   | SEP   |
|-------------|-------------------------------------------------------|-------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1           | 16                                                    | 14    | 14   | 15    | 23    | 22    | 40    | 61    | 52    | 22    | 13    | 10    |
| 2           | 15                                                    | 14    | 14   | 14    | 22    | 19    | 41    | 53    | 70    | 21    | 13    | 12    |
| 3           | 15                                                    | 14    | 13   | 13    | 20    | 18    | 37    | 50    | 54    | 23    | 13    | 10    |
| 4           | 15                                                    | 15    | 13   | 13    | 17    | 27    | 37    | 50    | 47    | 23    | 12    | 11    |
| 5           | 14                                                    | 17    | 12   | 12    | 16    | 32    | 37    | 58    | 44    | 22    | 12    | 11    |
| 6           | 14                                                    | 15    | 11   | 12    | 14    | 29    | 35    | 64    | 42    | 21    | 11    | 13    |
| 7           | 14                                                    | 15    | 12   | 12    | 14    | 28    | 36    | 69    | 40    | 20    | 11    | 12    |
| 8           | 14                                                    | 14    | 15   | 13    | 14    | 48    | 40    | 74    | 37    | 20    | 10    | 11    |
| 9           | 15                                                    | 14    | 13   | 15    | 14    | 91    | 40    | 75    | 35    | 20    | 10    | 11    |
| 10          | 16                                                    | 15    | 12   | 14    | 25    | 116   | 41    | 74    | 35    | 20    | 9.6   | 13    |
| 11          | 17                                                    | 16    | 11   | 13    | 52    | 150   | 34    | 67    | 37    | 21    | 9.5   | 11    |
| 12          | 17                                                    | 16    | 11   | 13    | 110   | 144   | 32    | 59    | 35    | 20    | 9.5   | 9.5   |
| 13          | 20                                                    | 17    | 11   | 12    | 300   | 139   | 33    | 54    | 34    | 20    | 9.0   | 9.0   |
| 14          | 18                                                    | 16    | 11   | 12    | 350   | 83    | 35    | 53    | 32    | 19    | 9.0   | 8.6   |
| 15          | 21                                                    | 16    | 11   | 12    | 300   | 51    | 33    | 54    | 31    | 18    | 9.0   | 8.2   |
| 16          | 18                                                    | 17    | 11   | 13    | 170   | 43    | 31    | 57    | 29    | 18    | 9.5   | 8.2   |
| 17          | 16                                                    | 16    | 11   | 15    | 100   | 28    | 30    | 56    | 28    | 18    | 9.0   | 8.2   |
| 18          | 16                                                    | 15    | 10   | 19    | 74    | 28    | 33    | 52    | 27    | 17    | 9.0   | 9.0   |
| 19          | 16                                                    | 15    | 10   | 17    | 40    | 26    | 33    | 49    | 26    | 17    | 8.6   | 9.5   |
| 20          | 16                                                    | 15    | 10   | 19    | 31    | 23    | 32    | 46    | 26    | 16    | 8.6   | 11    |
| 21          | 16                                                    | 15    | 10   | 24    | 26    | 30    | 33    | 43    | 26    | 16    | 8.6   | 11    |
| 22          | 16                                                    | 14    | 11   | 24    | 23    | 33    | 35    | 42    | 24    | 16    | 8.6   | 11    |
| 23          | 15                                                    | 13    | 11   | 23    | 22    | 26    | 44    | 50    | 24    | 16    | 8.6   | 13    |
| 24          | 15                                                    | 14    | 12   | 23    | 27    | 29    | 69    | 69    | 23    | 15    | 8.2   | 11    |
| 25          | 15                                                    | 15    | 13   | 22    | 34    | 36    | 54    | 59    | 24    | 15    | 8.2   | 11    |
| 26          | 15                                                    | 14    | 14   | 22    | 30    | 51    | 130   | 46    | 23    | 14    | 8.6   | 10    |
| 27          | 15                                                    | 13    | 14   | 22    | 27    | 62    | 164   | 43    | 23    | 14    | 8.2   | 9.5   |
| 28          | 14                                                    | 14    | 15   | 25    | 23    | 64    | 145   | 42    | 23    | 14    | 7.8   | 9.0   |
| 29          | 14                                                    | 14    | 15   | 30    | ----- | 54    | 101   | 44    | 23    | 14    | 7.4   | 9.0   |
| 30          | 14                                                    | 14    | 15   | 28    | ----- | 41    | 80    | 44    | 23    | 14    | 9.0   | 9.5   |
| 31          | 14                                                    | ----- | 15   | 25    | ----- | 40    | ----- | 46    | ----- | 14    | 10    | ----- |
| TOTAL       | 486                                                   | 446   | 381  | 546   | 1,918 | 1,611 | 1,565 | 1,703 | 997   | 558   | 298.5 | 310.2 |
| MEAN        | 15.7                                                  | 14.9  | 12.3 | 17.6  | 68.5  | 52.0  | 52.2  | 54.9  | 33.2  | 18.0  | 9.63  | 10.3  |
| MAX         | 21                                                    | 17    | 15   | 30    | 350   | 150   | 164   | 75    | 70    | 23    | 13    | 13    |
| MIN         | 14                                                    | 13    | 10   | 12    | 14    | 18    | 30    | 42    | 23    | 14    | 7.4   | 8.2   |
| AC-FT       | 964                                                   | 885   | 756  | 1,080 | 3,800 | 3,200 | 3,100 | 3,380 | 1,980 | 1,110 | 592   | 615   |
| CAL YR 1970 | TOTAL 16,076.0 MEAN 44.0 MAX 396 MIN 7.0 AC-FT 31,890 |       |      |       |       |       |       |       |       |       |       |       |
| WTR YR 1971 | TOTAL 10,819.7 MEAN 29.6 MAX 350 MIN 7.4 AC-FT 21,460 |       |      |       |       |       |       |       |       |       |       |       |

## PEAK DISCHARGE (BASE, 75 CFS)

| DATE | TIME | G.HT. | DISCHARGE | DATE | TIME | G.HT. | DISCHARGE |
|------|------|-------|-----------|------|------|-------|-----------|
| 2-14 | --   | --    | a500      | 5-8  | 1445 | 3.35  | 75        |
| 3-11 | 2100 | 3.92  | 164       | 5-24 | 1530 | 3.35  | 75        |
| 4-27 | 1200 | 3.85  | 166       |      |      |       |           |

a About.

NOTE.--Stage-discharge relation affected by ice Nov. 21 to Mar. 4 (no gage height record Feb. 1, 2, 5-10).

## YELLOWSTONE RIVER BASIN

06288200 Beauvais Creek near St. Xavier, Mont.

(Hydrologic bench-mark station)

LOCATION.--Lat 45°28'40", long 108°00'33", on west line of sec.15, T.4 S., R.30 E., Big Horn County, 1 mile downstream from Point Creek, 3 miles upstream from Muddy Creek, and 14 miles west of St. Xavier.

DRAINAGE AREA.--100 sq mi.

PERIOD OF RECORD.--July 1967 to current year.

GAGE.--Water-stage recorder. Altitude of gage is 3,350 ft (from topographic map).

EXTREMES.--Current year: Maximum discharge, about 200 cfs Feb. 12; maximum gage height, 6.04 ft Feb. 12 (back-water from ice); minimum daily discharge, 3.0 cfs Dec. 20.

Period of record: Maximum discharge, 1,600 cfs June 9, 1968 (gage height, 8.0 ft, from floodmark), from rating curve extended above 250 cfs on basis of slope-area measurement of peak flow; minimum daily, 0.50 cfs Jan. 18, 1970.

REMARKS.--Records fair except those for winter period, which are poor. No regulation. Diversions for irrigation of about 200 acres above station. Records of chemical analyses and suspended sediment loads for the current year are published in Part 2 of this report.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT            | NOV   | DEC       | JAN   | FEB     | MAR   | APR     | MAY   | JUN          | JUL   | AUG   | SEP   |
|-------------|----------------|-------|-----------|-------|---------|-------|---------|-------|--------------|-------|-------|-------|
| 1           | 7.4            | 7.3   | 10        | 6.5   | 10      | 6.5   | 42      | 48    | 42           | 11    | 7.0   | 6.0   |
| 2           | 7.0            | 7.2   | 8.5       | 6.0   | 5.0     | 6.0   | 32      | 46    | 33           | 11    | 6.8   | 5.2   |
| 3           | 7.3            | 6.6   | 7.0       | 5.5   | 5.5     | 7.0   | 21      | 48    | 24           | 11    | 6.5   | 5.7   |
| 4           | 7.2            | 6.0   | 6.0       | 5.0   | 6.0     | 11    | 19      | 52    | 21           | 11    | 6.4   | 21    |
| 5           | 6.9            | 7.5   | 4.5       | 4.5   | 6.0     | 9.5   | 17      | 50    | 20           | 11    | 6.2   | 17    |
| 6           | 7.2            | 8.4   | 5.5       | 4.0   | 5.0     | 8.0   | 16      | 50    | 19           | 10    | 6.0   | 6.5   |
| 7           | 8.2            | 7.2   | 7.0       | 4.5   | 4.5     | 15    | 19      | 47    | 18           | 9.7   | 5.8   | 7.6   |
| 8           | 8.4            | 7.2   | 7.4       | 5.0   | 5.0     | 19    | 24      | 41    | 18           | 9.4   | 5.6   | 14    |
| 9           | 8.4            | 6.9   | 6.9       | 5.5   | 6.0     | 20    | 25      | 39    | 18           | 9.6   | 5.4   | 6.9   |
| 10          | 9.0            | 7.6   | 6.0       | 5.0   | 8.0     | 29    | 24      | 37    | 17           | 9.6   | 5.4   | 5.4   |
| 11          | 12             | 11    | 5.0       | 4.5   | 30      | 38    | 30      | 34    | 36           | 9.4   | 5.2   | 5.0   |
| 12          | 11             | 10    | 5.5       | 4.0   | 180     | 28    | 35      | 33    | 19           | 9.2   | 5.3   | 4.9   |
| 13          | 17             | 7.2   | 5.5       | 4.0   | 140     | 36    | 25      | 31    | 16           | 9.1   | 5.2   | 4.8   |
| 14          | 13             | 7.2   | 6.0       | 3.5   | 100     | 30    | 19      | 30    | 16           | 8.9   | 5.1   | 4.9   |
| 15          | 9.1            | 6.8   | 5.0       | 3.5   | 60      | 18    | 18      | 30    | 15           | 8.8   | 4.9   | 5.1   |
| 16          | 8.4            | 6.6   | 5.5       | 4.0   | 41      | 14    | 26      | 28    | 14           | 8.6   | 4.9   | 5.5   |
| 17          | 8.2            | 6.6   | 6.0       | 5.0   | 24      | 13    | 30      | 26    | 14           | 8.3   | 5.1   | 5.8   |
| 18          | 8.0            | 6.6   | 4.5       | 9.0   | 15      | 11    | 24      | 25    | 14           | 7.8   | 5.0   | 6.1   |
| 19          | 7.6            | 6.8   | 3.5       | 15    | 12      | 11    | 27      | 26    | 15           | 7.8   | 5.0   | 6.1   |
| 20          | 7.8            | 6.9   | 3.0       | 30    | 14      | 13    | 22      | 25    | 13           | 7.7   | 4.9   | 7.4   |
| 21          | 7.6            | 6.5   | 4.5       | 45    | 12      | 14    | 28      | 24    | 13           | 7.6   | 4.8   | 13    |
| 22          | 7.4            | 5.0   | 5.5       | 35    | 10      | 13    | 40      | 36    | 12           | 7.5   | 4.5   | 8.5   |
| 23          | 7.8            | 4.0   | 6.0       | 20    | 8.0     | 13    | 55      | 84    | 12           | 7.4   | 4.5   | 6.4   |
| 24          | 7.4            | 3.5   | 6.0       | 15    | 13      | 13    | 48      | 47    | 11           | 7.3   | 4.5   | 6.0   |
| 25          | 7.8            | 8.0   | 6.0       | 12    | 16      | 25    | 54      | 30    | 11           | 7.1   | 4.6   | 5.8   |
| 26          | 7.6            | 14    | 6.0       | 10    | 14      | 20    | 71      | 25    | 11           | 7.2   | 4.7   | 5.7   |
| 27          | 7.4            | 9.4   | 6.0       | 8.0   | 10      | 26    | 84      | 24    | 11           | 7.3   | 4.7   | 6.8   |
| 28          | 7.2            | 8.2   | 6.0       | 10    | 7.0     | 35    | 66      | 22    | 12           | 7.4   | 4.6   | 6.0   |
| 29          | 7.3            | 9.1   | 6.5       | 15    | -----   | 27    | 55      | 21    | 12           | 7.9   | 4.5   | 5.9   |
| 30          | 7.3            | 11    | 7.0       | 30    | -----   | 20    | 52      | 24    | 12           | 7.9   | 5.1   | 5.8   |
| 31          | 7.3            | ----- | 7.0       | 20    | -----   | 30    | -----   | 45    | -----        | 7.2   | 8.5   | ----- |
| TOTAL       | 261.2          | 226.3 | 184.8     | 354.0 | 767.0   | 579.0 | 1,048   | 1,128 | 519          | 270.7 | 166.7 | 220.8 |
| MEAN        | 8.43           | 7.54  | 5.96      | 11.4  | 27.4    | 18.7  | 34.9    | 36.4  | 17.3         | 8.73  | 5.38  | 7.36  |
| MAX         | 17             | 14    | 10        | 45    | 180     | 38    | 84      | 84    | 42           | 11    | 8.5   | 21    |
| MIN         | 6.9            | 3.5   | 3.0       | 3.5   | 4.5     | 6.0   | 16      | 21    | 11           | 7.1   | 4.5   | 4.8   |
| AC-FT       | 518            | 449   | 367       | 702   | 1,520   | 1,150 | 2,080   | 2,240 | 1,030        | 537   | 331   | 438   |
| CAL YR 1970 | TOTAL 8,421.50 |       | MEAN 23.1 |       | MAX 230 |       | MIN .50 |       | AC-FT 16,700 |       |       |       |
| WTR YR 1971 | TOTAL 5,725.50 |       | MEAN 15.7 |       | MAX 180 |       | MIN 3.0 |       | AC-FT 11,360 |       |       |       |

PEAK DISCHARGE (BASE, 125 CFS, revised)

NOTE.--Stage-discharge relation affected by ice Dec. 10 to Feb. 15.

DATE TIME G.HT. DISCHARGE DATE TIME G.HT. DISCHARGE

2-12 -- -- a200

a About.

## YELLOWSTONE RIVER BASIN

163

06288960 Little Bighorn River near Parkman, Wyo.

LOCATION.--Lat 44°58'55", long 107°38'42", in SE $\frac{1}{4}$ SE $\frac{1}{4}$  sec.19, T.58 N., R.89 W., Sheridan County, on left bank at pack bridge on Dry Fork Trail, 1.7 miles upstream from Wyoming-Montana State line, and 15.5 miles west of Parkman.

DRAINAGE AREA.--137 sq mi.

PERIOD OF RECORD.--October 1969 to current year.

GAGE.--Water-stage recorder. Altitude of gage is 4,600 ft (from topographic map).

EXTREMES.--Current year: Maximum discharge, 959 cfs May 29 (gage height, 4.73 ft); minimum daily, 30 cfs Feb. 7, 8, Mar. 2.

Period of record: Maximum discharge, 1,230 cfs June 9, 1970 (gage height, 5.30 ft); minimum daily, 30 cfs Jan. 5, 1970, Feb. 7, 8, Mar. 2, 1971.

REMARKS.--Records good.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY   | OCT   | NOV   | DEC   | JAN   | FEB   | MAR   | APR   | MAY    | JUN    | JUL    | AUG   | SEP   |
|-------|-------|-------|-------|-------|-------|-------|-------|--------|--------|--------|-------|-------|
| 1     | 90    | 74    | 68    | 56    | 53    | 35    | 48    | 69     | 553    | 275    | 127   | 83    |
| 2     | 88    | 71    | 65    | 48    | 53    | 30    | 47    | 90     | 576    | 266    | 125   | 81    |
| 3     | 88    | 73    | 66    | 51    | 53    | 49    | 49    | 111    | 610    | 268    | 125   | 92    |
| 4     | 87    | 69    | 64    | 50    | 50    | 53    | 48    | 130    | 649    | 248    | 124   | 95    |
| 5     | 87    | 73    | 64    | 50    | 40    | 50    | 47    | 157    | 638    | 237    | 120   | 87    |
| 6     | 91    | 73    | 65    | 50    | 35    | 49    | 50    | 175    | 635    | 222    | 119   | 83    |
| 7     | 85    | 74    | 64    | 60    | 30    | 47    | 53    | 171    | 624    | 214    | 116   | 87    |
| 8     | 85    | 73    | 65    | 68    | 30    | 47    | 53    | 190    | 666    | 210    | 116   | 85    |
| 9     | 83    | 71    | 64    | 62    | 48    | 48    | 53    | 204    | 757    | 202    | 117   | 80    |
| 10    | 88    | 74    | 63    | 55    | 50    | 48    | 59    | 180    | 761    | 198    | 112   | 78    |
| 11    | 84    | 69    | 59    | 50    | 46    | 47    | 60    | 186    | 757    | 192    | 111   | 76    |
| 12    | 87    | 73    | 59    | 50    | 45    | 48    | 55    | 220    | 698    | 186    | 108   | 74    |
| 13    | 83    | 71    | 56    | 50    | 45    | 49    | 51    | 266    | 709    | 182    | 106   | 74    |
| 14    | 78    | 69    | 60    | 55    | 45    | 47    | 56    | 320    | 691    | 179    | 104   | 74    |
| 15    | 77    | 68    | 62    | 60    | 45    | 47    | 64    | 310    | 656    | 173    | 103   | 76    |
| 16    | 83    | 69    | 62    | 60    | 45    | 46    | 63    | 318    | 638    | 168    | 101   | 76    |
| 17    | 78    | 69    | 63    | 57    | 44    | 46    | 63    | 272    | 632    | 166    | 101   | 76    |
| 18    | 80    | 69    | 55    | 55    | 44    | 47    | 66    | 228    | 600    | 162    | 98    | 71    |
| 19    | 81    | 68    | 50    | 55    | 44    | 46    | 60    | 204    | 562    | 159    | 97    | 76    |
| 20    | 80    | 69    | 50    | 55    | 44    | 47    | 59    | 190    | 526    | 157    | 95    | 78    |
| 21    | 80    | 66    | 55    | 54    | 45    | 47    | 62    | 180    | 496    | 157    | 92    | 74    |
| 22    | 77    | 40    | 55    | 53    | 40    | 45    | 63    | 182    | 475    | 155    | 91    | 71    |
| 23    | 76    | 45    | 55    | 56    | 45    | 47    | 62    | 173    | 454    | 152    | 91    | 71    |
| 24    | 80    | 80    | 55    | 55    | 46    | 48    | 71    | 186    | 427    | 148    | 90    | 71    |
| 25    | 74    | 77    | 60    | 54    | 45    | 48    | 73    | 222    | 402    | 152    | 88    | 71    |
| 26    | 64    | 71    | 62    | 53    | 45    | 50    | 66    | 305    | 375    | 144    | 87    | 71    |
| 27    | 69    | 69    | 62    | 53    | 40    | 50    | 64    | 459    | 358    | 141    | 87    | 70    |
| 28    | 76    | 69    | 62    | 53    | 40    | 49    | 63    | 613    | 342    | 139    | 85    | 70    |
| 29    | 78    | 68    | 60    | 53    | ----- | 47    | 64    | 893    | 312    | 135    | 85    | 68    |
| 30    | 77    | 69    | 57    | 55    | ----- | 51    | 63    | 694    | 290    | 130    | 88    | 70    |
| 31    | 76    | ----- | 57    | 50    | ----- | 53    | ----- | 586    | -----  | 128    | 85    | ----- |
| TOTAL | 2,510 | 2,073 | 1,864 | 1,686 | 1,235 | 1,461 | 1,755 | 8,484  | 16,869 | 5,645  | 3,194 | 2,309 |
| MEAN  | 81.0  | 69.1  | 60.1  | 54.4  | 44.1  | 47.1  | 58.5  | 274    | 562    | 182    | 103   | 77.0  |
| MAX   | 91    | 80    | 68    | 68    | 53    | 53    | 73    | 893    | 761    | 275    | 127   | 95    |
| MIN   | 64    | 40    | 50    | 48    | 30    | 30    | 47    | 69     | 290    | 128    | 85    | 68    |
| AC-FT | 4,980 | 4,110 | 3,700 | 3,340 | 2,450 | 2,900 | 3,480 | 16,830 | 33,460 | 11,200 | 6,340 | 4,580 |

CAL YR 1970 TOTAL 63,727 MEAN 175 MAX 1,040 MIN 30 AC-FT 126,400  
WTR YR 1971 TOTAL 49,085 MEAN 134 MAX 893 MIN 30 AC-FT 97,360

## PEAK DISCHARGE (BASE, 350 CFS)

| DATE | TIME | G.HT. | DISCHARGE | DATE | TIME | G.HT. | DISCHARGE |
|------|------|-------|-----------|------|------|-------|-----------|
| 5-15 | 2230 | 3.07  | 382       | 6-10 | 2030 | 4.58  | 897       |
| 5-29 | 1000 | 4.73  | 959       |      |      |       |           |

## YELLOWSTONE RIVER BASIN

06288990 West Fork Little Bighorn River near Parkman, Wyo.

LOCATION.--Lat 44°59'55", long 107°37'45", in SE $\frac{1}{4}$  sec.17, T.58 N., R.89 W., Sheridan County, on right bank 0.1 mile upstream from Wyoming-Montana State line, 0.15 mile upstream from mouth, and 15 miles west of Parkman.

DRAINAGE AREA.--38.6 sq mi.

PERIOD OF RECORD.--October 1969 to current year.

GAGE.--Water-stage recorder. Altitude of gage is 4,400 ft (from topographic map). Prior to May 11, 1971, nonrecording gage at same site and datum.

EXTREMES.--Current year: Maximum discharge, 200 cfs May 29 (gage height, 2.22 ft); maximum gage height, 2.50 ft Jan. 1-5 (backwater from ice); minimum daily discharge, 6.0 cfs Feb. 8.

Period of record: Maximum discharge observed, 395 cfs June 10, 1970 (gage height, 2.65 ft); maximum gage height observed, 2.90 ft Jan. 9, 10, 1970 (backwater from ice); minimum daily discharge, 6.0 cfs Jan. 5, 1970, Feb. 8, 1971.

REMARKS.--Records good.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT   | NOV      | DEC  | JAN   | FEB   | MAR   | APR   | MAY   | JUN   | JUL    | AUG   | SEP   |
|-------------|-------|----------|------|-------|-------|-------|-------|-------|-------|--------|-------|-------|
| 1           | 20    | 17       | 15   | 12    | 9.0   | 7.0   | 12    | 21    | 104   | 46     | 25    | 18    |
| 2           | 20    | 17       | 15   | 12    | 9.3   | 8.0   | 12    | 26    | 117   | 45     | 25    | 18    |
| 3           | 20    | 17       | 15   | 11    | 9.0   | 10    | 12    | 33    | 127   | 44     | 25    | 19    |
| 4           | 19    | 17       | 15   | 10    | 8.8   | 10    | 13    | 42    | 145   | 41     | 25    | 19    |
| 5           | 19    | 16       | 15   | 10    | 9.0   | 10    | 13    | 46    | 137   | 41     | 25    | 18    |
| 6           | 19    | 16       | 15   | 11    | 8.0   | 9.9   | 13    | 53    | 140   | 41     | 24    | 18    |
| 7           | 19    | 16       | 15   | 14    | 7.0   | 10    | 13    | 55    | 127   | 40     | 24    | 19    |
| 8           | 19    | 16       | 15   | 16    | 6.0   | 10    | 14    | 55    | 132   | 38     | 24    | 18    |
| 9           | 19    | 16       | 14   | 15    | 8.0   | 10    | 14    | 59    | 151   | 36     | 23    | 18    |
| 10          | 19    | 16       | 14   | 14    | 8.8   | 10    | 14    | 55    | 163   | 36     | 23    | 17    |
| 11          | 19    | 16       | 14   | 13    | 8.6   | 10    | 14    | 54    | 157   | 35     | 23    | 17    |
| 12          | 19    | 16       | 15   | 11    | 9.0   | 11    | 14    | 72    | 135   | 34     | 22    | 18    |
| 13          | 18    | 16       | 15   | 9.0   | 8.8   | 11    | 15    | 89    | 132   | 32     | 22    | 18    |
| 14          | 18    | 16       | 15   | 7.0   | 8.8   | 11    | 16    | 119   | 135   | 31     | 22    | 18    |
| 15          | 18    | 15       | 15   | 8.0   | 9.0   | 11    | 16    | 117   | 132   | 30     | 20    | 18    |
| 16          | 18    | 16       | 15   | 9.0   | 9.0   | 11    | 19    | 119   | 127   | 30     | 20    | 18    |
| 17          | 18    | 16       | 15   | 9.0   | 8.0   | 10    | 22    | 101   | 122   | 29     | 20    | 19    |
| 18          | 18    | 16       | 14   | 9.0   | 8.0   | 11    | 22    | 78    | 122   | 28     | 20    | 18    |
| 19          | 18    | 15       | 12   | 8.8   | 8.0   | 11    | 22    | 62    | 112   | 28     | 20    | 19    |
| 20          | 18    | 15       | 10   | 8.8   | 8.0   | 11    | 23    | 54    | 101   | 27     | 20    | 19    |
| 21          | 18    | 14       | 12   | 9.0   | 7.0   | 11    | 23    | 46    | 95    | 27     | 19    | 19    |
| 22          | 17    | 10       | 13   | 9.3   | 8.0   | 11    | 18    | 45    | 89    | 27     | 19    | 18    |
| 23          | 17    | 14       | 14   | 8.8   | 9.0   | 11    | 20    | 40    | 86    | 26     | 19    | 18    |
| 24          | 17    | 17       | 14   | 9.0   | 9.0   | 11    | 19    | 38    | 80    | 26     | 19    | 18    |
| 25          | 17    | 16       | 14   | 9.0   | 9.0   | 11    | 19    | 40    | 76    | 28     | 18    | 18    |
| 26          | 17    | 15       | 14   | 9.3   | 9.0   | 11    | 19    | 53    | 70    | 27     | 18    | 19    |
| 27          | 17    | 15       | 14   | 8.8   | 8.0   | 12    | 20    | 80    | 67    | 26     | 18    | 18    |
| 28          | 17    | 15       | 13   | 8.8   | 7.0   | 12    | 21    | 129   | 64    | 26     | 18    | 18    |
| 29          | 17    | 15       | 12   | 8.8   | ----- | 12    | 21    | 182   | 55    | 26     | 19    | 18    |
| 30          | 17    | 15       | 12   | 8.8   | ----- | 12    | 21    | 151   | 50    | 25     | 19    | 18    |
| 31          | 17    | -----    | 12   | 8.8   | ----- | 12    | ----- | 117   | ----- | 26     | 18    | ----- |
| TOTAL       | 563   | 467      | 432  | 316.0 | 234.1 | 328.9 | 514   | 2,231 | 3,350 | 1,002  | 656   | 546   |
| MEAN        | 18.2  | 15.6     | 13.9 | 10.2  | 8.36  | 10.6  | 17.1  | 72.0  | 112   | 32.3   | 21.2  | 18.2  |
| MAX         | 20    | 17       | 15   | 16    | 9.3   | 12    | 23    | 182   | 163   | 46     | 25    | 19    |
| MIN         | 17    | 10       | 10   | 7.0   | 6.0   | 7.0   | 12    | 21    | 50    | 25     | 18    | 17    |
| AC-FT       | 1,120 | 926      | 857  | 627   | 464   | 652   | 1,020 | 4,430 | 6,640 | 1,990  | 1,300 | 1,080 |
| CAL YR 1970 | TOTAL | 17,948.0 | MEAN | 49.2  | MAX   | 370   | MIN   | 6.0   | AC-FT | 35,600 |       |       |
| WTR YR 1971 | TOTAL | 10,640.0 | MEAN | 29.2  | MAX   | 182   | MIN   | 6.0   | AC-FT | 21,100 |       |       |

PEAK DISCHARGE (BASE, 210 CFS).--No peak above base.

## YELLOWSTONE RIVER BASIN

165

06289000 Little Bighorn River at State line, near Wyola, Mont.

LOCATION.--Lat 45°00'25", long 107°37'05", in SW1/4 sec.36, T.9 S., R.33 E., Bighorn County, on right bank 20 ft downstream from county bridge, 0.5 mile north of Wyoming-Montana State line, 1 mile downstream from West Fork, and 13 miles southwest of Wyola.

DRAINAGE AREA.--193 sq mi.

PERIOD OF RECORD.--March 1939 to current year. Prior to October 1940, published as Little Horn River at State line, near Wyola.

GAGE.--Water-stage recorder. Altitude of gage is 4,450 ft (from topographic map).

AVERAGE DISCHARGE.--32 years, 150 cfs (108,700 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 1,180 cfs May 29 (gage height, 3.83 ft); minimum, 45 cfs Mar. 2.

Period of record: Maximum discharge, 2,730 cfs June 3, 1944 (gage height, 4.87 ft), from rating curve extended above 1,400 cfs; maximum gage height recorded, 5.93 ft June 9, 1944 (log jam); minimum discharge, 21 cfs Dec. 27, 1954, result of freezeup.

REMARKS.--Records good. No known diversion above station.

REVISIONS.--WSP 1729: Drainage area.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT                                                  | NOV   | DEC   | JAN   | FEB   | MAR   | APR   | MAY    | JUN    | JUL    | AUG   | SEP   |
|-------------|------------------------------------------------------|-------|-------|-------|-------|-------|-------|--------|--------|--------|-------|-------|
| 1           | 117                                                  | 94    | 87    | 74    | 74    | 60    | 69    | 98     | 615    | 335    | 148   | 112   |
| 2           | 115                                                  | 93    | 84    | 64    | 76    | 55    | 67    | 114    | 648    | 321    | 146   | 110   |
| 3           | 115                                                  | 93    | 86    | 62    | 76    | 76    | 69    | 138    | 708    | 321    | 143   | 117   |
| 4           | 112                                                  | 91    | 86    | 57    | 73    | 76    | 66    | 175    | 764    | 304    | 140   | 119   |
| 5           | 112                                                  | 93    | 84    | 62    | 67    | 73    | 66    | 225    | 736    | 286    | 138   | 112   |
| 6           | 117                                                  | 93    | 84    | 64    | 64    | 71    | 69    | 240    | 729    | 274    | 136   | 108   |
| 7           | 112                                                  | 94    | 84    | 77    | 64    | 71    | 74    | 232    | 722    | 261    | 136   | 114   |
| 8           | 114                                                  | 93    | 84    | 91    | 73    | 73    | 76    | 253    | 743    | 253    | 136   | 112   |
| 9           | 110                                                  | 93    | 83    | 81    | 76    | 71    | 74    | 278    | 884    | 244    | 136   | 106   |
| 10          | 114                                                  | 94    | 81    | 74    | 76    | 71    | 81    | 240    | 940    | 236    | 132   | 105   |
| 11          | 110                                                  | 89    | 80    | 62    | 74    | 71    | 84    | 240    | 916    | 232    | 132   | 103   |
| 12          | 112                                                  | 93    | 78    | 61    | 73    | 73    | 80    | 282    | 828    | 225    | 130   | 101   |
| 13          | 108                                                  | 91    | 76    | 71    | 74    | 73    | 74    | 355    | 828    | 217    | 127   | 101   |
| 14          | 103                                                  | 89    | 80    | 73    | 74    | 71    | 78    | 430    | 799    | 210    | 125   | 101   |
| 15          | 103                                                  | 89    | 81    | 81    | 73    | 69    | 87    | 414    | 750    | 202    | 123   | 101   |
| 16          | 106                                                  | 91    | 80    | 86    | 73    | 67    | 86    | 430    | 729    | 195    | 123   | 103   |
| 17          | 101                                                  | 91    | 81    | 83    | 71    | 67    | 86    | 381    | 743    | 192    | 123   | 105   |
| 18          | 103                                                  | 93    | 73    | 80    | 71    | 69    | 91    | 316    | 708    | 188    | 123   | 101   |
| 19          | 105                                                  | 91    | 62    | 78    | 70    | 69    | 84    | 274    | 674    | 185    | 121   | 103   |
| 20          | 103                                                  | 91    | 65    | 78    | 71    | 69    | 83    | 248    | 635    | 182    | 119   | 105   |
| 21          | 103                                                  | 83    | 69    | 76    | 64    | 69    | 84    | 232    | 602    | 178    | 117   | 101   |
| 22          | 101                                                  | 54    | 71    | 71    | 65    | 67    | 87    | 236    | 570    | 178    | 117   | 99    |
| 23          | 101                                                  | 60    | 69    | 77    | 71    | 69    | 86    | 217    | 557    | 175    | 117   | 99    |
| 24          | 103                                                  | 101   | 76    | 77    | 73    | 70    | 94    | 225    | 532    | 171    | 115   | 99    |
| 25          | 99                                                   | 96    | 78    | 76    | 71    | 70    | 99    | 274    | 490    | 175    | 114   | 99    |
| 26          | 89                                                   | 91    | 80    | 76    | 71    | 70    | 94    | 360    | 460    | 165    | 114   | 101   |
| 27          | 93                                                   | 89    | 81    | 74    | 62    | 70    | 93    | 502    | 448    | 162    | 114   | 99    |
| 28          | 98                                                   | 87    | 80    | 74    | 66    | 70    | 91    | 602    | 425    | 160    | 112   | 99    |
| 29          | 99                                                   | 87    | 81    | 74    | ----- | 67    | 91    | 988    | 381    | 157    | 114   | 98    |
| 30          | 98                                                   | 89    | 77    | 74    | ----- | 71    | 91    | 820    | 355    | 151    | 117   | 99    |
| 31          | 96                                                   | ----- | 77    | 74    | ----- | 74    | ----- | 680    | -----  | 148    | 114   | ----- |
| TOTAL       | 3,272                                                | 2,676 | 2,438 | 2,282 | 1,986 | 2,162 | 2,454 | 10,499 | 19,919 | 6,683  | 3,902 | 3,132 |
| MEAN        | 106                                                  | 89.2  | 78.6  | 73.6  | 70.9  | 69.7  | 81.8  | 339    | 664    | 216    | 126   | 104   |
| MAX         | 117                                                  | 101   | 87    | 91    | 76    | 76    | 99    | 988    | 940    | 335    | 148   | 119   |
| MIN         | 89                                                   | 54    | 62    | 57    | 62    | 55    | 66    | 98     | 355    | 148    | 112   | 98    |
| AC-FT       | 6,490                                                | 5,310 | 4,840 | 4,530 | 3,940 | 4,290 | 4,870 | 20,820 | 39,510 | 13,260 | 7,740 | 6,210 |
| CAL YR 1970 | TOTAL 80,934 MEAN 222 MAX 1,370 MIN 47 AC-FT 160,500 |       |       |       |       |       |       |        |        |        |       |       |
| WTR YR 1971 | TOTAL 61,405 MEAN 168 MAX 988 MIN 54 AC-FT 121,800   |       |       |       |       |       |       |        |        |        |       |       |

## PEAK DISCHARGE (BASE, 510 CFS)

| DATE | TIME | G.HT. | DISCHARGE | DATE | TIME | G.HT. | DISCHARGE |
|------|------|-------|-----------|------|------|-------|-----------|
| 5-29 | 0945 | 3.83  | 1,180     | 6-10 | 2130 | 3.68  | 1,060     |
| 6-3  | 2215 | 3.43  | 860       |      |      |       |           |



06290500 Little Bighorn River below Pass Creek, near Wyola, Mont.

LOCATION.--Lat 45°10'38", long 107°23'36", in WSW 1/4 sec. 35, T.7 S., R.35 E., Big Horn County, on right bank 3.5 miles north of Wyola and 6 miles downstream from Pass Creek.

DRAINAGE AREA.--428 sq mi.

PERIOD OF RECORD.--March 1939 to December 1958, August 1959 to current year. Prior to October 1940, published as Little Horn River below Pass Creek, near Wyola.

GAGE.--Water-stage recorder. Altitude of gage is 3,600 ft (from topographic map).

AVERAGE DISCHARGE.--31 years, 204 cfs (147,800 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 1,240 cfs May 29 (gage height, 4.60 ft); maximum gage height, 6.96 ft Feb. 11 (backwater from ice); minimum discharge, 96 cfs Aug. 26, 27, but may have been less during period of ice effect.

Period of record: Maximum discharge, 3,630 cfs June 14, 1963 (gage height, 7.43 ft), from rating curve extended above 2,800 cfs; minimum, 12 cfs Aug. 5, 7, 8, 1961 (gage height, 0.89 ft).

REMARKS.--Records excellent except those for winter period, which are poor. Diversions for irrigation of about 7,700 acres above station. Records of chemical analyses, water temperatures, and suspended sediment loads for the current year are published in Part 2 of this report.

REVISIONS.--WSP 1729: Drainage area.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT   | NOV     | DEC   | JAN   | FEB    | MAR    | APR    | MAY    | JUN    | JUL     | AUG   | SEP   |
|-------------|-------|---------|-------|-------|--------|--------|--------|--------|--------|---------|-------|-------|
| 1           | 162   | 153     | 170   | 150   | 135    | 130    | 201    | 284    | 870    | 350     | 141   | 115   |
| 2           | 162   | 150     | 153   | 140   | 140    | 135    | 193    | 284    | 835    | 332     | 143   | 108   |
| 3           | 165   | 148     | 153   | 130   | 140    | 135    | 190    | 305    | 885    | 341     | 148   | 113   |
| 4           | 157   | 145     | 148   | 125   | 140    | 135    | 180    | 338    | 945    | 332     | 153   | 150   |
| 5           | 150   | 145     | 141   | 120   | 140    | 141    | 175    | 368    | 915    | 311     | 150   | 136   |
| 6           | 155   | 150     | 143   | 125   | 125    | 139    | 172    | 413    | 935    | 299     | 145   | 121   |
| 7           | 155   | 148     | 148   | 135   | 120    | 139    | 188    | 419    | 885    | 275     | 139   | 134   |
| 8           | 155   | 153     | 148   | 140   | 140    | 134    | 215    | 422    | 860    | 253     | 136   | 143   |
| 9           | 153   | 148     | 145   | 135   | 150    | 143    | 193    | 452    | 970    | 253     | 143   | 132   |
| 10          | 170   | 162     | 139   | 130   | 160    | 180    | 190    | 437    | 990    | 242     | 141   | 125   |
| 11          | 162   | 160     | 145   | 125   | 200    | 255    | 198    | 410    | 1,010  | 231     | 141   | 119   |
| 12          | 170   | 155     | 150   | 120   | 400    | 267    | 185    | 425    | 915    | 225     | 139   | 115   |
| 13          | 175   | 165     | 155   | 115   | 500    | 278    | 175    | 476    | 885    | 212     | 130   | 117   |
| 14          | 162   | 160     | 160   | 110   | 400    | 228    | 172    | 562    | 875    | 198     | 125   | 117   |
| 15          | 150   | 153     | 160   | 125   | 350    | 190    | 177    | 587    | 830    | 193     | 123   | 123   |
| 16          | 157   | 153     | 150   | 140   | 250    | 177    | 183    | 602    | 782    | 185     | 121   | 132   |
| 17          | 155   | 150     | 139   | 145   | 225    | 165    | 177    | 576    | 778    | 170     | 119   | 139   |
| 18          | 153   | 153     | 143   | 150   | 175    | 150    | 183    | 510    | 755    | 165     | 119   | 139   |
| 19          | 153   | 153     | 130   | 150   | 160    | 148    | 183    | 446    | 702    | 162     | 117   | 136   |
| 20          | 155   | 155     | 125   | 150   | 145    | 167    | 188    | 404    | 650    | 155     | 119   | 143   |
| 21          | 155   | 155     | 130   | 145   | 135    | 201    | 198    | 380    | 626    | 150     | 117   | 150   |
| 22          | 153   | 130     | 135   | 140   | 130    | 155    | 329    | 443    | 569    | 143     | 117   | 141   |
| 23          | 153   | 100     | 135   | 145   | 140    | 155    | 281    | 413    | 548    | 143     | 117   | 136   |
| 24          | 153   | 185     | 140   | 145   | 145    | 162    | 255    | 374    | 520    | 148     | 117   | 134   |
| 25          | 155   | 177     | 150   | 145   | 150    | 234    | 905    | 380    | 485    | 162     | 106   | 132   |
| 26          | 148   | 160     | 150   | 145   | 145    | 247    | 666    | 422    | 458    | 160     | 104   | 132   |
| 27          | 143   | 157     | 155   | 145   | 140    | 311    | 482    | 545    | 443    | 153     | 100   | 134   |
| 28          | 145   | 153     | 155   | 145   | 135    | 244    | 383    | 733    | 437    | 157     | 102   | 132   |
| 29          | 148   | 155     | 160   | 140   | -----  | 207    | 326    | 1,060  | 413    | 162     | 106   | 130   |
| 30          | 150   | 165     | 160   | 140   | -----  | 215    | 302    | 1,150  | 377    | 155     | 128   | 132   |
| 31          | 153   | -----   | 160   | 135   | -----  | 242    | -----  | 995    | -----  | 148     | 123   | ----- |
| TOTAL       | 4,832 | 4,596   | 4,575 | 4,230 | 5,315  | 5,809  | 7,845  | 15,615 | 22,148 | 6,565   | 3,929 | 3,910 |
| MEAN        | 156   | 153     | 148   | 136   | 190    | 187    | 262    | 504    | 738    | 212     | 127   | 130   |
| MAX         | 175   | 185     | 170   | 150   | 500    | 311    | 905    | 1,150  | 1,010  | 350     | 153   | 150   |
| MIN         | 143   | 100     | 125   | 110   | 120    | 130    | 172    | 284    | 377    | 143     | 100   | 108   |
| AC-FT       | 9,580 | 9,120   | 9,070 | 8,390 | 10,540 | 11,520 | 15,560 | 30,970 | 43,930 | 13,020  | 7,790 | 7,760 |
| CAL YR 1970 | TOTAL | 128,302 | MEAN  | 352   | MAX    | 1,730  | MIN    | 80     | AC-FT  | 254,500 |       |       |
| WTR YR 1971 | TOTAL | 89,369  | MEAN  | 245   | MAX    | 1,150  | MIN    | 100    | AC-FT  | 177,300 |       |       |

## PEAK DISCHARGE (BASE, 580 CFS)

| DATE | TIME | G.HT. | DISCHARGE | DATE | TIME | G.HT. | DISCHARGE |
|------|------|-------|-----------|------|------|-------|-----------|
| 2-13 | --   | --    | a700      | 5-29 | 2045 | 4.60  | 1,240     |
| 4-25 | 0900 | 4.58  | 1,230     | 6-11 | 0900 | 4.35  | 1,090     |
| 5-16 | 0645 | 3.37  | 630       |      |      |       |           |

a About.

NOTE.--Stage-discharge relation affected by ice Dec. 19 to Mar. 4.

06291500 Lodgegrass Creek above Willow Creek diversion, near Wyola, Mont.

LOCATION.--Lat 45°07'30", long. 107°36'00", in W<sup>1</sup>/<sub>4</sub> sec. 19, T. 8 S., R. 34 E., Big Horn County, on left bank 0.5 mile upstream from Willow Creek diversion canal, 1.5 miles downstream from Spring Creek, and 10 miles west of Wyola.

DRAINAGE AREA.--80.7 sq mi.

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

GAGE.--Water-stage recorder. Altitude of gage is 4,360 ft (from topographic map).

AVERAGE DISCHARGE.--32 years, 48.9 cfs (35,430 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 378 cfs June 11 (gage height, 4.35 ft); minimum daily, 15 cfs Jan. 14.

Period of record: Maximum discharge, 1,130 cfs June 9, 1964 (gage height, 6.14 ft), from rating curve extended above 600 cfs; minimum daily, 3.0 cfs Jan. 17, 18, 25, 30, 31, 1950, Jan. 15, 16, 1954.

REMARKS.--Records good except those for winter period, which are poor. Diversions for irrigation of about 400 acres above station.

REVISIONS (WATER YEARS).--WSP 1559: 1944-47. WSP 1629: Drainage area.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT          | NOV       | DEC     | JAN    | FEB          | MAR   | APR   | MAY   | JUN    | JUL   | AUG   | SEP   |
|-------------|--------------|-----------|---------|--------|--------------|-------|-------|-------|--------|-------|-------|-------|
| 1           | 31           | 23        | 28      | 21     | 23           | 18    | 30    | 59    | 253    | 119   | 37    | 26    |
| 2           | 32           | 22        | 24      | 20     | 22           | 18    | 29    | 70    | 251    | 114   | 33    | 25    |
| 3           | 32           | 22        | 23      | 19     | 22           | 18    | 30    | 89    | 253    | 110   | 33    | 32    |
| 4           | 31           | 22        | 22      | 19     | 21           | 19    | 29    | 98    | 256    | 107   | 33    | 36    |
| 5           | 31           | 23        | 22      | 19     | 20           | 20    | 29    | 106   | 268    | 102   | 31    | 29    |
| 6           | 32           | 23        | 23      | 20     | 19           | 21    | 32    | 116   | 280    | 97    | 29    | 25    |
| 7           | 33           | 23        | 22      | 21     | 18           | 23    | 37    | 106   | 287    | 89    | 29    | 32    |
| 8           | 32           | 24        | 23      | 21     | 20           | 21    | 40    | 103   | 280    | 82    | 28    | 29    |
| 9           | 32           | 23        | 23      | 20     | 22           | 20    | 34    | 110   | 305    | 79    | 30    | 25    |
| 10          | 35           | 27        | 22      | 20     | 25           | 24    | 40    | 100   | 350    | 78    | 33    | 23    |
| 11          | 33           | 26        | 20      | 19     | 26           | 31    | 33    | 90    | 368    | 76    | 32    | 22    |
| 12          | 36           | 27        | 20      | 18     | 28           | 32    | 31    | 97    | 346    | 74    | 31    | 21    |
| 13          | 36           | 27        | 20      | 17     | 30           | 37    | 29    | 112   | 314    | 70    | 30    | 21    |
| 14          | 31           | 26        | 21      | 15     | 28           | 29    | 30    | 139   | 317    | 67    | 29    | 21    |
| 15          | 28           | 25        | 22      | 18     | 27           | 23    | 33    | 147   | 337    | 65    | 28    | 23    |
| 16          | 28           | 24        | 22      | 20     | 25           | 20    | 34    | 153   | 324    | 63    | 28    | 25    |
| 17          | 27           | 24        | 21      | 22     | 25           | 19    | 32    | 147   | 320    | 60    | 28    | 26    |
| 18          | 27           | 25        | 21      | 23     | 23           | 19    | 34    | 130   | 301    | 59    | 27    | 24    |
| 19          | 27           | 24        | 20      | 23     | 21           | 18    | 32    | 115   | 294    | 57    | 21    | 24    |
| 20          | 27           | 24        | 20      | 22     | 20           | 22    | 36    | 104   | 265    | 55    | 19    | 28    |
| 21          | 26           | 24        | 19      | 21     | 20           | 22    | 45    | 98    | 252    | 52    | 18    | 27    |
| 22          | 27           | 22        | 18      | 20     | 21           | 20    | 86    | 116   | 237    | 53    | 19    | 24    |
| 23          | 26           | 20        | 18      | 20     | 23           | 18    | 49    | 103   | 232    | 51    | 19    | 23    |
| 24          | 26           | 23        | 18      | 20     | 24           | 26    | 70    | 92    | 222    | 50    | 19    | 22    |
| 25          | 26           | 24        | 18      | 21     | 24           | 33    | 180   | 97    | 210    | 51    | 19    | 22    |
| 26          | 25           | 24        | 19      | 21     | 24           | 47    | 98    | 110   | 194    | 49    | 22    | 22    |
| 27          | 25           | 24        | 20      | 22     | 23           | 47    | 78    | 150   | 175    | 47    | 22    | 23    |
| 28          | 25           | 23        | 20      | 23     | 20           | 34    | 66    | 218   | 160    | 49    | 21    | 22    |
| 29          | 24           | 24        | 21      | 24     | -----        | 32    | 60    | 332   | 146    | 45    | 23    | 21    |
| 30          | 24           | 27        | 22      | 25     | -----        | 40    | 56    | 348   | 131    | 43    | 32    | 22    |
| 31          | 24           | -----     | 22      | 24     | -----        | 34    | ----- | 301   | -----  | 41    | 29    | ----- |
| TOTAL       | 899          | 719       | 654     | 638    | 644          | 805   | 1,442 | 4,156 | 7,928  | 2,154 | 832   | 745   |
| MEAN        | 29.0         | 24.0      | 21.1    | 20.6   | 23.0         | 26.0  | 48.1  | 134   | 264    | 69.5  | 26.8  | 24.8  |
| MAX         | 36           | 27        | 28      | 25     | 30           | 47    | 180   | 348   | 368    | 119   | 37    | 36    |
| MIN         | 24           | 20        | 18      | 15     | 18           | 18    | 29    | 59    | 131    | 41    | 18    | 21    |
| AC-FT       | 1,780        | 1,430     | 1,300   | 1,270  | 1,280        | 1,600 | 2,860 | 8,240 | 15,730 | 4,270 | 1,650 | 1,480 |
| CAL YR 1970 | TOTAL 31,508 | MEAN 86.3 | MAX 529 | MIN 14 | AC-FT 62,500 |       |       |       |        |       |       |       |
| WTR YR 1971 | TOTAL 21,616 | MEAN 59.2 | MAX 368 | MIN 15 | AC-FT 42,880 |       |       |       |        |       |       |       |

PEAK DISCHARGE (BASE, 270 CFS)

| DATE | TIME | G.H.T. | DISCHARGE | DATE | TIME | G.H.T. | DISCHARGE |
|------|------|--------|-----------|------|------|--------|-----------|
| 4-25 | 0300 | 4.31   | 360       | 6-11 | 1545 | 4.35   | 378       |
| 5-29 | 2315 | 4.31   | 369       |      |      |        |           |

NOTE.--Stage-discharge relation affected by ice Dec. 17 to Mar. 5.

## YELLOWSTONE RIVER BASIN

06294000 Little Bighorn River near Hardin, Mont.

LOCATION.--Lat 45°44'08", long 107°33'27", in NE1/4 sec.19, T.1 S., R.34 E., Big Horn County, on left bank 50 ft downstream from bridge on Sarpy Road, 0.2 mile upstream from terminal wasteway of Agency Canal, 0.6 mile upstream from mouth, and 2.3 miles east of Hardin.

DRAINAGE AREA.--1,294 sq mi.

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

GAGE.--Water-stage recorder. Altitude of gage is 2,890 ft (from topographic map). Prior to Oct. 7, 1953, nonrecording gage at site 0.4 mile downstream. Oct. 7, 1953, to May 6, 1963, water-stage recorder at site 0.3 mile downstream. May 6, 1963, to Nov. 6, 1963, nonrecording gage at site 0.4 mile downstream. All at different datums.

AVERAGE DISCHARGE.--18 years, 281 cfs (203,600 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, about 2,000 cfs Feb. 14 (gage height, 7.30 ft, backwater from ice); minimum daily, 100 cfs Dec. 21.

Period of record: Maximum discharge, 4,520 cfs Apr. 2, 1965; maximum gage height, 11.78 ft Mar. 20, 1960, site and datum then in use (backwater from ice); minimum discharge observed, 0.20 cfs Aug. 7, 1961, result of discharge measurement.

REMARKS.--Records good except those for winter period, which are poor. Flow partly regulated by Willow Creek Reservoir (capacity, 23,000 acre-ft). Diversions for irrigation of about 17,000 acres above station. Figures of discharge given herein include flow of terminal wasteway of Agency Canal. Records of chemical analyses, water temperatures, and suspended sediment loads for the current year are published in Part 2 of this report.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT           | NOV    | DEC    | JAN    | FEB    | MAR    | APR    | MAY    | JUN    | JUL    | AUG   | SEP    |
|-------------|---------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|--------|
| 1           | 219           | 229    | 286    | 185    | 270    | 450    | 895    | 531    | 1,220  | 427    | 173   | 247    |
| 2           | 213           | 229    | 300    | 175    | 220    | 400    | 511    | 491    | 1,140  | 379    | 178   | 215    |
| 3           | 215           | 225    | 290    | 165    | 200    | 360    | 521    | 466    | 1,120  | 348    | 171   | 198    |
| 4           | 220           | 229    | 250    | 155    | 195    | 330    | 480    | 461    | 1,070  | 346    | 162   | 181    |
| 5           | 220           | 229    | 160    | 145    | 190    | 360    | 506    | 461    | 1,080  | 351    | 162   | 201    |
| 6           | 221           | 220    | 165    | 135    | 185    | 410    | 505    | 491    | 1,080  | 331    | 156   | 202    |
| 7           | 217           | 229    | 170    | 140    | 185    | 470    | 510    | 501    | 1,100  | 301    | 160   | 193    |
| 8           | 227           | 229    | 175    | 150    | 180    | 410    | 516    | 523    | 1,080  | 281    | 156   | 180    |
| 9           | 227           | 229    | 185    | 160    | 175    | 450    | 549    | 534    | 1,040  | 257    | 152   | 205    |
| 10          | 228           | 238    | 190    | 170    | 170    | 495    | 521    | 533    | 1,150  | 252    | 154   | 206    |
| 11          | 233           | 239    | 190    | 170    | 200    | 710    | 516    | 535    | 1,370  | 243    | 151   | 193    |
| 12          | 247           | 248    | 190    | 160    | 420    | 1,120  | 516    | 509    | 1,290  | 243    | 150   | 181    |
| 13          | 238           | 243    | 190    | 160    | 1,000  | 1,620  | 476    | 504    | 1,240  | 225    | 139   | 175    |
| 14          | 238           | 247    | 190    | 150    | 1,700  | 1,410  | 446    | 543    | 1,170  | 184    | 131   | 165    |
| 15          | 224           | 251    | 185    | 140    | 1,500  | 1,240  | 427    | 598    | 1,120  | 183    | 128   | 170    |
| 16          | 238           | 243    | 175    | 130    | 1,300  | 956    | 413    | 648    | 1,090  | 175    | 133   | 176    |
| 17          | 251           | 238    | 170    | 120    | 1,200  | 723    | 409    | 667    | 1,050  | 171    | 132   | 192    |
| 18          | 241           | 238    | 160    | 130    | 1,100  | 616    | 395    | 664    | 1,000  | 161    | 139   | 195    |
| 19          | 254           | 233    | 150    | 150    | 1,000  | 526    | 373    | 573    | 989    | 134    | 137   | 183    |
| 20          | 237           | 238    | 130    | 170    | 900    | 555    | 395    | 512    | 922    | 126    | 136   | 181    |
| 21          | 233           | 230    | 100    | 190    | 800    | 880    | 396    | 461    | 864    | 131    | 131   | 196    |
| 22          | 233           | 170    | 105    | 210    | 700    | 693    | 428    | 434    | 789    | 120    | 138   | 208    |
| 23          | 238           | 110    | 110    | 240    | 600    | 531    | 562    | 509    | 709    | 116    | 138   | 212    |
| 24          | 238           | 160    | 120    | 230    | 500    | 506    | 597    | 520    | 657    | 103    | 126   | 205    |
| 25          | 238           | 210    | 130    | 220    | 600    | 573    | 441    | 450    | 619    | 122    | 124   | 190    |
| 26          | 238           | 230    | 140    | 210    | 570    | 935    | 1,100  | 425    | 564    | 130    | 127   | 182    |
| 27          | 238           | 250    | 160    | 200    | 540    | 1,670  | 1,080  | 436    | 552    | 139    | 127   | 180    |
| 28          | 243           | 220    | 170    | 190    | 490    | 1,870  | 911    | 500    | 528    | 147    | 120   | 179    |
| 29          | 243           | 240    | 180    | 220    | -----  | 1,270  | 672    | 717    | 505    | 176    | 109   | 182    |
| 30          | 238           | 270    | 190    | 260    | -----  | 1,020  | 639    | 1,020  | 467    | 200    | 176   | 179    |
| 31          | 229           | -----  | 190    | 300    | -----  | 999    | -----  | 1,290  | -----  | 208    | 206   | -----  |
| TOTAL       | 7,217         | 6,794  | 5,496  | 5,530  | 17,090 | 24,558 | 16,706 | 17,507 | 28,575 | 6,710  | 4,522 | 5,752  |
| MEAN        | 233           | 226    | 177    | 178    | 610    | 792    | 557    | 565    | 953    | 216    | 146   | 192    |
| MAX         | 254           | 270    | 300    | 300    | 1,700  | 1,870  | 1,100  | 1,290  | 1,370  | 427    | 206   | 247    |
| MIN         | 213           | 110    | 100    | 120    | 170    | 330    | 373    | 425    | 467    | 103    | 109   | 165    |
| AC-FT       | 14,310        | 13,480 | 10,900 | 10,970 | 33,900 | 48,710 | 33,140 | 34,730 | 56,680 | 13,310 | 8,970 | 11,410 |
| CAL YR 1970 | TOTAL 193,856 |        |        |        |        |        |        |        |        |        |       |        |
| WTR YR 1971 | TOTAL 146,457 |        |        |        |        |        |        |        |        |        |       |        |
|             | MEAN 531      |        |        |        |        |        |        |        |        |        |       |        |
|             | MAX 2,390     |        |        |        |        |        |        |        |        |        |       |        |
|             | MIN 100       |        |        |        |        |        |        |        |        |        |       |        |
|             | AC-FT 384,500 |        |        |        |        |        |        |        |        |        |       |        |
|             | MIN 100       |        |        |        |        |        |        |        |        |        |       |        |
|             | AC-FT 290,500 |        |        |        |        |        |        |        |        |        |       |        |

## PEAK DISCHARGE (BASE, 1,000 CFS)

| DATE | TIME | G.H.T. | DISCHARGE | DATE | TIME | G.H.T. | DISCHARGE |
|------|------|--------|-----------|------|------|--------|-----------|
| 2-14 | 1400 | a7.30  | b2,000    | 3-28 | 0200 | 4.97   | 1,980     |
| 3-13 | 1800 | --     | 1,990     | 4-26 | --   | 4.33   | 1,440     |
| 3-21 | 0500 | 3.85   | 1,050     | 6-11 | 0130 | --     | 1,400     |

a Backwater from ice.

b About.

NOTE.--Stage-discharge relation affected by ice Dec. 2 to Mar. 14.

## YELLOWSTONE RIVER BASIN

169

06294700 Bighorn River at Bighorn, Mont.

LOCATION.--Lat 46°08'50", long 107°28'00", in NE1/4 sec.33, T.5 N., R.34 E., Treasure County, on right bank just downstream from bridge on old U.S. Highway 10, 0.3 mile downstream from bridge on Interstate Highway 94, 0.7 mile upstream from mouth, 1.3 miles southwest of Bighorn, and 4.4 miles east of Custer.

DRAINAGE AREA.--22,885 sq mi.

PERIOD OF RECORD.--May 1945 to current year. Prior to Oct. 6, 1955, published as "near Custer."

GAGE.--Water-stage recorder. Altitude of gage is 2,690 ft (by barometer). May 11 to Dec. 6, 1945, non-recording gage, and Dec. 7, 1945, to Oct. 6, 1955, water-stage recorder, at site 4 miles upstream at different datum.

AVERAGE DISCHARGE.--26 years, 3,805 cfs (2,757,000 acre-ft per year), unadjusted.

EXTREMES.--Current year: Maximum discharge, 13,000 cfs Feb. 14 (gage height, 6.26 ft); maximum gage height, 9.48 ft Feb. 12 (backwater from ice); minimum daily, 1,180 cfs Oct. 23.

Period of record: Maximum discharge, 26,200 cfs June 24, 1947 (gage height, 8.79 ft, site and datum then in use), from rating curve extended above 12,500 cfs; maximum gage height recorded, 14.21 ft Apr. 2, 1965 (ice jam); minimum discharge, about 275 cfs Nov. 15, 1959, result of freezeup; minimum daily, 400 cfs Apr. 4, 1967.

REMARKS.--Records good except those for period of backwater from Yellowstone River, which are fair. Major regulation by 14 reservoirs in Wyoming and 1 in Montana with combined usable storage of about 1,400,000 acre-ft, and Bighorn Lake (see p. 158). Diversions for irrigation of about 465,000 acres above station. Records of chemical analyses, water temperatures, and suspended sediment loads for the current year are published in Part 2 of this report.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT                                                             | NOV     | DEC     | JAN     | FEB     | MAR     | APR     | MAY     | JUN     | JUL     | AUG     | SEP     |
|-------------|-----------------------------------------------------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 1           | 1,990                                                           | 3,280   | 3,080   | 4,800   | 4,000   | 4,600   | 6,820   | 6,300   | 8,790   | 7,640   | 5,020   | 3,140   |
| 2           | 2,010                                                           | 3,380   | 3,050   | 4,770   | 4,000   | 4,600   | 6,420   | 6,180   | 9,290   | 7,470   | 5,060   | 3,010   |
| 3           | 2,720                                                           | 3,580   | 3,080   | 4,730   | 3,700   | 4,930   | 6,150   | 6,130   | 9,370   | 7,420   | 3,990   | 3,120   |
| 4           | 2,800                                                           | 3,660   | 3,050   | 4,700   | 3,500   | 4,820   | 6,180   | 6,150   | 9,260   | 6,630   | 3,520   | 3,200   |
| 5           | 2,760                                                           | 3,640   | 2,970   | 4,700   | 3,500   | 4,820   | 6,080   | 6,220   | 9,260   | 6,440   | 3,460   | 2,930   |
| 6           | 2,820                                                           | 3,640   | 2,930   | 4,700   | 3,400   | 5,130   | 6,130   | 6,270   | 8,530   | 6,270   | 3,480   | 2,840   |
| 7           | 2,720                                                           | 3,680   | 2,990   | 4,400   | 3,300   | 5,210   | 6,370   | 6,300   | 8,790   | 6,080   | 3,500   | 2,530   |
| 8           | 2,760                                                           | 3,660   | 3,420   | 3,950   | 3,400   | 5,280   | 6,220   | 5,730   | 8,820   | 5,730   | 3,540   | 2,950   |
| 9           | 2,800                                                           | 2,970   | 3,990   | 3,720   | 4,000   | 5,430   | 6,340   | 6,390   | 9,080   | 5,730   | 3,460   | 2,900   |
| 10          | 2,900                                                           | 3,700   | 4,010   | 3,580   | 4,500   | 5,980   | 6,540   | 6,460   | 9,370   | 5,730   | 3,420   | 2,820   |
| 11          | 2,860                                                           | 3,660   | 3,950   | 3,540   | 5,500   | 6,630   | 6,420   | 6,460   | 9,780   | 5,730   | 3,420   | 2,780   |
| 12          | 2,880                                                           | 3,680   | 3,910   | 3,400   | 6,500   | 7,100   | 6,390   | 6,370   | 9,700   | 5,710   | 3,560   | 2,720   |
| 13          | 3,080                                                           | 3,680   | 3,910   | 3,300   | 10,400  | 7,800   | 6,390   | 7,000   | 9,310   | 5,620   | 3,680   | 2,700   |
| 14          | 3,030                                                           | 3,660   | 3,910   | 3,200   | 12,800  | 7,420   | 6,270   | 8,070   | 9,110   | 5,980   | 3,160   | 2,690   |
| 15          | 3,160                                                           | 3,660   | 4,240   | 3,300   | 11,400  | 6,820   | 6,270   | 8,480   | 9,110   | 6,150   | 3,120   | 2,700   |
| 16          | 2,910                                                           | 3,680   | 4,370   | 4,000   | 9,210   | 6,340   | 6,220   | 8,480   | 9,110   | 6,560   | 3,180   | 2,700   |
| 17          | 2,700                                                           | 3,680   | 4,410   | 5,200   | 6,780   | 5,980   | 6,250   | 8,430   | 8,980   | 6,580   | 3,260   | 2,720   |
| 18          | 2,690                                                           | 3,600   | 4,750   | 5,800   | 5,130   | 5,410   | 6,220   | 8,530   | 8,950   | 5,870   | 3,100   | 2,760   |
| 19          | 2,670                                                           | 3,100   | 4,800   | 6,000   | 3,820   | 4,930   | 4,880   | 8,270   | 8,480   | 5,570   | 3,380   | 2,760   |
| 20          | 2,970                                                           | 3,080   | 4,700   | 6,000   | 3,840   | 5,260   | 5,590   | 8,590   | 8,480   | 5,460   | 3,440   | 2,760   |
| 21          | 3,360                                                           | 3,070   | 4,700   | 5,700   | 3,800   | 5,500   | 4,970   | 8,220   | 8,430   | 4,970   | 2,780   | 2,820   |
| 22          | 3,260                                                           | 2,990   | 4,730   | 4,710   | 3,640   | 5,200   | 5,640   | 8,270   | 8,480   | 4,560   | 2,400   | 2,820   |
| 23          | 1,180                                                           | 2,800   | 4,700   | 4,350   | 4,200   | 5,500   | 6,060   | 8,510   | 8,400   | 4,560   | 2,400   | 2,880   |
| 24          | 1,400                                                           | 3,340   | 4,730   | 4,140   | 4,600   | 5,570   | 6,320   | 8,590   | 8,100   | 5,130   | 2,350   | 2,880   |
| 25          | 3,240                                                           | 3,740   | 4,730   | 3,910   | 5,240   | 6,060   | 6,220   | 8,300   | 8,300   | 4,620   | 2,350   | 2,860   |
| 26          | 3,260                                                           | 3,420   | 4,730   | 3,860   | 5,100   | 6,440   | 6,730   | 8,250   | 8,270   | 4,220   | 2,380   | 2,840   |
| 27          | 3,300                                                           | 3,070   | 4,730   | 3,920   | 4,820   | 7,340   | 7,800   | 8,270   | 8,100   | 4,660   | 2,420   | 2,840   |
| 28          | 3,260                                                           | 3,050   | 4,750   | 3,820   | 4,700   | 8,040   | 7,270   | 8,170   | 7,970   | 4,840   | 2,460   | 2,840   |
| 29          | 3,260                                                           | 3,030   | 4,750   | 4,560   | -----   | 7,900   | 6,820   | 7,900   | 7,640   | 4,750   | 2,480   | 2,860   |
| 30          | 3,280                                                           | 3,080   | 4,770   | 4,710   | -----   | 7,120   | 6,560   | 8,380   | 7,620   | 4,690   | 2,910   | 2,860   |
| 31          | 3,300                                                           | -----   | 4,800   | 4,000   | -----   | 6,850   | -----   | 8,740   | -----   | 4,430   | 3,220   | -----   |
| TOTAL       | 87,330                                                          | 102,260 | 127,640 | 135,370 | 148,780 | 186,010 | 188,540 | 232,410 | 262,880 | 175,800 | 99,900  | 85,230  |
| MEAN        | 2,817                                                           | 3,409   | 4,117   | 4,367   | 5,314   | 6,060   | 6,285   | 7,497   | 8,763   | 5,671   | 3,223   | 2,841   |
| MAX         | 3,360                                                           | 3,740   | 4,800   | 6,000   | 12,800  | 8,040   | 7,800   | 8,740   | 9,780   | 7,640   | 5,060   | 3,200   |
| MIN         | 1,180                                                           | 2,800   | 2,930   | 3,200   | 3,300   | 4,600   | 4,880   | 5,730   | 7,620   | 4,220   | 2,350   | 2,530   |
| AC-FT       | 173,200                                                         | 202,800 | 253,200 | 268,500 | 295,100 | 369,000 | 374,000 | 461,000 | 521,400 | 348,700 | 198,200 | 169,100 |
| CAL YR 1970 | TOTAL 1,429,270 MEAN 3,916 MAX 15,100 MIN 1,060 AC-FT 2,835,000 |         |         |         |         |         |         |         |         |         |         |         |
| WTR YR 1971 | TOTAL 1,832,150 MEAN 5,020 MAX 12,800 MIN 1,180 AC-FT 3,634,000 |         |         |         |         |         |         |         |         |         |         |         |

NOTE.--Stage-discharge relation affected by backwater from Yellowstone River May 27 to July 31.

## YELLOWSTONE RIVER BASIN

06306250 Prairie Dog Creek near Acme, Wyo.

LOCATION.--Lat 44°59'02", long 106°50'21", in NE $\frac{1}{4}$ SW $\frac{1}{4}$  sec.23, T.58 N., R.83 W., Sheridan County, on right bank, 600 ft upstream from county bridge, 0.9 mile upstream from mouth, 2.8 miles downstream from Coutant Creek and 7.6 miles northeast of Acme.

DRAINAGE AREA.--358 sq mi.

PERIOD OF RECORD.--October 1970 to September 1971. Records for May 1965 to September 1970 in files of Office of Wyoming State Engineer.

GAGE.--Water-stage recorder. Altitude of gage is 3,450 ft (from topographic map).

EXTREMES.--Current year: Maximum discharge, 567 cfs Mar. 28 (gage height, 5.21 ft), from rating curve extended above 90 cfs on basis of step-backwater computation; maximum gage height, 5.62 ft Feb. 16 (backwater from ice); minimum discharge, 6.4 cfs Aug. 17 (gage height, 0.68 ft).

REMARKS.--Records good except those for winter period, which are poor. Diversions for irrigation of about 13,600 acres above station, of which about 60 acres lies below station. Flow supplemented by 3 transbasin diversions from North Piney Creek and South Piney Creek via Prairie Dog ditch, Piney and Cruse ditch and Mead-Coffeen ditch.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT                                                   | NOV   | DEC   | JAN   | FEB   | MAR   | APR   | MAY   | JUN   | JUL   | AUG   | SEP   |
|-------------|-------------------------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1           | 38                                                    | 43    | 37    | 25    | 22    | 28    | 178   | 108   | 91    | 18    | 10    | 27    |
| 2           | 35                                                    | 43    | 38    | 23    | 23    | 32    | 132   | 91    | 71    | 16    | 9.8   | 25    |
| 3           | 34                                                    | 43    | 35    | 21    | 23    | 35    | 93    | 81    | 55    | 12    | 9.8   | 25    |
| 4           | 32                                                    | 40    | 33    | 20    | 24    | 35    | 80    | 73    | 48    | 13    | 9.5   | 33    |
| 5           | 27                                                    | 36    | 25    | 20    | 23    | 33    | 69    | 68    | 46    | 13    | 9.8   | 34    |
| 6           | 31                                                    | 34    | 20    | 22    | 22    | 30    | 64    | 63    | 41    | 16    | 9.5   | 36    |
| 7           | 32                                                    | 36    | 25    | 23    | 20    | 30    | 63    | 58    | 38    | 15    | 8.5   | 30    |
| 8           | 36                                                    | 38    | 42    | 25    | 20    | 35    | 65    | 54    | 35    | 11    | 8.5   | 24    |
| 9           | 39                                                    | 41    | 35    | 24    | 25    | 50    | 71    | 52    | 28    | 10    | 8.3   | 21    |
| 10          | 40                                                    | 41    | 30    | 23    | 30    | 70    | 65    | 46    | 28    | 13    | 7.6   | 20    |
| 11          | 42                                                    | 38    | 22    | 20    | 40    | 80    | 62    | 46    | 32    | 16    | 7.4   | 18    |
| 12          | 48                                                    | 38    | 18    | 18    | 50    | 85    | 61    | 44    | 34    | 19    | 7.4   | 15    |
| 13          | 52                                                    | 37    | 22    | 16    | 60    | 90    | 58    | 41    | 31    | 15    | 7.6   | 15    |
| 14          | 57                                                    | 37    | 25    | 15    | 80    | 85    | 54    | 40    | 30    | 13    | 8.3   | 15    |
| 15          | 60                                                    | 38    | 25    | 16    | 90    | 90    | 54    | 37    | 26    | 12    | 8.3   | 15    |
| 16          | 57                                                    | 37    | 25    | 18    | 150   | 85    | 51    | 36    | 22    | 12    | 7.8   | 14    |
| 17          | 54                                                    | 36    | 23    | 20    | 250   | 80    | 48    | 33    | 18    | 10    | 7.4   | 15    |
| 18          | 52                                                    | 35    | 21    | 23    | 150   | 70    | 47    | 30    | 16    | 9.5   | 10    | 17    |
| 19          | 52                                                    | 34    | 18    | 25    | 80    | 65    | 46    | 28    | 15    | 9.5   | 14    | 19    |
| 20          | 49                                                    | 34    | 15    | 26    | 70    | 65    | 47    | 20    | 15    | 9.5   | 16    | 21    |
| 21          | 49                                                    | 32    | 16    | 25    | 55    | 60    | 54    | 17    | 16    | 9.5   | 16    | 26    |
| 22          | 50                                                    | 12    | 17    | 25    | 45    | 60    | 69    | 16    | 18    | 9.8   | 15    | 35    |
| 23          | 50                                                    | 15    | 19    | 25    | 40    | 70    | 96    | 16    | 18    | 11    | 12    | 39    |
| 24          | 49                                                    | 25    | 21    | 25    | 35    | 75    | 93    | 27    | 18    | 10    | 8.8   | 38    |
| 25          | 47                                                    | 32    | 23    | 26    | 30    | 84    | 146   | 28    | 19    | 9.5   | 8.8   | 39    |
| 26          | 46                                                    | 33    | 25    | 27    | 28    | 137   | 333   | 22    | 15    | 10    | 10    | 36    |
| 27          | 46                                                    | 35    | 26    | 27    | 28    | 251   | 303   | 17    | 13    | 11    | 9.8   | 34    |
| 28          | 44                                                    | 34    | 28    | 30    | 28    | 457   | 225   | 13    | 14    | 9.2   | 8.8   | 34    |
| 29          | 43                                                    | 35    | 30    | 29    | ----- | 290   | 168   | 13    | 16    | 10    | 11    | 36    |
| 30          | 43                                                    | 35    | 30    | 27    | ----- | 178   | 129   | 17    | 17    | 9.8   | 14    | 38    |
| 31          | 44                                                    | ----- | 28    | 23    | ----- | 149   | ----- | 51    | ----- | 10    | 18    | ----- |
| TOTAL       | 1,378                                                 | 1,047 | 797   | 712   | 1,541 | 2,984 | 3,024 | 1,286 | 884   | 372.3 | 317.7 | 794   |
| MEAN        | 44.5                                                  | 34.9  | 25.7  | 23.0  | 55.0  | 96.3  | 101   | 41.5  | 29.5  | 12.0  | 10.2  | 26.5  |
| MAX         | 60                                                    | 43    | 42    | 30    | 250   | 457   | 333   | 108   | 91    | 19    | 18    | 39    |
| MIN         | 27                                                    | 12    | 15    | 15    | 20    | 28    | 46    | 13    | 13    | 9.2   | 7.4   | 14    |
| AC-FT       | 2,730                                                 | 2,080 | 1,580 | 1,410 | 3,060 | 5,920 | 6,000 | 2,550 | 1,750 | 738   | 630   | 1,570 |
| WTR YR 1971 | TOTAL 15,137.0 MEAN 41.5 MAX 457 MIN 7.4 AC-FT 30,020 |       |       |       |       |       |       |       |       |       |       |       |

NOTE.--Stage-discharge relation affected by ice Nov. 22 to Mar. 24 (no gage-height record Jan. 3, 4, 6-26, Feb. 1-3, 5-13).



## YELLOWSTONE RIVER BASIN

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06306300 Tongue River at State line, near Decker, Mont.

LOCATION.--Lat 45°00'32", long 106°50'08", in NW¼ sec.33, T.9 S., R.40 E., Big Horn County, on left bank 1 mile north of Wyoming-Montana State line, 1.5 miles upstream from Badger Creek, and 1.4 miles southeast of Decker.

DRAINAGE AREA.--1,477 sq mi.

PERIOD OF RECORD.--August 1960 to current year. Records published as "near Decker" May 1928 to September 1938 not equivalent owing to intervening drainage area.

GAGE.--Water-stage recorder. Altitude of gage is 3,430 ft (from topographic map).

AVERAGE DISCHARGE.--11 years, 494 cfs (357,900 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 3,110 cfs May 31 (gage height, 6.99 ft); maximum gage height, 10.93 ft Feb. 15 (backwater from ice); minimum discharge, 42 cfs Nov. 23, result of freezeup.

Period of record: Maximum discharge, 7,480 cfs June 15, 1967 (gage height, 10.86 ft); maximum gage height, 10.94 ft Feb. 6, 1963 (backwater from ice jam); minimum discharge, 3.9 cfs Aug. 23, 1961 (gage height, 1.83 ft).

REMARKS.--Records good except those for winter period, which are poor. Flow regulated by many small reservoirs in Wyoming (combined capacity, about 15,000 acre-ft). Diversions for irrigation of about 57,000 acres above station. Records of chemical analyses and water temperatures for the current year are published in Part 2 of this report.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT           | NOV      | DEC       | JAN     | FEB           | MAR    | APR    | MAY    | JUN     | JUL    | AUG   | SEP    |
|-------------|---------------|----------|-----------|---------|---------------|--------|--------|--------|---------|--------|-------|--------|
| 1           | 262           | 283      | 255       | 230     | 500           | 260    | 505    | 635    | 2,730   | 634    | 158   | 150    |
| 2           | 252           | 277      | 260       | 200     | 350           | 255    | 404    | 617    | 2,710   | 560    | 141   | 138    |
| 3           | 256           | 266      | 250       | 180     | 250           | 250    | 346    | 663    | 2,560   | 514    | 126   | 129    |
| 4           | 252           | 274      | 240       | 160     | 200           | 250    | 338    | 760    | 2,490   | 529    | 123   | 151    |
| 5           | 242           | 252      | 230       | 150     | 180           | 260    | 314    | 879    | 2,450   | 511    | 115   | 183    |
| 6           | 245           | 262      | 240       | 160     | 160           | 240    | 300    | 1,030  | 2,290   | 471    | 105   | 176    |
| 7           | 242           | 273      | 260       | 165     | 150           | 230    | 316    | 1,100  | 2,210   | 424    | 96    | 165    |
| 8           | 252           | 288      | 260       | 170     | 140           | 250    | 370    | 1,100  | 2,070   | 401    | 95    | 165    |
| 9           | 259           | 291      | 250       | 165     | 150           | 300    | 402    | 1,190  | 2,090   | 408    | 97    | 176    |
| 10          | 262           | 275      | 230       | 160     | 160           | 350    | 390    | 1,160  | 2,150   | 404    | 94    | 170    |
| 11          | 288           | 297      | 220       | 155     | 350           | 500    | 411    | 1,060  | 2,180   | 400    | 97    | 158    |
| 12          | 284           | 272      | 210       | 150     | 1,000         | 850    | 444    | 1,090  | 2,220   | 401    | 93    | 150    |
| 13          | 332           | 283      | 210       | 145     | 1,500         | 900    | 396    | 1,240  | 2,390   | 382    | 91    | 143    |
| 14          | 324           | 288      | 220       | 140     | 2,500         | 800    | 341    | 1,450  | 2,550   | 360    | 94    | 142    |
| 15          | 308           | 277      | 230       | 145     | 2,700         | 700    | 354    | 1,620  | 2,440   | 347    | 92    | 134    |
| 16          | 288           | 259      | 250       | 150     | 2,200         | 600    | 372    | 1,610  | 2,310   | 332    | 89    | 138    |
| 17          | 295           | 269      | 270       | 160     | 1,500         | 550    | 393    | 1,510  | 2,210   | 309    | 93    | 156    |
| 18          | 286           | 263      | 260       | 190     | 1,000         | 475    | 375    | 1,330  | 2,150   | 286    | 97    | 178    |
| 19          | 286           | 262      | 230       | 250     | 700           | 430    | 415    | 1,160  | 2,060   | 280    | 94    | 191    |
| 20          | 290           | 250      | 200       | 300     | 500           | 400    | 414    | 1,010  | 1,880   | 270    | 96    | 204    |
| 21          | 285           | 240      | 210       | 300     | 400           | 450    | 425    | 911    | 1,710   | 240    | 98    | 232    |
| 22          | 284           | 150      | 225       | 260     | 350           | 525    | 504    | 903    | 1,620   | 229    | 94    | 242    |
| 23          | 275           | 110      | 230       | 270     | 300           | 400    | 682    | 917    | 1,460   | 235    | 89    | 239    |
| 24          | 281           | 170      | 240       | 280     | 325           | 315    | 558    | 842    | 1,300   | 211    | 82    | 238    |
| 25          | 287           | 300      | 250       | 270     | 350           | 375    | 1,860  | 818    | 1,270   | 196    | 82    | 231    |
| 26          | 285           | 280      | 260       | 280     | 330           | 491    | 1,910  | 877    | 1,210   | 213    | 85    | 221    |
| 27          | 256           | 250      | 270       | 280     | 300           | 623    | 1,380  | 1,050  | 1,130   | 234    | 89    | 212    |
| 28          | 249           | 240      | 265       | 280     | 270           | 845    | 1,010  | 1,350  | 1,040   | 203    | 87    | 211    |
| 29          | 253           | 230      | 260       | 350     | -----         | 622    | 793    | 1,850  | 874     | 195    | 84    | 213    |
| 30          | 276           | 240      | 260       | 600     | -----         | 475    | 730    | 2,720  | 705     | 187    | 106   | 216    |
| 31          | 291           | -----    | 250       | 900     | -----         | 472    | -----  | 2,890  | -----   | 172    | 145   | -----  |
| TOTAL       | 8,527         | 7,671    | 7,495     | 7,595   | 18,815        | 14,443 | 17,452 | 37,342 | 58,459  | 10,538 | 3,127 | 5,452  |
| MEAN        | 275           | 256      | 242       | 245     | 672           | 466    | 582    | 1,205  | 1,949   | 340    | 101   | 182    |
| MAX         | 332           | 300      | 270       | 900     | 2,700         | 900    | 1,910  | 2,890  | 2,730   | 634    | 158   | 242    |
| MIN         | 242           | 110      | 200       | 140     | 140           | 230    | 300    | 617    | 705     | 172    | 82    | 129    |
| AC-FT       | 16,910        | 15,220   | 14,870    | 15,060  | 37,320        | 28,650 | 34,620 | 74,070 | 116,000 | 20,900 | 6,200 | 10,810 |
| CAL YR 1970 | TOTAL 243,501 | MEAN 667 | MAX 3,900 | MIN 100 | AC-FT 483,000 |        |        |        |         |        |       |        |
| WTR YR 1971 | TOTAL 196,916 | MEAN 539 | MAX 2,890 | MIN 82  | AC-FT 390,600 |        |        |        |         |        |       |        |

## PEAK DISCHARGE (BASE, 2,000 CFS)

| DATE | TIME | G.HT. | DISCHARGE | DATE | TIME | G.HT. | DISCHARGE |
|------|------|-------|-----------|------|------|-------|-----------|
| 2-15 | --   | --    | a3,100    | 5-31 | 1215 | 6.99  | 3,110     |
| 4-25 | 1515 | 6.75  | 2,920     | 6-14 | 1730 | 6.53  | 2,650     |

a About.

NOTE.--Stage-discharge relation affected by ice Nov. 21 to Mar. 23.

## YELLOWSTONE RIVER BASIN

06307500 Tongue River at Tongue River Dam, near Decker, Mont.

LOCATION.--Lat 45°08'29", long 106°46'15", in NE¼ sec.13, T.8 S., R.40 E., Big Horn County, on left bank 0.5 mile downstream from Tongue River Dam, 4 miles upstream from Post Creek, 8 miles northeast of Decker, 16 miles southeast of Kirby, and at mile 162.3.

DRAINAGE AREA.--1,770 sq mi.

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

GAGE.--Water-stage recorder. Datum of gage is 3,344.40 ft above mean sea level (levels by Bureau of Reclamation).

AVERAGE DISCHARGE.--32 years, 448 cfs (324,600 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 2,040 cfs June 20 (gage height, 4.35 ft); minimum daily, 153 cfs Nov. 24.

Period of record: Maximum discharge, 7,340 cfs June 15 or 16, 1967 (gage height, 8.20 ft, from floodmark); no flow part of each day Nov. 12, 13, 1969, when gates at dam were closed.

REMARKS.--Records good. Flow regulated by Tongue River Reservoir (see p. 185) and many small reservoirs (combined capacity, about 15,000 acre-ft). Diversions for irrigation of about 57,500 acres above station.

REVISIONS.--WSP 1729: Drainage area.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY   | OCT    | NOV    | DEC    | JAN    | FEB    | MAR    | APR    | MAY    | JUN    | JUL    | AUG    | SEP      |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|----------|
| 1     | 328    | 279    | 168    | 170    | 175    | 990    | 557    | 918    | 1,910  | 735    | 345    | 328      |
| 2     | 328    | 279    | 170    | 170    | 175    | 984    | 557    | 918    | 1,920  | 596    | 345    | 329      |
| 3     | 328    | 279    | 168    | 170    | 175    | 978    | 557    | 918    | 1,920  | 543    | 345    | 329      |
| 4     | 325    | 279    | 170    | 170    | 173    | 972    | 557    | 912    | 1,910  | 491    | 345    | 329      |
| 5     | 325    | 279    | 170    | 173    | 173    | 966    | 557    | 912    | 1,910  | 434    | 345    | 331      |
| 6     | 325    | 276    | 168    | 173    | 175    | 960    | 553    | 918    | 1,910  | 442    | 341    | 331      |
| 7     | 307    | 279    | 170    | 173    | 175    | 816    | 553    | 912    | 1,900  | 442    | 341    | 332      |
| 8     | 290    | 279    | 170    | 173    | 175    | 676    | 553    | 984    | 1,890  | 442    | 340    | 332      |
| 9     | 290    | 279    | 170    | 173    | 173    | 670    | 553    | 1,030  | 1,880  | 346    | 339    | 332      |
| 10    | 286    | 279    | 170    | 173    | 173    | 670    | 548    | 1,040  | 1,880  | 256    | 339    | 332      |
| 11    | 286    | 279    | 170    | 173    | 178    | 670    | 548    | 1,030  | 1,880  | 309    | 336    | 332      |
| 12    | 286    | 279    | 170    | 173    | 175    | 676    | 548    | 864    | 1,880  | 310    | 335    | 331      |
| 13    | 286    | 279    | 170    | 173    | 218    | 676    | 548    | 1,090  | 1,930  | 310    | 335    | 330      |
| 14    | 286    | 279    | 170    | 173    | 430    | 676    | 548    | 1,170  | 2,000  | 324    | 335    | 329      |
| 15    | 286    | 279    | 170    | 173    | 725    | 630    | 544    | 1,240  | 2,010  | 363    | 335    | 328      |
| 16    | 286    | 279    | 170    | 173    | 954    | 571    | 544    | 1,370  | 2,010  | 362    | 332    | 265      |
| 17    | 286    | 279    | 170    | 173    | 1,030  | 562    | 526    | 1,380  | 2,010  | 359    | 332    | 207      |
| 18    | 286    | 279    | 170    | 173    | 1,030  | 557    | 450    | 1,440  | 2,020  | 359    | 332    | 206      |
| 19    | 251    | 279    | 170    | 173    | 1,030  | 557    | 450    | 1,690  | 2,020  | 357    | 332    | 206      |
| 20    | 193    | 279    | 170    | 173    | 1,030  | 562    | 526    | 1,720  | 2,020  | 356    | 332    | 206      |
| 21    | 279    | 279    | 170    | 173    | 1,020  | 557    | 589    | 1,780  | 1,770  | 356    | 333    | 203      |
| 22    | 279    | 279    | 170    | 173    | 1,010  | 557    | 589    | 1,830  | 1,350  | 356    | 330    | 203      |
| 23    | 279    | 224    | 170    | 173    | 1,010  | 553    | 589    | 1,870  | 1,210  | 356    | 330    | 203      |
| 24    | 279    | 153    | 170    | 173    | 1,010  | 557    | 589    | 1,840  | 984    | 352    | 331    | 203      |
| 25    | 279    | 168    | 170    | 173    | 1,000  | 557    | 589    | 1,810  | 840    | 352    | 331    | 203      |
| 26    | 279    | 168    | 170    | 173    | 1,000  | 557    | 598    | 1,800  | 846    | 349    | 331    | 203      |
| 27    | 279    | 168    | 170    | 173    | 996    | 557    | 640    | 1,770  | 846    | 349    | 328    | 202      |
| 28    | 279    | 168    | 170    | 173    | 990    | 557    | 846    | 1,010  | 840    | 349    | 329    | 201      |
| 29    | 279    | 168    | 170    | 173    | -----  | 557    | 918    | 1,280  | 840    | 349    | 330    | 200      |
| 30    | 279    | 168    | 170    | 175    | -----  | 557    | 918    | 1,300  | 840    | 349    | 333    | 200      |
| 31    | 279    | -----  | 170    | 175    | -----  | 562    | -----  | 1,660  | -----  | 346    | 332    | -----    |
| TOTAL | 8,933  | 7,520  | 5,264  | 5,355  | 16,578 | 20,947 | 17,642 | 40,406 | 49,176 | 11,999 | 10,399 | 8,066    |
| MEAN  | 288    | 251    | 170    | 173    | 592    | 676    | 588    | 1,303  | 1,639  | 387    | 335    | 269      |
| MAX   | 328    | 279    | 170    | 175    | 1,030  | 990    | 918    | 1,870  | 2,020  | 735    | 345    | 332      |
| MIN   | 193    | 153    | 168    | 170    | 173    | 553    | 450    | 864    | 840    | 256    | 328    | 200      |
| AC-FT | 17,720 | 14,920 | 10,440 | 10,620 | 32,880 | 41,550 | 34,990 | 80,150 | 97,540 | 23,800 | 20,630 | 16,000</ |

06307800 Tongue River near Ashland, Mont.

LOCATION.--Lat 45°47'00", long 106°16'10", near center of sec.2, T.1 S., R.44 E., Rosebud County, on right bank 2 miles upstream from Beaver Creek, 6 miles upstream from Brandenburg Bridge, and 13 miles north of Ashland.

DRAINAGE AREA.--3,830 sq mi.

PERIOD OF RECORD.--September 1966 to current year.

GAGE.--Water-stage recorder. Altitude of gage is 2,790 ft (from topographic map).

AVERAGE DISCHARGE.--5 years, 623 cfs (451,400 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, about 5,500 cfs Feb. 16; maximum gage height, 12.1 ft Feb. 16 (ice jam), from floodmark; minimum discharge, 67 cfs Nov. 23, result of freezeup.

Period of record: Maximum discharge, 5,740 cfs June 18, 1967 (gage height, 8.45 ft); maximum gage height, 12.1 ft Feb. 16, 1971 (ice jam) from floodmark; minimum daily discharge, 50 cfs Nov. 8, Dec. 1-3, 1966.

REMARKS.--Records good except those for winter period, which are poor. Flow regulated by Tongue River Reservoir (see p.185 ), and many small reservoirs in Wyoming (combined capacity, about 15,000 acre-ft). Diversions for irrigation of about 65,000 acres above station.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT           | NOV      | DEC       | JAN     | FEB           | MAR    | APR    | MAY    | JUN     | JUL    | AUG    | SEP    |
|-------------|---------------|----------|-----------|---------|---------------|--------|--------|--------|---------|--------|--------|--------|
| 1           | 315           | 301      | 200       | 185     | 240           | 950    | 1,540  | 903    | 1,430   | 798    | 305    | 450    |
| 2           | 315           | 301      | 195       | 175     | 230           | 900    | 1,250  | 910    | 1,800   | 770    | 305    | 400    |
| 3           | 320           | 301      | 190       | 165     | 220           | 850    | 903    | 910    | 1,870   | 682    | 310    | 360    |
| 4           | 325           | 301      | 185       | 150     | 210           | 950    | 791    | 918    | 1,890   | 592    | 310    | 340    |
| 5           | 320           | 301      | 180       | 140     | 200           | 1,100  | 749    | 918    | 1,920   | 568    | 305    | 335    |
| 6           | 320           | 301      | 180       | 150     | 200           | 1,060  | 714    | 910    | 1,920   | 490    | 310    | 335    |
| 7           | 320           | 301      | 185       | 155     | 200           | 1,030  | 700    | 903    | 1,930   | 460    | 305    | 335    |
| 8           | 325           | 301      | 195       | 160     | 200           | 1,000  | 728    | 903    | 1,920   | 449    | 305    | 340    |
| 9           | 315           | 305      | 210       | 165     | 210           | 1,100  | 707    | 918    | 1,930   | 444    | 310    | 335    |
| 10          | 310           | 310      | 220       | 165     | 240           | 1,300  | 694    | 990    | 1,930   | 427    | 296    | 330    |
| 11          | 310           | 305      | 185       | 165     | 400           | 1,500  | 676    | 990    | 2,010   | 350    | 292    | 325    |
| 12          | 310           | 305      | 180       | 165     | 600           | 2,000  | 658    | 982    | 1,960   | 296    | 292    | 320    |
| 13          | 320           | 301      | 180       | 165     | 1,000         | 2,700  | 646    | 882    | 1,940   | 305    | 278    | 320    |
| 14          | 315           | 301      | 180       | 165     | 3,000         | 2,300  | 634    | 958    | 1,990   | 292    | 278    | 315    |
| 15          | 305           | 301      | 180       | 165     | 4,000         | 1,800  | 628    | 1,070  | 2,080   | 287    | 274    | 320    |
| 16          | 305           | 301      | 175       | 165     | 5,000         | 1,400  | 622    | 1,070  | 2,100   | 292    | 278    | 330    |
| 17          | 305           | 305      | 175       | 170     | 3,000         | 1,150  | 616    | 1,200  | 2,090   | 310    | 278    | 330    |
| 18          | 305           | 305      | 175       | 175     | 2,500         | 1,050  | 610    | 1,230  | 2,070   | 305    | 283    | 296    |
| 19          | 305           | 305      | 170       | 175     | 2,000         | 896    | 568    | 1,250  | 2,070   | 310    | 283    | 252    |
| 20          | 305           | 310      | 170       | 175     | 1,400         | 826    | 544    | 1,450  | 2,060   | 310    | 278    | 248    |
| 21          | 301           | 315      | 160       | 180     | 1,200         | 854    | 544    | 1,490  | 2,050   | 310    | 278    | 244    |
| 22          | 236           | 210      | 150       | 185     | 1,100         | 926    | 646    | 1,600  | 1,860   | 305    | 274    | 244    |
| 23          | 287           | 100      | 140       | 190     | 1,000         | 861    | 652    | 1,640  | 1,500   | 305    | 274    | 240    |
| 24          | 301           | 130      | 140       | 190     | 1,050         | 812    | 646    | 1,680  | 1,200   | 310    | 274    | 240    |
| 25          | 301           | 200      | 150       | 190     | 1,100         | 777    | 658    | 1,650  | 1,110   | 305    | 274    | 240    |
| 26          | 305           | 190      | 160       | 190     | 1,300         | 1,430  | 676    | 1,650  | 861     | 310    | 278    | 236    |
| 27          | 301           | 170      | 170       | 190     | 1,100         | 2,060  | 670    | 1,630  | 847     | 315    | 278    | 236    |
| 28          | 301           | 190      | 175       | 250     | 1,000         | 2,350  | 664    | 1,620  | 854     | 310    | 278    | 236    |
| 29          | 296           | 220      | 180       | 280     | -----         | 2,070  | 763    | 1,310  | 840     | 305    | 278    | 236    |
| 30          | 305           | 210      | 185       | 300     | -----         | 1,910  | 875    | 1,230  | 812     | 301    | 350    | 228    |
| 31          | 305           | -----    | 190       | 250     | -----         | 1,690  | -----  | 1,280  | -----   | 296    | 500    | -----  |
| TOTAL       | 9,509         | 7,997    | 5,510     | 5,690   | 33,900        | 41,602 | 21,772 | 37,045 | 50,844  | 12,109 | 9,211  | 8,996  |
| MEAN        | 307           | 267      | 178       | 184     | 1,211         | 1,342  | 726    | 1,195  | 1,695   | 391    | 297    | 300    |
| MAX         | 325           | 315      | 220       | 300     | 5,000         | 2,700  | 1,540  | 1,680  | 2,100   | 798    | 500    | 450    |
| MIN         | 236           | 100      | 140       | 140     | 200           | 777    | 544    | 882    | 812     | 287    | 274    | 228    |
| AC-FT       | 18,860        | 15,860   | 10,930    | 11,290  | 67,240        | 82,520 | 43,180 | 73,480 | 100,800 | 24,020 | 18,270 | 17,840 |
| CAL YR 1970 | TOTAL 243,718 | MEAN 668 | MAX 3,710 | MIN 100 | AC-FT 483,400 |        |        |        |         |        |        |        |
| WTR YR 1971 | TOTAL 244,185 | MEAN 669 | MAX 5,000 | MIN 100 | AC-FT 484,300 |        |        |        |         |        |        |        |

NOTE.--Stage-discharge relation affected by ice Nov. 22 to Mar. 16 (no gage height record Feb. 20-22, Mar. 14-16).

## YELLOWSTONE RIVER BASIN

06308500 Tongue River at Miles City, Mont.

LOCATION.--Lat 46°21'30", long 105°48'24", in SE¼ sec.23, T.7 N., R.47 E., Custer County, on right bank 4 miles south of Miles City and 8 miles upstream from mouth.

DRAINAGE AREA.--5,379 sq mi.

PERIOD OF RECORD.--April 1938 to April 1942, April 1946 to current year. Published as "near Miles City" April 1938 to April 1942. Not equivalent to records published as "near Miles City" May 1929 to October 1932. Monthly discharge only for some periods, published in WSP 1309.

GAGE.--Water-stage recorder. Altitude of gage is 2,370 ft (by barometer). April 1938 to April 1942, non-recording gage at site 8 miles upstream at different datum. April 1946 to Sept. 30, 1963, at datum 1.00 ft higher.

AVERAGE DISCHARGE.--28 years (1938-41, 1946-71), 417 cfs (302,100 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, about 9,000 cfs Feb. 15 (gage height, 13.27 ft, backwater from ice); minimum daily, 47 cfs July 18.

Period of record: Maximum discharge, 13,300 cfs June 15, 1962 (gage height, 12.33 ft, present datum), from rating curve extended above 5,200 cfs on basis of float measurement; maximum gage height, 13.27 ft (present datum) Mar. 19, 1960, Feb. 15, 1971 (ice jam); no flow July 9-19, Aug. 13, 14, Sept. 28, 1940.

REMARKS.--Records good except those for winter period, which are poor. Flow regulated by Tongue River Reservoir (see p. 185), and many small reservoirs in Wyoming (combined capacity, about 15,000 acre-ft). Diversions for irrigation of about 90,000 acres above station. Records of chemical analyses and water temperatures for the current year are published in Part 2 of this report.

REVISIONS.--WSP 1729: Drainage area.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT           | NOV      | DEC       | JAN    | FEB           | MAR     | APR    | MAY    | JUN     | JUL    | AUG   | SEP    |
|-------------|---------------|----------|-----------|--------|---------------|---------|--------|--------|---------|--------|-------|--------|
| 1           | 251           | 272      | 250       | 190    | 220           | 1,100   | 1,910  | 960    | 1,290   | 722    | 125   | 336    |
| 2           | 251           | 272      | 240       | 190    | 225           | 1,060   | 1,760  | 1,010  | 1,350   | 695    | 132   | 420    |
| 3           | 251           | 272      | 220       | 200    | 220           | 966     | 1,890  | 1,040  | 1,690   | 690    | 135   | 296    |
| 4           | 254           | 272      | 210       | 195    | 215           | 1,130   | 1,220  | 1,030  | 1,740   | 625    | 82    | 265    |
| 5           | 262           | 286      | 200       | 190    | 210           | 1,300   | 1,060  | 1,040  | 1,760   | 546    | 88    | 272    |
| 6           | 268           | 320      | 200       | 185    | 205           | 1,260   | 1,000  | 1,040  | 1,780   | 478    | 97    | 279    |
| 7           | 268           | 316      | 210       | 180    | 205           | 1,190   | 936    | 1,040  | 1,820   | 400    | 104   | 272    |
| 8           | 265           | 316      | 230       | 175    | 205           | 1,150   | 930    | 954    | 1,840   | 324    | 97    | 268    |
| 9           | 265           | 316      | 260       | 175    | 205           | 1,340   | 924    | 912    | 1,860   | 293    | 130   | 268    |
| 10          | 276           | 328      | 230       | 175    | 200           | 1,620   | 924    | 918    | 1,910   | 262    | 155   | 265    |
| 11          | 268           | 332      | 210       | 175    | 210           | 2,110   | 900    | 1,040  | 2,000   | 279    | 97    | 254    |
| 12          | 272           | 328      | 210       | 170    | 300           | 3,180   | 882    | 1,010  | 1,910   | 251    | 94    | 237    |
| 13          | 286           | 328      | 200       | 170    | 660           | 4,300   | 370    | 1,000  | 1,880   | 174    | 88    | 223    |
| 14          | 282           | 328      | 200       | 170    | 1,900         | 3,590   | 859    | 978    | 2,030   | 97     | 86    | 234    |
| 15          | 282           | 320      | 200       | 175    | 7,800         | 2,680   | 848    | 888    | 1,970   | 72     | 67    | 223    |
| 16          | 276           | 324      | 200       | 175    | 8,000         | 2,430   | 848    | 1,030  | 1,980   | 51     | 78    | 220    |
| 17          | 272           | 320      | 210       | 180    | 6,600         | 1,950   | 837    | 1,020  | 2,320   | 48     | 70    | 220    |
| 18          | 272           | 320      | 210       | 180    | 4,590         | 1,630   | 832    | 1,100  | 2,150   | 47     | 70    | 223    |
| 19          | 272           | 320      | 210       | 185    | 3,400         | 1,290   | 826    | 1,160  | 2,070   | 84     | 70    | 223    |
| 20          | 272           | 320      | 210       | 190    | 2,520         | 1,160   | 826    | 1,180  | 2,090   | 99     | 72    | 198    |
| 21          | 272           | 300      | 210       | 190    | 2,000         | 1,470   | 782    | 1,330  | 2,050   | 74     | 86    | 168    |
| 22          | 272           | 240      | 210       | 195    | 1,580         | 1,210   | 776    | 1,400  | 2,000   | 65     | 92    | 160    |
| 23          | 258           | 200      | 200       | 195    | 1,370         | 1,160   | 782    | 1,520  | 1,970   | 70     | 86    | 158    |
| 24          | 220           | 160      | 200       | 200    | 1,350         | 1,040   | 826    | 1,520  | 1,580   | 58     | 65    | 165    |
| 25          | 258           | 190      | 195       | 200    | 1,460         | 1,170   | 837    | 1,540  | 1,270   | 58     | 90    | 155    |
| 26          | 265           | 220      | 195       | 200    | 1,720         | 1,120   | 842    | 1,520  | 1,130   | 90     | 97    | 150    |
| 27          | 268           | 220      | 190       | 205    | 1,400         | 1,550   | 848    | 1,540  | 906     | 113    | 80    | 150    |
| 28          | 279           | 260      | 185       | 210    | 1,250         | 2,810   | 859    | 1,520  | 826     | 118    | 90    | 152    |
| 29          | 272           | 250      | 180       | 210    | -----         | 2,690   | 864    | 1,520  | 826     | 115    | 106   | 150    |
| 30          | 268           | 250      | 180       | 215    | -----         | 2,480   | 870    | 1,440  | 776     | 128    | 195   | 150    |
| 31          | 272           | -----    | 200       | 215    | -----         | 2,140   | -----  | 1,230  | -----   | 130    | 272   | -----  |
| TOTAL       | 8,269         | 8,500    | 6,455     | 5,860  | 50,220        | 55,276  | 29,368 | 36,430 | 50,674  | 7,256  | 3,196 | 6,754  |
| MEAN        | 267           | 283      | 208       | 189    | 1,794         | 1,783   | 979    | 1,175  | 1,689   | 234    | 103   | 225    |
| MAX         | 286           | 332      | 260       | 215    | 8,000         | 4,300   | 1,910  | 1,540  | 2,320   | 722    | 272   | 420    |
| MIN         | 220           | 160      | 180       | 170    | 200           | 966     | 776    | 888    | 776     | 47     | 65    | 150    |
| AC-FT       | 16,400        | 16,860   | 12,800    | 11,620 | 99,610        | 109,600 | 58,250 | 72,260 | 100,500 | 14,390 | 6,340 | 13,400 |
| CAL YR 1970 | TOTAL 222,274 | MEAN 609 | MAX 3,420 | MIN 88 | AC-FT 440,900 |         |        |        |         |        |       |        |
| WTR YR 1971 | TOTAL 268,258 | MEAN 735 | MAX 8,000 | MIN 47 | AC-FT 532,100 |         |        |        |         |        |       |        |

NOTE.--Stage-discharge relation affected by ice Nov. 21 to Feb. 17.



## YELLOWSTONE RIVER BASIN

175

06309000 Yellowstone River at Miles City, Mont.

LOCATION.--Lat 46°25'16", long 105°51'51", in SW1/4 sec.28, T.8 N., R.47 E., Custer County, on left bank 350 ft upstream from bridge on State Highway 22 at Miles City, 0.8 mile downstream from Tongue River, and at mile 180.8.

DRAINAGE AREA.--48,253 sq mi.

PERIOD OF RECORD.--September 1922 to September 1923, August 1928 to current year. Monthly discharge only for some periods, published in WSP 1309.

GAGE.--Water-stage recorder. Datum of gage is 2,330.20 ft above mean sea level (State Highway Department bench mark). Prior to May 6, 1929, nonrecording gages at pumping plant 1.2 miles downstream at different datums. May 6, 1929, to Sept. 30, 1931, nonrecording gage, and Oct. 1, 1931, to Nov. 10, 1937, water-stage recorder at present site and datum. Nov. 11, 1937, to Sept. 30, 1946, water-stage recorder at pumping plant 1.2 miles downstream at different datum.

AVERAGE DISCHARGE.--44 years (1922-23, 1928-71), 11,250 cfs (8,151,000 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 58,300 cfs June 26, 27 (gage height, 12.10 ft); maximum gage height, 20.59 ft Feb. 14 (ice jam); minimum daily discharge, 4,600 cfs Jan. 15.

Period of record: Maximum discharge, 96,300 cfs June 19, 1944 (gage height, 12.74 ft, site and datum then in use); maximum gage height, 21.7 ft Mar. 20, 1944 (present site and datum, ice jam), from floodmark; minimum discharge, 996 cfs Dec. 14, 1932.

REMARKS.--Records good except those for winter period, which are poor. Some regulation by reservoirs on tributary streams. Diversions for irrigation of about 1,100,000 acres above station (does not include flood irrigation).

REVISIONS.--WSP 1729: Drainage area.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT                                                               | NOV     | DEC     | JAN     | FEB     | MAR     | APR     | MAY     | JUN      | JUL     | AUG     | SEP     |
|-------------|-------------------------------------------------------------------|---------|---------|---------|---------|---------|---------|---------|----------|---------|---------|---------|
| 1           | 8,320                                                             | 8,320   | 8,000   | 8,200   | 9,000   | 9,200   | 14,500  | 15,400  | 41,100   | 42,900  | 16,300  | 10,500  |
| 2           | 8,190                                                             | 8,260   | 8,060   | 8,300   | 8,600   | 8,800   | 15,100  | 14,800  | 38,700   | 36,800  | 16,300  | 13,000  |
| 3           | 8,190                                                             | 8,160   | 7,780   | 8,200   | 9,000   | 8,300   | 14,700  | 14,400  | 38,100   | 34,400  | 15,800  | 12,000  |
| 4           | 8,480                                                             | 8,290   | 8,000   | 8,000   | 10,000  | 10,000  | 13,100  | 14,500  | 35,400   | 34,100  | 14,100  | 11,200  |
| 5           | 8,580                                                             | 8,480   | 7,970   | 7,400   | 10,500  | 11,200  | 12,500  | 15,700  | 34,000   | 37,300  | 12,900  | 11,600  |
| 6           | 8,540                                                             | 8,380   | 7,360   | 7,200   | 9,000   | 11,200  | 12,100  | 17,200  | 34,300   | 39,400  | 12,700  | 12,800  |
| 7           | 8,450                                                             | 8,320   | 7,170   | 6,600   | 8,000   | 11,200  | 11,900  | 18,300  | 33,700   | 35,400  | 12,600  | 12,200  |
| 8           | 8,350                                                             | 8,350   | 7,080   | 6,200   | 7,500   | 12,000  | 12,000  | 18,600  | 34,400   | 33,700  | 12,500  | 11,400  |
| 9           | 8,510                                                             | 8,380   | 7,300   | 6,200   | 8,600   | 12,200  | 12,000  | 18,600  | 35,000   | 33,100  | 12,600  | 11,500  |
| 10          | 8,580                                                             | 8,130   | 8,030   | 5,600   | 9,400   | 13,700  | 12,200  | 19,900  | 37,600   | 31,400  | 12,500  | 11,500  |
| 11          | 8,670                                                             | 8,320   | 8,130   | 5,300   | 11,000  | 18,300  | 12,800  | 21,300  | 43,300   | 30,100  | 12,000  | 11,300  |
| 12          | 8,670                                                             | 8,610   | 8,060   | 5,200   | 13,500  | 18,500  | 12,600  | 21,100  | 46,700   | 30,100  | 11,400  | 10,600  |
| 13          | 8,840                                                             | 8,450   | 8,000   | 5,100   | 23,000  | 19,400  | 12,600  | 20,600  | 49,200   | 30,300  | 11,100  | 10,100  |
| 14          | 9,260                                                             | 8,350   | 7,780   | 4,800   | 45,000  | 18,600  | 12,700  | 22,100  | 48,900   | 29,200  | 11,000  | 9,710   |
| 15          | 9,220                                                             | 8,220   | 7,230   | 4,600   | 42,000  | 17,000  | 12,300  | 25,100  | 48,000   | 28,300  | 10,200  | 9,400   |
| 16          | 9,220                                                             | 8,260   | 7,620   | 5,200   | 38,000  | 15,400  | 12,200  | 27,800  | 47,900   | 27,500  | 9,820   | 9,190   |
| 17          | 9,010                                                             | 8,130   | 7,390   | 7,500   | 34,000  | 13,700  | 11,900  | 26,900  | 49,100   | 27,300  | 9,750   | 9,120   |
| 18          | 8,540                                                             | 8,060   | 7,200   | 9,000   | 30,000  | 12,400  | 12,000  | 26,000  | 49,900   | 26,600  | 9,680   | 9,120   |
| 19          | 8,350                                                             | 8,060   | 6,300   | 10,000  | 23,000  | 11,400  | 12,500  | 27,200  | 50,300   | 25,600  | 9,260   | 9,330   |
| 20          | 8,290                                                             | 7,650   | 5,600   | 10,500  | 14,000  | 10,200  | 11,600  | 25,100  | 49,900   | 25,500  | 9,150   | 9,330   |
| 21          | 8,450                                                             | 7,520   | 5,200   | 11,000  | 12,000  | 10,700  | 11,500  | 22,700  | 50,300   | 24,400  | 9,080   | 9,050   |
| 22          | 8,840                                                             | 7,170   | 5,600   | 11,000  | 11,000  | 11,000  | 11,200  | 20,600  | 50,000   | 22,800  | 8,580   | 9,260   |
| 23          | 8,770                                                             | 6,920   | 5,400   | 10,500  | 10,500  | 11,100  | 11,700  | 20,400  | 50,400   | 21,700  | 7,900   | 9,360   |
| 24          | 7,360                                                             | 6,950   | 5,200   | 9,500   | 10,000  | 10,800  | 12,400  | 20,900  | 52,600   | 21,400  | 7,620   | 9,150   |
| 25          | 6,270                                                             | 6,800   | 6,000   | 8,500   | 11,500  | 10,800  | 13,600  | 21,100  | 55,300   | 21,300  | 7,390   | 8,910   |
| 26          | 8,000                                                             | 7,330   | 6,100   | 8,000   | 12,500  | 11,300  | 13,800  | 20,000  | 57,700   | 20,200  | 7,200   | 8,670   |
| 27          | 8,510                                                             | 8,190   | 6,200   | 7,600   | 11,500  | 12,800  | 15,400  | 20,000  | 57,300   | 19,400  | 7,200   | 8,510   |
| 28          | 8,540                                                             | 8,000   | 6,200   | 8,300   | 10,500  | 15,300  | 18,500  | 21,100  | 53,500   | 19,300  | 7,080   | 8,450   |
| 29          | 8,380                                                             | 8,000   | 6,200   | 8,800   | -----   | 16,600  | 17,400  | 25,000  | 51,900   | 18,700  | 7,010   | 8,420   |
| 30          | 8,450                                                             | 8,000   | 6,700   | 9,300   | -----   | 16,800  | 16,200  | 31,400  | 50,900   | 18,000  | 7,680   | 8,380   |
| 31          | 8,290                                                             | -----   | 7,500   | 9,700   | -----   | 15,700  | -----   | 37,900  | -----    | 17,200  | 8,910   | -----   |
| TOTAL       | 262,120                                                           | 240,060 | 216,360 | 241,300 | 452,600 | 405,600 | 395,000 | 671,700 | 1,375,4M | 863,400 | 327,310 | 303,060 |
| MEAN        | 8,455                                                             | 8,002   | 6,979   | 7,784   | 16,160  | 13,080  | 13,170  | 21,670  | 45,850   | 27,850  | 10,560  | 10,100  |
| MAX         | 9,260                                                             | 8,610   | 8,130   | 11,000  | 45,000  | 19,400  | 18,500  | 37,900  | 57,700   | 42,900  | 16,300  | 13,000  |
| MIN         | 6,270                                                             | 6,800   | 5,200   | 4,600   | 7,500   | 8,300   | 11,200  | 14,400  | 33,700   | 17,200  | 7,010   | 8,380   |
| AC-FT       | 519,900                                                           | 476,200 | 429,200 | 478,600 | 897,700 | 804,500 | 783,500 | 1,332M  | 2,728M   | 1,713M  | 649,200 | 601,100 |
| CAL YR 1970 | TOTAL 4,949,250 MEAN 13,560 MAX 58,200 MIN 2,700 AC-FT 9,817,000  |         |         |         |         |         |         |         |          |         |         |         |
| WTR YR 1971 | TOTAL 5,753,910 MEAN 15,760 MAX 57,700 MIN 4,600 AC-FT 11,410,000 |         |         |         |         |         |         |         |          |         |         |         |

NOTE.--Stage-discharge relation affected by ice Dec. 18 to Mar. 4 (no gage-height record Jan. 9-12).



## YELLOWSTONE RIVER BASIN

06324500 Powder River at Moorhead, Mont.

LOCATION.--Lat 45°04'10", long 105°52'00", in NW¼ sec.8, T.9 S., R.48 E., Powder River County, on left bank 500 ft downstream from discontinued post office at Moorhead, 6.2 miles upstream from Buffalo Creek, and at mile 184.8.

DRAINAGE AREA.--8,088 sq mi.

PERIOD OF RECORD.--May 1929 to current year. Monthly discharge only for some periods, published in WSP 1309.

GAGE.--Water-stage recorder. Datum of gage is 3,334.6 ft above mean sea level. Prior to Aug. 28, 1931, non-recording gage at site 0.3 mile upstream at different datum. Aug. 28, 1931, to Mar. 21, 1956, water-stage recorder at site 1.2 miles upstream at different datum. Mar. 22 to July 24, 1956, nonrecording gage at site 0.3 mile downstream at different datum. July 25 to Sept. 12, 1956, nonrecording gage at present site and datum.

AVERAGE DISCHARGE.--42 years, 451 cfs (326,700 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 8,340 cfs June 1 (gage height, 7.70 ft); maximum gage height, 8.21 ft Feb. 16 (ice jam); minimum discharge, 7.0 cfs Sept. 2.

Period of record: Maximum discharge, 23,000 cfs June 17, 1962 (gage height, 12.77 ft, from graph based on gage readings), from rating curve extended above 7,000 cfs on basis of slope-area measurement of peak flow; maximum gage height, 17.7 ft Mar. 21, 1956, site and datum then in use (ice jam); no flow at times.

Flood of Sept. 30, 1923, reached a stage of 19 ft, site and datum used 1931-56, from information by local residents.

REMARKS.--Records good except those for winter period, which are poor. Some regulation by three reservoirs in Wyoming with combined usable capacity of 36,800 acre-ft. Diversions for irrigation of about 50,000 acres above station. Records of chemical analyses for the current year are published in Part 2 of this report.

REVISIONS (WATER YEARS).--WSP 1309: 1932(M). WSP 1729: Drainage area.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT                                                      | NOV    | DEC   | JAN   | FEB    | MAR    | APR    | MAY    | JUN     | JUL    | AUG   | SEP     |
|-------------|----------------------------------------------------------|--------|-------|-------|--------|--------|--------|--------|---------|--------|-------|---------|
| 1           | 110                                                      | 202    | 180   | 140   | 170    | 330    | 320    | 810    | 7,160   | 569    | 82    | 10      |
| 2           | 103                                                      | 196    | 250   | 135   | 165    | 300    | 514    | 680    | 4,600   | 473    | 58    | 8.0     |
| 3           | 96                                                       | 196    | 220   | 130   | 155    | 320    | 512    | 596    | 3,680   | 404    | 48    | 14      |
| 4           | 100                                                      | 202    | 180   | 125   | 150    | 352    | 496    | 552    | 3,010   | 364    | 36    | 19      |
| 5           | 96                                                       | 214    | 140   | 120   | 145    | 345    | 480    | 569    | 2,620   | 326    | 30    | 16      |
| 6           | 100                                                      | 220    | 110   | 130   | 140    | 326    | 459    | 641    | 2,490   | 300    | 23    | 14      |
| 7           | 96                                                       | 226    | 120   | 135   | 140    | 319    | 459    | 4,060  | 2,280   | 280    | 20    | 16      |
| 8           | 110                                                      | 232    | 150   | 135   | 160    | 332    | 452    | 2,060  | 2,020   | 256    | 20    | 23      |
| 9           | 103                                                      | 226    | 140   | 140   | 175    | 332    | 438    | 1,420  | 1,850   | 238    | 20    | 22      |
| 10          | 115                                                      | 238    | 130   | 135   | 200    | 371    | 417    | 1,140  | 1,910   | 220    | 15    | 19      |
| 11          | 125                                                      | 250    | 120   | 125   | 250    | 445    | 417    | 1,070  | 1,950   | 220    | 14    | 24      |
| 12          | 130                                                      | 262    | 110   | 115   | 400    | 660    | 424    | 1,030  | 2,120   | 178    | 14    | 30      |
| 13          | 145                                                      | 262    | 100   | 110   | 600    | 1,170  | 452    | 1,020  | 1,880   | 155    | 14    | 27      |
| 14          | 160                                                      | 250    | 70    | 105   | 1,300  | 1,440  | 424    | 971    | 1,770   | 130    | 12    | 22      |
| 15          | 160                                                      | 262    | 80    | 105   | 4,000  | 1,590  | 410    | 949    | 1,740   | 106    | 17    | 20      |
| 16          | 160                                                      | 256    | 90    | 110   | 3,000  | 1,390  | 431    | 1,080  | 1,690   | 96     | 21    | 22      |
| 17          | 166                                                      | 256    | 95    | 115   | 2,000  | 1,120  | 417    | 1,290  | 1,730   | 82     | 23    | 24      |
| 18          | 166                                                      | 250    | 100   | 120   | 1,440  | 949    | 424    | 1,240  | 1,710   | 70     | 27    | 23      |
| 19          | 172                                                      | 244    | 95    | 125   | 1,000  | 800    | 417    | 1,210  | 1,730   | 68     | 26    | 31      |
| 20          | 172                                                      | 244    | 90    | 135   | 641    | 680    | 452    | 1,120  | 1,550   | 60     | 27    | 42      |
| 21          | 172                                                      | 244    | 85    | 140   | 424    | 800    | 504    | 949    | 1,550   | 48     | 38    | 46      |
| 22          | 172                                                      | 100    | 80    | 145   | 352    | 720    | 552    | 872    | 1,430   | 47     | 20    | 44      |
| 23          | 172                                                      | 60     | 90    | 150   | 378    | 650    | 740    | 850    | 1,380   | 42     | 17    | 48      |
| 24          | 178                                                      | 80     | 95    | 155   | 424    | 578    | 960    | 800    | 1,420   | 40     | 12    | 65      |
| 25          | 184                                                      | 110    | 100   | 160   | 404    | 1,010  | 960    | 770    | 1,370   | 41     | 9.4   | 92      |
| 26          | 190                                                      | 140    | 110   | 165   | 400    | 2,120  | 1,000  | 770    | 1,260   | 55     | 9.4   | 96      |
| 27          | 196                                                      | 170    | 100   | 170   | 390    | 3,340  | 905    | 700    | 1,110   | 60     | 8.0   | 103     |
| 28          | 190                                                      | 210    | 100   | 170   | 370    | 2,900  | 830    | 700    | 938     | 70     | 10    | 110     |
| 29          | 178                                                      | 200    | 120   | 170   | -----  | 1,440  | 950    | 750    | 820     | 120    | 12    | 110     |
| 30          | 190                                                      | 150    | 140   | 170   | -----  | 1,260  | 894    | 3,580  | 750     | 115    | 15    | 120     |
| 31          | 196                                                      | -----  | 150   | 170   | -----  | 1,040  | -----  | 5,490  | -----   | 100    | 14    | -----   |
| TOTAL       | 4,603                                                    | 6,152  | 3,740 | 4,255 | 10,363 | 29,429 | 17,610 | 39,739 | 61,518  | 5,333  | 711.8 | 1,260.0 |
| MEAN        | 148                                                      | 205    | 121   | 137   | 692    | 949    | 587    | 1,282  | 2,051   | 172    | 23.0  | 42.0    |
| MAX         | 196                                                      | 262    | 250   | 170   | 4,000  | 3,340  | 1,000  | 5,490  | 7,160   | 569    | 82    | 120     |
| MIN         | 96                                                       | 60     | 70    | 105   | 140    | 300    | 410    | 552    | 750     | 40     | 8.0   | 8.0     |
| AC-FT       | 9,130                                                    | 12,200 | 7,420 | 8,440 | 38,410 | 58,370 | 34,930 | 78,820 | 122,000 | 10,580 | 1,410 | 2,500   |
| CAL YR 1970 | TOTAL 173,571.7 MEAN 476 MAX 7,310 MIN 6.0 AC-FT 344,300 |        |       |       |        |        |        |        |         |        |       |         |
| WTR YR 1971 | TOTAL 193,713.8 MEAN 531 MAX 7,160 MIN 8.0 AC-FT 384,200 |        |       |       |        |        |        |        |         |        |       |         |

PEAK DISCHARGE (BASE, 3,700 CFS)

NOTE.--Stage-discharge relation affected by ice Nov. 22 to Feb. 17.

DATE TIME G.H.T. DISCHARGE DATE TIME G.H.T. DISCHARGE

a2-15 -- -- b5,000 5-7 b0800 b6.55 b5,900  
3-27 1500 5.34 3,770 6-1 b1500 7.70 8,340

a Feb. 15 or 16.  
b About.

06325500 Little Powder River near Broadus, Mont.

LOCATION.--Lat 45°23'25", long 105°18'15", in NW 1/4 sec. 21, T. 5 S., R. 52 E., Powder River County, on left bank 1.5 miles downstream from East Fork, 5.5 miles southeast of Broadus, and 8 miles upstream from mouth.

DRAINAGE AREA.--1,974 sq mi.

PERIOD OF RECORD.--May 1947 to September 1953, water year 1956 (annual maximum), March 1957 to current year (fragmentary record March to September 1962). Monthly discharge only for May 1947, published in WSP 1309.

GAGE.--Water-stage recorder and crest-stage gage. Altitude of gage is 3,020 ft (by barometer). Prior to Dec. 10, 1962, water-stage recorder at site 0.8 mile upstream at different datum.

AVERAGE DISCHARGE.--19 years (1947-53, 1957-61, 1962-71), 37.3 cfs (27,020 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 1,940 cfs Mar. 13 (gage height, 7.6 ft, from floodmark); maximum gage height observed, 7.84 ft Feb. 17 (backwater from ice); no flow Feb. 8-11.

Period of record: Maximum discharge, 2,440 cfs Mar. 21, 1969 (gage height, 8.3 ft, from graph based on gage readings); maximum gage height, 9.36 ft Mar. 19 or 20, 1960 (from high-water mark in gage well, backwater from ice, site and datum then in use); no flow at times.

REMARKS.--Records fair except those for the period Nov. 21 to Mar. 31, which are poor. Small diversions for irrigation of hay meadows above station.

REVISIONS (WATER YEARS).--WSP 1116: 1947. WSP 1729: Drainage area.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT                                                   | NOV   | DEC   | JAN    | FEB      | MAR    | APR    | MAY   | JUN   | JUL   | AUG   | SEP   |
|-------------|-------------------------------------------------------|-------|-------|--------|----------|--------|--------|-------|-------|-------|-------|-------|
| 1           | 13                                                    | 4.3   | 4.0   | .50    | 3.0      | 37     | 1,240  | 131   | 90    | 40    | 9.4   | 6.0   |
| 2           | 13                                                    | 3.9   | 4.0   | .50    | 2.5      | 31     | 1,020  | 114   | 153   | 35    | 9.1   | 4.1   |
| 3           | 13                                                    | 3.5   | 4.0   | .50    | 2.0      | 49     | 536    | 103   | 135   | 38    | 8.8   | 3.5   |
| 4           | 13                                                    | 3.7   | 4.0   | .50    | 1.5      | 47     | 308    | 94    | 108   | 34    | 8.2   | 3.7   |
| 5           | 9.4                                                   | 3.5   | 4.0   | .50    | 1.0      | 36     | 238    | 86    | 98    | 37    | 7.6   | 5.0   |
| 6           | 3.1                                                   | 4.8   | 4.0   | .50    | .50      | 26     | 200    | 78    | 103   | 34    | 6.5   | 23    |
| 7           | 2.7                                                   | 2.7   | 4.0   | .70    | .20      | 34     | 182    | 72    | 94    | 28    | 6.2   | 12    |
| 8           | 2.7                                                   | 1.5   | 4.0   | .60    | 0        | 51     | 186    | 68    | 100   | 26    | 5.5   | 5.5   |
| 9           | 2.7                                                   | 3.5   | 4.0   | .50    | 0        | 68     | 210    | 63    | 81    | 23    | 5.0   | 4.5   |
| 10          | 2.7                                                   | 4.8   | 4.0   | .50    | 0        | 105    | 222    | 60    | 90    | 20    | 4.3   | 4.1   |
| 11          | 2.7                                                   | 3.9   | 4.0   | .50    | 0        | 273    | 192    | 56    | 79    | 20    | 4.1   | 4.1   |
| 12          | 3.1                                                   | 6.8   | 4.0   | .40    | 10       | 543    | 169    | 54    | 229   | 16    | 4.1   | 3.7   |
| 13          | 3.1                                                   | 5.8   | 4.0   | .30    | 50       | 1,370  | 146    | 50    | 152   | 18    | 3.9   | 3.7   |
| 14          | 3.1                                                   | 4.1   | 4.5   | .20    | 200      | 1,350  | 129    | 49    | 164   | 18    | 3.5   | 3.7   |
| 15          | 3.1                                                   | 5.8   | 4.5   | .20    | 600      | 1,340  | 111    | 48    | 133   | 18    | 3.1   | 3.9   |
| 16          | 2.9                                                   | 5.2   | 4.5   | .20    | 1,200    | 1,340  | 102    | 46    | 81    | 18    | 3.1   | 4.1   |
| 17          | 3.1                                                   | 5.0   | 4.5   | .30    | 1,800    | 1,110  | 95     | 44    | 65    | 16    | 3.1   | 4.1   |
| 18          | 3.1                                                   | 4.8   | 4.0   | .40    | 1,700    | 504    | 89     | 43    | 57    | 14    | 3.1   | 4.3   |
| 19          | 3.1                                                   | 4.5   | 3.5   | .60    | 1,600    | 271    | 87     | 42    | 49    | 11    | 3.1   | 4.5   |
| 20          | 3.1                                                   | 4.5   | 3.0   | .80    | 1,250    | 169    | 105    | 42    | 45    | 10    | 2.7   | 4.5   |
| 21          | 3.1                                                   | 4.0   | 2.5   | 1.0    | 262      | 262    | 105    | 41    | 41    | 10    | 2.5   | 4.5   |
| 22          | 3.1                                                   | 3.7   | 2.0   | 1.4    | 206      | 260    | 111    | 48    | 39    | 10    | 2.4   | 4.5   |
| 23          | 3.3                                                   | 3.5   | 1.5   | 2.0    | 147      | 212    | 118    | 65    | 38    | 9.7   | 2.5   | 4.5   |
| 24          | 3.3                                                   | 3.8   | 1.2   | 10     | 131      | 198    | 138    | 158   | 34    | 8.5   | 2.4   | 4.0   |
| 25          | 3.5                                                   | 4.0   | 1.0   | 30     | 114      | 249    | 135    | 118   | 33    | 9.1   | 2.4   | 3.9   |
| 26          | 3.1                                                   | 4.0   | .70   | 20     | 98       | 420    | 135    | 108   | 31    | 11    | 2.4   | 3.7   |
| 27          | 3.5                                                   | 4.0   | .50   | 15     | 86       | 550    | 165    | 103   | 29    | 11    | 2.4   | 3.7   |
| 28          | 4.5                                                   | 4.0   | .50   | 10     | 60       | 1,510  | 245    | 94    | 58    | 11    | 2.4   | 4.1   |
| 29          | 3.7                                                   | 4.0   | .50   | 7.0    | -----    | 1,700  | 245    | 78    | 65    | 12    | 2.4   | 4.5   |
| 30          | 3.7                                                   | 4.0   | .50   | 5.0    | -----    | 1,590  | 164    | 76    | 49    | 12    | 4.3   | 4.5   |
| 31          | 3.5                                                   | ----- | .50   | 4.0    | -----    | 1,610  | -----  | 76    | ----- | 11    | 11    | ----- |
| TOTAL       | 144.0                                                 | 125.6 | 91.90 | 114.60 | 9,524.70 | 17,315 | 7,128  | 2,308 | 2,523 | 589.3 | 141.5 | 153.9 |
| MEAN        | 4.65                                                  | 4.19  | 2.96  | 3.70   | 340      | 559    | 238    | 74.5  | 84.1  | 19.0  | 4.56  | 5.13  |
| MAX         | 13                                                    | 6.8   | 4.5   | 30     | 1,800    | 1,700  | 1,240  | 158   | 229   | 40    | 11    | 23    |
| MIN         | 2.7                                                   | 1.5   | .50   | .20    | 0        | 26     | 87     | 41    | 29    | 8.5   | 2.4   | 3.5   |
| AC-FT       | 286                                                   | 249   | 182   | 227    | 18,890   | 34,340 | 14,140 | 4,580 | 5,000 | 1,170 | 281   | 305   |
| CAL YR 1970 | TOTAL 9,842.62 MEAN 27.0 MAX 560 MIN 0 AC-FT 19,520   |       |       |        |          |        |        |       |       |       |       |       |
| WTR YR 1971 | TOTAL 40,159.50 MEAN 110 MAX 1,800 MIN 0 AC-FT 79,660 |       |       |        |          |        |        |       |       |       |       |       |

## PEAK DISCHARGE (BASE, 400 CFS)

| DATE | TIME | G.HT. | DISCHARGE | DATE | TIME | G.HT. | DISCHARGE |
|------|------|-------|-----------|------|------|-------|-----------|
| 2-17 | --   | ab7.8 | al,800    | 3-31 | 1330 | 7.49  | 1,890     |
| 3-13 | --   | c7.6  | 1,940     |      |      |       |           |

a About.

b Backwater from ice.

c From floodmark.

NOTE.--Stage-discharge relation affected by ice Nov. 21 to Feb. 19 (no gage-height record Dec. 30 to Jan. 10).

## YELLOWSTONE RIVER BASIN

06326500 Powder River near Locate, Mont.

LOCATION.--Lat 46°27'00", long 105°19'00", in SW¼ sec.14, T.8 N., R.51 E., Custer County, on left bank 1.5 miles downstream from bridge on U.S. Highway 12 at present site of Locate (5 miles west of former site of Locate), 1.5 miles upstream from Locate Creek, and 25 miles east of Miles City.

DRAINAGE AREA.--13,194 sq mi. Area at site used prior to Oct 1, 1965, 13,189 sq mi.

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

GAGE.--Water-stage recorder. Altitude of gage is 2,390 ft (by barometer). Prior to July 11, 1947, nonrecording gage at bridge 1.5 miles upstream, and July 11, 1947, to Sept. 30, 1965, water-stage recorder at sites near bridge at different datum. Oct. 1, 1965, to Oct. 4, 1966, nonrecording gage, and Oct. 5, 1966, to Apr. 15, 1969, water-stage recorder at site 200 ft upstream at present datum.

AVERAGE DISCHARGE.--33 years, 609 cfs (441,200 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 10,200 cfs Feb. 18 (gage height, 7.6 ft); maximum gage height, 9.6 ft Feb. 15 (ice jam); minimum discharge observed, 9.4 cfs Aug. 23.

Period of record: Maximum discharge observed, 31,000 cfs Feb. 19, 1943 (gage height, 11.23 ft, site and datum then in use), from rating curve extended above 17,000 cfs; no flow Jan. 16 to Feb. 12, Feb. 22-24, 1950, July 27, Sept. 21-27, Oct. 1, 1960, Sept. 4-8, 1961.

REMARKS.--Records good except those for Nov. 22 to Apr. 21, which are poor. Some regulation by three reservoirs in Wyoming with combined usable capacity of 36,800 acre-ft. Diversions for irrigation of about 52,000 acres above station.

REVISIONS (WATER YEARS).--WSP 926: 1939. WSP 1309: 1938-39(M). WSP 1729: Drainage area.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT   | NOV       | DEC   | JAN   | FEB     | MAR     | APR    | MAY    | JUN     | JUL     | AUG   | SEP   |
|-------------|-------|-----------|-------|-------|---------|---------|--------|--------|---------|---------|-------|-------|
| 1           | 39    | 196       | 180   | 85    | 95      | 592     | 3,850  | 1,160  | 3,920   | 1,120   | 41    | 21    |
| 2           | 39    | 192       | 165   | 80    | 95      | 472     | 3,150  | 1,080  | 5,620   | 950     | 38    | 16    |
| 3           | 43    | 196       | 155   | 80    | 95      | 382     | 3,100  | 998    | 5,080   | 795     | 38    | 12    |
| 4           | 45    | 216       | 145   | 80    | 95      | 305     | 2,050  | 862    | 4,620   | 683     | 43    | 12    |
| 5           | 49    | 212       | 140   | 80    | 95      | 442     | 1,390  | 788    | 4,030   | 592     | 51    | 36    |
| 6           | 58    | 216       | 150   | 80    | 95      | 490     | 1,200  | 746    | 3,810   | 526     | 56    | 224   |
| 7           | 67    | 220       | 160   | 80    | 95      | 478     | 1,070  | 711    | 3,260   | 454     | 49    | 145   |
| 8           | 71    | 220       | 150   | 80    | 95      | 436     | 942    | 1,060  | 2,920   | 406     | 49    | 69    |
| 9           | 76    | 242       | 140   | 80    | 95      | 502     | 918    | 2,910  | 2,600   | 354     | 42    | 43    |
| 10          | 78    | 270       | 140   | 80    | 95      | 1,010   | 894    | 1,930  | 2,320   | 315     | 35    | 31    |
| 11          | 76    | 275       | 140   | 85    | 110     | 1,990   | 846    | 1,550  | 2,140   | 295     | 31    | 26    |
| 12          | 80    | 265       | 150   | 85    | 130     | 3,750   | 830    | 1,280  | 2,280   | 270     | 29    | 23    |
| 13          | 97    | 256       | 135   | 90    | 250     | 6,600   | 816    | 1,160  | 2,300   | 238     | 25    | 21    |
| 14          | 105   | 265       | 120   | 90    | 600     | 6,540   | 781    | 1,160  | 2,780   | 216     | 23    | 17    |
| 15          | 107   | 275       | 130   | 90    | 7,000   | 5,800   | 760    | 1,130  | 2,240   | 200     | 19    | 15    |
| 16          | 107   | 275       | 125   | 90    | 7,560   | 5,700   | 816    | 1,120  | 2,340   | 180     | 18    | 15    |
| 17          | 107   | 260       | 120   | 90    | 7,820   | 5,270   | 732    | 1,090  | 3,030   | 162     | 16    | 16    |
| 18          | 112   | 260       | 115   | 90    | 8,720   | 4,010   | 711    | 1,220  | 2,630   | 148     | 17    | 17    |
| 19          | 115   | 265       | 110   | 95    | 7,170   | 2,870   | 655    | 1,380  | 2,340   | 139     | 16    | 17    |
| 20          | 121   | 265       | 110   | 95    | 4,770   | 2,600   | 669    | 1,370  | 2,380   | 121     | 15    | 21    |
| 21          | 127   | 260       | 105   | 95    | 3,320   | 2,580   | 697    | 1,350  | 2,110   | 112     | 15    | 22    |
| 22          | 133   | 200       | 100   | 95    | 2,040   | 2,480   | 704    | 1,400  | 1,870   | 102     | 11    | 22    |
| 23          | 136   | 180       | 95    | 95    | 1,480   | 2,160   | 697    | 1,340  | 1,880   | 87      | 9.4   | 22    |
| 24          | 139   | 210       | 90    | 95    | 1,250   | 1,660   | 788    | 1,290  | 1,740   | 80      | 12    | 22    |
| 25          | 142   | 200       | 85    | 95    | 1,050   | 1,610   | 838    | 1,170  | 1,640   | 71      | 12    | 20    |
| 26          | 145   | 190       | 80    | 95    | 1,280   | 1,840   | 1,130  | 1,130  | 1,580   | 69      | 10    | 20    |
| 27          | 152   | 180       | 75    | 95    | 910     | 3,010   | 1,220  | 1,090  | 1,480   | 62      | 10    | 23    |
| 28          | 162   | 170       | 75    | 95    | 704     | 5,930   | 1,120  | 1,030  | 1,420   | 54      | 9.8   | 25    |
| 29          | 180   | 190       | 75    | 95    | -----   | 7,920   | 1,060  | 958    | 1,380   | 53      | 11    | 28    |
| 30          | 192   | 190       | 80    | 95    | -----   | 5,750   | 1,130  | 982    | 1,270   | 49      | 12    | 43    |
| 31          | 196   | -----     | 85    | 95    | -----   | 4,680   | -----  | 1,140  | -----   | 43      | 19    | ----- |
| TOTAL       | 3,296 | 6,811     | 3,725 | 2,750 | 57,114  | 89,859  | 35,564 | 37,585 | 79,010  | 8,946   | 782.2 | 1,044 |
| MEAN        | 106   | 227       | 120   | 88.7  | 2,040   | 2,899   | 1,185  | 1,212  | 2,634   | 289     | 25.2  | 34.8  |
| MAX         | 196   | 275       | 180   | 95    | 8,720   | 7,920   | 3,850  | 2,910  | 5,620   | 1,120   | 56    | 224   |
| MIN         | 39    | 170       | 75    | 80    | 95      | 305     | 655    | 711    | 1,270   | 43      | 9.4   | 12    |
| AC-FT       | 6,540 | 13,510    | 7,390 | 5,450 | 113,300 | 178,200 | 70,540 | 74,550 | 156,700 | 17,740  | 1,550 | 2,070 |
| CAL YR 1970 | TOTAL | 207,778.6 | MEAN  | 569   | MAX     | 5,860   | MIN    | 4.3    | AC-FT   | 412,100 |       |       |
| WTR YR 1971 | TOTAL | 326,486.2 | MEAN  | 894   | MAX     | 8,720   | MIN    | 9.4    | AC-FT   | 647,600 |       |       |

## PEAK DISCHARGE (BASE, 5,000 CFS)

| DATE | TIME | G.H.T. | DISCHARGE | DATE | TIME | G.H.T. | DISCHARGE |
|------|------|--------|-----------|------|------|--------|-----------|
| 2-18 | 0800 | 7.6    | 10,200    | 3-29 | --   | a7.1   | a8,500    |
| 3-13 | --   | --     | a7,500    | 6-2  | 0620 | 6.59   | 6,080     |

a About.

06329500 Yellowstone River near Sidney, Mont.

LOCATION.--Lat 47°40'42", long 104°09'22", in SW<sup>1</sup>/<sub>4</sub>NE<sup>1</sup>/<sub>4</sub>SW<sup>1</sup>/<sub>4</sub> sec.9, T.22 N., R.59 E., Richland County, on left bank at Montana-Dakota Utilities Company powerplant, 0.2 mile downstream from bridge on State Highway 23, 2.5 miles south of Sidney, 3.0 miles downstream from Fox Creek, and 30 miles upstream from mouth.

DRAINAGE AREA.--69,103 sq mi. Area at site 4.5 miles upstream, 68,812 sq mi.

PERIOD OF RECORD.--October 1910 to September 1931 (published as "at Intake"), October 1933 to current year. If monthly figures of diversion to Lower Yellowstone Canal at Intake are added to records at this site, records equivalent to those published as Yellowstone River at Glendive (1898-1910, 1931-34) can be obtained. Monthly discharge only for some periods, published in WSP 1309. Monthly figures of diversions into Lower Yellowstone Canal prior to 1951 published in WSP 1309, 1951-60 published in WSP 1729, 1961-65 published in WSP 1916, and 1966-71 are published in annual reports.

GAGE.--Water-stage recorder. Datum of gage is 1,881.3 ft above mean sea level (levels by Corps of Engineers). Jan. 1, 1911, to Sept. 30, 1931, nonrecording gage at site 32 miles upstream at different datum. Apr. 9, 1934, to May 16, 1945, water-stage recorder at two sites within 500 ft of highway bridge 0.2 mile upstream and May 17, 1945, to Apr. 3, 1952, nonrecording gage on same bridge at datum 1.36 ft higher. Apr. 4, 1952, to Nov. 19, 1967, water-stage recorder at site 4.5 miles upstream at different datum.

AVERAGE DISCHARGE.--59 years, 12,980 cfs (9,404,000 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 62,900 cfs June 28 (gage height, 14.97 ft); maximum gage height, 21.67 ft Feb. 17 (backwater from ice); minimum daily discharge, 5,600 cfs Jan. 19.

Period of record: Maximum discharge observed, 159,000 cfs June 2, 1921 (gage height, 12.6 ft, site and datum then in use); maximum gage height observed, 21.85 ft Mar. 22, 1947, site and datum then in use (backwater from ice); minimum discharge, 470 cfs May 17, 1961 (gage height, 2.73 ft, site and datum then in use).

REMARKS.--Records good except those for winter period, which are fair. Some regulation on tributary streams. Diversions for irrigation of about 1,250,000 acres above station. Lower Yellowstone Canal diverts from left bank in NW<sup>1</sup>/<sub>4</sub> sec.36, T.18 N., R.56 E., at Lower Yellowstone diversion dam at Intake about 36.6 miles upstream for irrigation of about 52,000 acres, of which about one third lies above station (see table below). Records of chemical analyses and water temperatures for the current year are published in Part 2 of this report.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT             | NOV     | DEC     | JAN         | FEB        | MAR       | APR              | MAY     | JUN      | JUL     | AUG     | SEP     |
|-------------|-----------------|---------|---------|-------------|------------|-----------|------------------|---------|----------|---------|---------|---------|
| 1           | 8,520           | 8,480   | 8,400   | 8,400       | 9,500      | 12,300    | 26,100           | 16,700  | 37,800   | 55,800  | 16,200  | 6,950   |
| 2           | 8,620           | 8,390   | 8,600   | 8,200       | 9,800      | 11,000    | 22,000           | 16,100  | 43,700   | 47,900  | 15,500  | 8,320   |
| 3           | 8,520           | 8,450   | 8,600   | 8,200       | 10,200     | 10,000    | 19,500           | 15,800  | 44,800   | 41,200  | 15,100  | 10,700  |
| 4           | 8,350           | 8,320   | 8,600   | 8,200       | 9,600      | 9,600     | 17,900           | 15,400  | 43,500   | 37,300  | 14,600  | 11,700  |
| 5           | 8,290           | 8,190   | 8,400   | 9,000       | 9,000      | 9,600     | 16,100           | 15,100  | 41,800   | 36,200  | 14,100  | 14,400  |
| 6           | 8,750           | 8,420   | 8,200   | 8,600       | 9,500      | 11,000    | 14,900           | 15,800  | 39,300   | 37,300  | 12,500  | 12,800  |
| 7           | 8,750           | 8,550   | 8,400   | 8,400       | 9,500      | 12,000    | 14,400           | 17,100  | 39,600   | 40,300  | 12,000  | 12,500  |
| 8           | 8,480           | 8,480   | 8,200   | 8,000       | 9,500      | 11,000    | 14,000           | 18,300  | 39,400   | 36,100  | 11,900  | 12,800  |
| 9           | 8,520           | 8,450   | 7,800   | 7,600       | 9,000      | 10,500    | 13,900           | 18,900  | 38,800   | 34,100  | 11,700  | 11,800  |
| 10          | 8,420           | 8,480   | 7,600   | 7,200       | 8,000      | 11,000    | 13,800           | 20,900  | 39,900   | 33,500  | 11,500  | 11,300  |
| 11          | 8,620           | 8,620   | 7,900   | 7,200       | 8,200      | 13,000    | 13,500           | 21,000  | 42,100   | 35,200  | 11,500  | 11,400  |
| 12          | 8,680           | 8,290   | 8,000   | 7,400       | 9,000      | 15,000    | 14,000           | 22,100  | 47,600   | 31,200  | 11,100  | 11,200  |
| 13          | 8,850           | 8,910   | 8,400   | 7,200       | 11,300     | 20,000    | 13,900           | 22,100  | 51,600   | 29,300  | 10,700  | 10,800  |
| 14          | 8,850           | 8,950   | 8,200   | 6,800       | 14,000     | 30,000    | 13,600           | 21,500  | 55,900   | 29,800  | 10,100  | 10,200  |
| 15          | 9,040           | 8,780   | 8,000   | 6,600       | 20,000     | 40,000    | 13,700           | 21,900  | 55,800   | 28,800  | 10,100  | 9,700   |
| 16          | 9,410           | 8,650   | 7,900   | 6,200       | 39,000     | 35,000    | 13,400           | 24,700  | 52,900   | 27,700  | 9,700   | 9,340   |
| 17          | 9,340           | 8,460   | 7,600   | 6,000       | 50,000     | 32,000    | 13,200           | 27,400  | 53,200   | 27,000  | 8,980   | 9,210   |
| 18          | 9,310           | 8,480   | 7,400   | 5,800       | 40,000     | 27,000    | 12,800           | 26,800  | 54,800   | 26,400  | 8,780   | 9,040   |
| 19          | 8,980           | 8,390   | 7,400   | 5,600       | 38,000     | 22,000    | 12,500           | 25,900  | 55,700   | 26,000  | 8,550   | 8,910   |
| 20          | 8,580           | 8,320   | 7,200   | 6,000       | 35,000     | 20,000    | 13,100           | 27,200  | 55,400   | 24,900  | 8,000   | 9,080   |
| 21          | 8,420           | 8,230   | 7,000   | 7,000       | 30,000     | 18,000    | 13,300           | 25,900  | 55,400   | 24,700  | 7,590   | 9,640   |
| 22          | 8,350           | 8,000   | 7,400   | 9,600       | 25,000     | 17,700    | 12,100           | 24,700  | 55,800   | 24,100  | 7,650   | 9,340   |
| 23          | 8,620           | 8,000   | 7,200   | 10,800      | 16,000     | 17,100    | 12,400           | 22,700  | 55,700   | 22,600  | 7,550   | 9,080   |
| 24          | 8,880           | 7,600   | 7,000   | 12,000      | 12,200     | 15,900    | 12,200           | 21,800  | 56,200   | 21,100  | 7,050   | 9,240   |
| 25          | 8,620           | 7,600   | 7,200   | 13,000      | 14,000     | 14,600    | 12,600           | 22,100  | 58,000   | 20,500  | 6,610   | 9,240   |
| 26          | 7,110           | 7,400   | 7,400   | 13,500      | 14,500     | 14,000    | 13,300           | 22,300  | 60,100   | 20,400  | 6,400   | 9,010   |
| 27          | 6,530           | 7,600   | 7,400   | 12,000      | 14,500     | 14,700    | 14,200           | 21,500  | 62,100   | 19,500  | 6,210   | 8,810   |
| 28          | 8,240           | 7,800   | 7,600   | 11,000      | 13,000     | 22,900    | 14,600           | 21,300  | 61,900   | 18,300  | 6,090   | 8,580   |
| 29          | 8,650           | 8,700   | 7,800   | 9,800       | -----      | 28,600    | 17,800           | 21,900  | 59,200   | 18,100  | 5,990   | 8,420   |
| 30          | 8,620           | 8,600   | 8,200   | 9,200       | -----      | 32,400    | 17,400           | 25,400  | 56,500   | 17,600  | 5,840   | 8,390   |
| 31          | 8,480           | -----   | 8,500   | 9,400       | -----      | 30,300    | -----            | 31,200  | -----    | 17,000  | 6,210   | -----   |
| TOTAL       | 265,500         | 249,610 | 243,300 | 264,100     | 497,000    | 588,900   | 446,200          | 671,500 | 1,514,5M | 910,900 | 306,000 | 301,900 |
| MEAN        | 8,565           | 8,320   | 7,848   | 8,519       | 17,750     | 19,000    | 14,870           | 21,660  | 50,480   | 29,380  | 9,871   | 10,060  |
| MAX         | 9,410           | 8,950   | 8,600   | 13,500      | 50,000     | 40,000    | 26,100           | 31,200  | 62,100   | 55,800  | 16,200  | 14,400  |
| MIN         | 6,580           | 7,400   | 7,000   | 5,600       | 3,000      | 9,600     | 12,100           | 15,100  | 37,800   | 17,000  | 5,840   | 6,950   |
| AC-FT       | 526,600         | 495,100 | 482,600 | 523,800     | 985,800    | 1,168M    | 885,000          | 1,332M  | 3,004M   | 1,807M  | 607,000 | 598,800 |
| (+)         | 3,050           | 3,810   | 3,960   | 3,960       | 2,300      | 0         | 0                | 37,800  | 70,450   | 80,470  | 82,700  | 59,610  |
| CAL YR 1970 | TOTAL 5,191,720 |         |         | MEAN 14,220 | MAX 59,800 | MIN 2,500 | AC-FT 10,300,000 |         |          | (+)     |         |         |
| WTR YR 1971 | TOTAL 6,259,410 |         |         | MEAN 17,150 | MAX 62,100 | MIN 5,600 | AC-FT 12,420,000 |         |          | (+)     |         |         |

M Expressed in thousands.

+ Diversions, in acre-feet, by Lower Yellowstone Canal, furnished by Bureau of Reclamation.

NOTE.--Stage-discharge relation affected by ice Nov. 22 to Mar. 21.



## Smaller reservoirs in Missouri River basin in Montana

06012000 LIMA RESERVOIR.--Lat 44°39'16", long 112°21'54", in SW $\frac{1}{4}$  sec.32, T.13 S., R.6 W., Beaverhead County, at Lima Dam on Red Rock River, 7 miles northwest of Monda. Drainage area, 570 sq mi. Period of record, April 1940 to current year. Records prior to October 1950, published only in WSP 1309, and those for April 1955, published only in WSP 1729. Records of daily elevations available in files of Helena district office. Nonrecording gage read twice daily. Datum of gage is at mean sea level (levels by Montana Water Resources Board).

Extremes for current year: Maximum contents observed, 82,950 acre-ft June 30 (elevation, 6,582.53 ft); minimum observed, 39,210 acre-ft Oct. 1-4 (elevation, 6,573.28 ft). Extremes for period of record: Maximum contents observed, 85,220 acre-ft May 13, 1952 (elevation, 6,582.88 ft); minimum observed, 995 acre-ft July 11, 1961 (elevation, 6,545.98 ft).

Reservoir is formed by earthfill dam with concrete spillway completed in 1902. Usable capacity, 84,050 acre-ft between elevation 6,537.3 ft (bottom of tunnel) and 6,582.7 ft (spillway crest). No dead storage. Figures given herein represent usable contents. Water is used for irrigation, flood control and recreation. Records furnished by Water Users Irrigation Co. Correction: In WSP 1916, the elevation of the minimum contents was listed incorrectly; it should be 6,545.98 ft.

06020500 RUBY RIVER RESERVOIR.--Lat 45°14'21", long 112°06'35", in NE $\frac{1}{4}$  sec.8, T.7 S., R.4 W., Madison County, at dam on Ruby River, 6 miles south of Alder. Drainage area, 596 sq mi. Period of record, July 1938 to April 1950, September 1954, May 1955, September to November 1955, and February to September 1960 (total contents), October 1960 to current year (usable contents). Records prior to October 1939, published only in WSP 1309 and those for September 1954, published only in WSP 1729. Elevations are determined by measuring from reference points in the middle and at or near the end of the month. Datum of gage is at mean sea level (levels by Montana Water Resources Board).

Extremes for current year: Maximum contents observed, 38,850 acre-ft June 15, 30 (elevation, 5,392.0 ft); minimum observed, 8,200 acre-ft Oct. 15 (elevation, 5,346.0 ft). Extremes for period of record: Maximum contents observed, 44,120 acre-ft June 1, 15, 1947 (elevation, 5,397.1 ft); no storage at times in 1938, 1955, 1961.

Reservoir is formed by earthfill dam with concrete spillway completed in 1938. Usable capacity, 38,850 acre-ft between elevation 5,300.0 ft (bottom of tunnel) and 5,392.0 ft (spillway crest). Dead storage, 100 acre-ft below elevation 5,300.0 ft. Figures given herein represent usable contents. Water is used for irrigation and recreation. Records furnished by Montana Water Resources Board. Revisions, WSP 1729: Drainage area.

06036000 WILLOW CREEK RESERVOIR.--Lat 45°42'51", long 111°41'57", in NW $\frac{1}{4}$  sec.35, T.1 S., R.1 W., Madison County, at dam on Willow Creek, 4 miles east of Harrison. Drainage area, 153 sq mi. Period of record, February 1938 to March 1958 (total contents), April 1958 to current year (usable contents). Records prior to October 1939, published only in WSP 1309 and November, December 1951, published only in WSP 1729. Prior to October 1949, published as Harrison Lake near Harrison. Elevations determined by measuring from reference marks in the middle and at or near the end of the month. Datum of gage is at mean sea level (levels by Montana Water Resources Board).

Extremes for current year: Maximum contents observed, 17,730 acre-ft July 1, 15 (elevation, 4,736.0 ft); minimum observed, 2,270 acre-ft Nov. 15 (elevation, 4,705.0 ft). Extremes for period of record: Maximum contents observed, 19,230 acre-ft June 30, 1963 (elevation, 4,736.7 ft); minimum observed, 2,270 acre-ft Nov. 15, 1970 (elevation, 4,705.0 ft).

Reservoir is formed by earth and rockfill dam with concrete spillway completed in 1938. Usable capacity, 17,730 acre-ft between elevation 4,666.5 ft (tunnel inlet) and 4,736.0 ft (spillway crest). Dead storage, 270 acre-ft below elevation 4,666.5 ft. Figures given herein represent usable contents. Water is used for irrigation and recreation. Records furnished by Montana Water Resources Board. Revisions (water years), WSP 1629: 1958. WSP 1729: 1948(M), 1951-52, 1956-57.

06038000 HEBGEN LAKE.--Lat 44°51'51", long 111°20'09", in SW $\frac{1}{4}$  sec.23, T.11 S., R.3 E., Gallatin County, at Hebgen Dam on Madison River, 18 miles northwest of West Yellowstone, and at mile 103. Drainage area, 904 sq mi. Period of record, January 1936 to current year. Records prior to October 1939, published only in WSP 1309. Figures of contents published in WSP 1629, 1709 and 1729 have been found to be in error and should not be used. Prior to Oct. 1, 1949, published as Hebgen Reservoir near West Yellowstone. Records of daily elevations since October 1955 on file in Helena district office. Nonrecording gage read about twice daily. Datum of gage is at mean sea level (levels by The Montana Power Co.). Prior to earthquake of Aug. 17, 1959, datum of gage was 9.74 ft higher, also at mean sea level.

Extremes for current year: Maximum contents observed, 377,200 acre-ft June 28 to July 27 (elevation, 6,534.85 ft); minimum observed, 266,500 acre-ft Nov. 25 to Mar. 31 (elevation, 6,525.29 ft). Extremes for period of record: Maximum contents observed, 377,500 acre-ft on many days 1962-64, 1970 (elevation, 6,534.87 ft); minimum monthend, 670 acre-ft Dec. 31, 1936 (by capacity table used prior to August 1959).

Reservoir is formed by earthfill dam with concrete core and spillway completed in 1915, repaired in 1960 following severe earthquake of Aug. 17, 1959, which lowered dam 9.74 ft and deformed reservoir area. Subsequent usable capacity, 377,500 acre-ft between elevation 6,473.00 ft (bottom of outlet tower) and 6,534.87 ft (spillway crest). Dead storage, 7,340 acre-ft below elevation 6,473.00 ft. Prior to Aug. 17, 1959, usable capacity, 344,700 acre-ft between 6,483.11 ft (bottom of outlet tower) and 6,544.61 ft (spillway crest). No dead storage. Observations of reservoir level prior and subsequent to earthquake indicate smaller increase in capacity than indicated by new capacity table. Figures given herein represent usable contents. Water is used for power and recreation. Records furnished by The Montana Power Co. Revisions WSP 1916: 1959-60.

06040500 ENNIS LAKE.--Lat 45°28'12", long 111°38'15", in NW $\frac{1}{4}$  sec.20, T.4 S., R.1 E., Madison County, at Madison Dam on Madison River, 5 miles northeast of McAllister. Drainage area, 2,181 sq mi. Period of record, January 1936 to current year. Records prior to October 1939, published only in WSP 1309. Prior to 1949, published as Madison Reservoir near McAllister. Records of daily elevations since October 1955 on file in Helena district office. Nonrecording gage read about twice daily. Datum of gage is at mean sea level (levels by The Montana Power Co.).

Extremes for current year: Maximum contents observed, 40,260 acre-ft Aug. 28-30 (elevation, 4,841.30 ft); minimum observed, 33,500 acre-ft Mar. 2, 3 (elevation, 4,839.50 ft). Extremes for period of record: Maximum contents observed, 40,830 acre-ft June 20, 1968 (elevation, 4,841.45 ft); minimum observed, 2,600 acre-ft Mar. 31, 1937 (elevation, 4,828.8 ft).

Reservoir is formed by timber crib dam completed in 1900. Usable capacity, 41,020 acre-ft between elevation 4,826.5 ft (bottom of penstock) and 4,841.5 ft (top of flashboards). Dead storage, 1,040 acre-ft below elevation 4,826.5 ft. Not normally drawn below 4,831.0 ft, 6,810 acre-ft. Figures given herein represent usable contents. Water is used for power and recreation. Records furnished by The Montana Power Co.



## Smaller reservoirs in Missouri River basin in Montana--Continued

06049500 MIDDLE CREEK RESERVOIR.--Lat 45°29'18", long 110°58'42", in NW¼SW¼ sec.15, T.4 S., R.6 E., Gallatin County, at dam on Hyalite Creek, 14 miles south of Bozeman. Drainage area, 27.4 sq mi. Period of record, April 1951 to current year. Nonrecording gage read in the middle and at or near the end of the month. Altitude of lake at full pond is about 6,700 ft (from topographic map).

Extremes for current year: Maximum contents observed, 7,930 acre-ft July 15 (gage height, 200.3 ft); minimum observed, 2,570 acre-ft Sept. 30 (gage height, 164.7 ft). Extremes for period of record: Maximum contents observed, 8,240 acre-ft May 31, 1966 (gage height, 201.7 ft); minimum observed, 120 acre-ft Oct. 18, 1965 (gage height, 129.0 ft).

Reservoir is formed by earthfill dam with conduit control works completed in 1951. Storage began in March 1951. Usable capacity, 8,030 acre-ft between gage height 125 ft (bottom of outlet) and 200.75 ft (spillway crest). Dead storage, 209 acre-ft below gage height 125 ft. Figures given herein represent usable contents. Water is used for irrigation and municipal purposes. Records furnished by Montana Water Resources Board.

06064500 LAKE HELENA.--Lat 46°45'58", long 111°53'10", in SE¼SW¼ sec.29, T.12 N., R.2 W., Lewis and Clark County, at Hauser Dam on Missouri River, 13 miles northeast of Helena. Drainage area, 610 sq mi above dam and control works on Prickly Pear Creek. Period of record, May 1945 to current year. April to July 1953 scattered daily elevations and contents, published in WSP 1320-B. May to June 1964 daily elevations and contents, published in WSP 1840-B. Records of daily elevations since October 1955 on file in Helena district office. Nonrecording gage at Hauser Dam read hourly. Datum of gage is at mean sea level (levels by The Montana Power Co.).

Extremes for current year: Maximum contents observed, 11,560 acre-ft July 1 (elevation, 3,635.50 ft); minimum observed, 8,270 acre-ft May 11 (elevation, 3,633.90 ft). Extremes for period of record: Maximum contents observed, 11,790 acre-ft Aug. 2, 1960, Dec. 10, 1962, July 19, 20, Sept. 4, 1963, Aug. 15, 1968 (elevation, 3,635.60 ft); no storage Mar. 29 to Apr. 7, 1958, Feb. 12, 20, 1962.

Gage heights collected at Hauser Dam are effective on Lake Helena at control dam. Prior to April 1945, contents of Lake Helena included with records of Hauser Lake. Since that date, a dam and control works has separated the two lakes to allow independent regulation of Lake Helena, if needed. Usable capacity, 10,450 acre-ft between elevation 3,624.00 ft (bottom of control works) and 3,635.00 ft (top of flashboards). No dead storage. Figures given herein represent usable contents. Water is used for recreation, wildlife, and power production through Hauser Dam. Records furnished by The Montana Power Co.

06065000 HAUSER LAKE.--Lat 46°45'58", long 111°53'10", in SE¼SW¼ sec.29, T.12 N., R.2 W., Lewis and Clark County, at Hauser Dam on Missouri River, 1.6 miles downstream from Prickly Pear Creek, 13 miles northeast of Helena, and at mile 2,226.4. Drainage area, 16,876 sq mi. Period of record, January 1936 to current year. Records prior to October 1939, published only in WSP 1309. April to July 1953 scattered daily elevations and contents, published in WSP 1320-B. May to June 1964 daily elevations and contents, published in WSP 1840-B. Monthend contents prior to May 1945 include contents of Lake Helena, excluded thereafter. Records of daily elevations since October 1955 on file in Helena district office. Nonrecording gage read hourly. Datum of gage is at mean sea level (levels by The Montana Power Co.).

Extremes for current year: Maximum contents observed, 53,260 acre-ft July 1 (elevation, 3,635.50 ft); minimum observed, 45,300 acre-ft Oct. 1 (elevation, 3,633.30 ft). Extremes for period of record: Maximum contents observed since May 1945, 53,630 acre-ft Aug. 2, 1960, Dec. 10, 1961, July 19, 20, Sept. 4, 1963, Aug. 15, 1968 (elevation, 3,635.60 ft); no storage Jan. 31, Feb. 29, 1936.

Reservoir is formed by concrete dam completed in 1907; separated from Lake Helena in April 1945. Usable contents, 51,420 acre-ft between elevation 3,617.00 ft (bottom of tunnel) and 3,635.00 ft (top of flashboards). Dead storage, 46,810 acre-ft below elevation 3,617.00 ft. Prior to Nov. 28, 1949, usable capacity, 52,090 acre-ft at elevation 3,635.00 ft (decrease caused by construction of new Canyon Ferry Dam in backwater of Hauser Dam). Not normally drawn below 3,621.00 ft, 8,870 acre-ft. Figures given herein represent usable contents. Water is used for power and recreation. Records furnished by The Montana Power Co. Revisions (water years), WSP 1729: 1949-57.

06066000 HOLTER LAKE.--Lat 46°59'28", long 112°00'17", on line between SE¼ sec.5, and NE¼ sec.8, T.14 N., R.3 W., Lewis and Clark County, at Holter Dam on Missouri River, 3.3 miles east of Wolf Creek, and at mile 2,204. Drainage area, 17,149 sq mi. Period of record, January 1936 to current year. Records prior to October 1939, published only in WSP 1309. April to July 1953 scattered daily elevations and contents, published in WSP 1320-B. May to June 1964 daily elevations and contents, published in WSP 1840-B. Records of daily elevations since October 1955 on file in Helena district office. Prior to 1950, published as Holter Reservoir near Wolf Creek. Nonrecording gage read three times daily. Datum of gage is at mean sea level (levels by The Montana Power Co.).

Extremes for current year: Maximum contents observed, 82,060 acre-ft Oct. 28, Aug. 2 (elevation, 3,564.03 ft); minimum observed, 61,300 acre-ft Sept. 20 (elevation, 3,559.50 ft). Extremes for period of record: Maximum contents observed, 85,250 acre-ft June 19, 1970 (elevation, 3,564.70 ft); no storage Feb. 29, Dec. 31, 1936.

Reservoir is formed by concrete dam completed in 1918. Usable capacity, 81,920 acre-ft between elevation 3,543.0 ft (bottom of tunnel) and 3,564.0 ft (top of flashboards). Dead storage, 158,500 acre-ft below elevation 3,543.0 ft. Not normally drawn below 3,548.0 ft, 16,660 acre-ft. Figures given herein represent usable contents. Water is used for power and recreation. Records furnished by The Montana Power Co.

06075000 SMITH RIVER RESERVOIR.--Lat 46°37'27", long 110°44'48", near center of south line of sec.17, T.10 N., R.8 W., Meagher County, at dam on Smith River, 9 miles northeast of White Sulphur Springs. Drainage area, 72.3 sq mi. Period of record, April 1938 to September 1950 (scattered records 1947-50) and April to October 1959 (total contents), November 1959 to current year (usable contents). Records for some periods, published only in WSP 1309 and for April 1959, published only in WSP 1729. Elevations determined by measuring from reference marks at or near middle and end of month. Datum of gage is at mean sea level (levels by Montana Water Resources Board).

Extremes for current year: Maximum contents observed, 11,500 acre-ft June 1 (elevation, 5,488.6 ft); minimum observed, 3,030 acre-ft Sept. 19 (elevation, 5,455.8 ft). Extremes for period of record: Maximum contents observed, 11,600 acre-ft Apr. 30, 1950 (elevation, 5,488.6 ft); minimum, 360 acre-ft Sept. 30, 1940 (elevation, 5,432.4 ft).

Reservoir is formed by earthfill dam with concrete spillway completed in 1936. Usable capacity, 10,650 acre-ft between elevation, 5,415.0 ft (bottom of outlet) and 5,486.0 ft (spillway crest). Dead storage, 52 acre-ft below elevation 5,415.0 ft. Figures given herein represent usable contents. Water is used for irrigation and recreation. Records furnished by Montana Water Resources Board. Revisions (water years), WSP 1729: 1960.

## Smaller reservoirs in the Missouri River basin in Montana--Continued

- 06079500 GIBSON RESERVOIR.**--Lat 47°36'09", long 112°45'39", in NE¼NW¼SE¼ sec.4, T.21 N., R.9 W., Teton County, at Gibson Dam on Sun River, 19 miles northwest of Augusta, and at mile 99.9. Drainage area, 575 sq mi. Period of record, January 1930 to current year. Records prior to October 1940, published only in WSP 1309. April to July 1953 scattered daily elevations and contents, published in WSP 1320-B. May to June 1964 daily elevations and contents, published in WSP 1840-B. Nonrecording gage read daily. Datum of gage is at mean sea level (levels by Bureau of Reclamation).
- Extremes for current year: Maximum contents observed, 104,500 acre-ft June 24 (elevation, 4,723.8 ft); minimum observed, 15,640 acre-ft Oct. 5, 10, 11 (elevation, 4,628.7 ft). Extremes for period of record: Maximum contents, 116,400 acre-ft June 8, 1964 (elevation, 4,732.23 ft, from floodmark), of which 11,600 acre-ft was uncontrolled storage; minimum observed, 11 acre-ft Oct. 13, 1936 (elevation, 4,560.9 ft).
- Reservoir is formed by concrete dam with glory-hole type spillway completed in 1929. Usable capacity, 104,800 acre-ft (88,560 acre-ft prior to 1939) between elevation 4,557.5 ft (bottom of outlet) and 4,724.0 ft (top of glory hole). Dead storage, 16 acre-ft below elevation 4,557.5 ft. Figures given herein represent usable contents. Water is used for irrigation and recreation. Records furnished by Bureau of Reclamation.
- 06080500 PISHKUN RESERVOIR.**--Lat 47°40'36", long 112°29'48", in W¼ sec.10, T.22 N., R.7 W., Teton County, at dam 14 miles northwest of Augusta. Period of record, January 1936 to current year. Records prior to October 1940, published only in WSP 1309. April to July 1953 scattered daily elevations and contents, published in WSP 1320-B. Nonrecording gage read one or more times a month. Datum of gage is at mean sea level (levels by Bureau of Reclamation).
- Extremes for current year: Maximum contents observed, 32,210 acre-ft May 19 (elevation, 4,371.1 ft); minimum observed, 12,000 acre-ft Oct. 1 (elevation, 4,355.8 ft). Extremes for period of record: Maximum contents observed, 32,700 acre-ft July 4-6, 1953 (elevation, 4,371.4 ft); no storage October 1939 to March 1940, Oct. 31, 1967.
- This is an offstream reservoir formed by two earthfill dams completed in 1919. Stored water is diverted from Sun River in sec.36, T.22 N., R.9 W., 18 miles northwest of Augusta. Usable capacity, 32,050 acre-ft between elevation 4,342.0 ft (bottom of outlet) and 4,371.0 ft (maximum pool). Dead storage, 16,400 acre-ft below elevation 4,342.0 ft. Prior to 1940, usable capacity varied from 3,600 to 21,750 acre-ft. Figures given herein represent usable contents. Water is used for irrigation, recreation and wildlife. Records furnished by Bureau of Reclamation.
- 06082000 WILLOW CREEK RESERVOIR.**--Lat 47°32'48", long 112°25'45", in SW¼NW¼ sec.30, T.21 N., R.6 W., Lewis and Clark County, at dam on Willow Creek, 4 miles northwest of Augusta. Period of record, January 1936 to September 1960 (total contents), October 1960 to current year (usable contents). Records prior to October 1940, published only in WSP 1309. April to July 1953 scattered daily elevations and contents, published in WSP 1320-B. Nonrecording gage read one or more times a month. Datum of gage is at mean sea level (levels by Bureau of Reclamation).
- Extremes for current year: Maximum contents observed, 31,580 ft July 6 (elevation, 4,145.5 ft); minimum observed, 19,230 acre-ft Aug. 31 (elevation, 4,132.2 ft). Extremes for period of record: Maximum contents observed, 33,130 acre-ft July 11, 1965 (elevation, 4,142.6 ft); no storage July 31, Aug. 31, 1940.
- Reservoir is formed by earthfill dam completed in 1911. Usable capacity, 32,230 acre-ft between elevation 4,085.28 ft (bottom of outlet) and 4,142.0 ft (maximum pool). Dead storage, 67 acre-ft below elevation 4,085.28 ft. Prior to 1941, total capacity was 16,700 acre-ft. Supplemental water diverted from Sun River in sec.36, T.22 N., R.9 W., 18 miles northwest of Augusta. Figures given herein represent usable contents. Water is used for irrigation, recreation, and wildlife. Records furnished by Bureau of Reclamation.
- 06083000 NILAN RESERVOIR.**--Lat 47°29'06", long 112°32'24", in S¼NE¼ sec.18, T.20 N., R.7 W., Lewis and Clark County, at north dam, lat 47°28'18", long 112°30'54", in SE¼NE¼ sec.20, T.20 N., R.7 W., at east dam, 6 miles west of Augusta. Period of record, December 1951 to current year. April to July 1953 scattered daily contents, published in WSP 1320-B. Records for November 1958 to March 1959, published only in WSP 1729. Nonrecording gage read at middle and end of month. Datum of gage is at mean sea level (levels by Montana Water Resources Board).
- Extremes for current year: Maximum contents observed, 9,940 acre-ft June 15 (elevation, 4,442.2 ft); minimum observed, 5,220 acre-ft Aug. 31 (elevation, 4,431.4 ft). Extremes for period of record: Maximum contents observed, 13,520 acre-ft May 31, 1963 (elevation, 4,448.5 ft); minimum observed since first filling, 2,300 acre-ft Sept. 14, 1966 (elevation, 4,421.0 ft).
- This is an offstream reservoir formed by two earthfill dams completed in 1951. Usable capacity 10,090 acre-ft between elevation 4,402.0 ft (bottom of outlet) and 4,442.5 ft (spillway crest). Dead storage, 900 acre-ft below elevation 4,402.0 ft, not including contents of old lake. Stored water is diverted from Smith Creek in NE¼ sec.4, T.19 N., R.8 W., and from Ford Creek in SW¼ sec.26, T.20 N., R.8 W., at points 12 miles and 10 miles, respectively, southwest of Augusta. Figures given herein represent usable contents. Water is used for irrigation and recreation. Records furnished by Montana Water Resources Board.
- 06090900 LOWER TWO MEDICINE LAKE.**--Lat 48°29'39", long 113°15'49", in NE¼ sec.34, T.32 N., R.13 W., Glacier County, at dam on Two Medicine River, 4 miles northwest of East Glacier. Drainage area, 50.2 sq mi. Period of record, September 1938 to June 1964 (dam destroyed), December 1967 to current year. Figures of no storage prior to April 1961 may be in error and should be used with caution. Records prior to October 1940, published only in WSP 1309. April to July 1953 scattered daily elevations and contents, published in WSP 1320-B. May to June 1964 occasional elevations and contents, published in WSP 1840-B. Prior to 1942, published as Two Medicine Lake near East Glacier. Nonrecording gage read at or near end of month. Datum of gage is at mean sea level (levels by Bureau of Reclamation) and is 8.22 ft higher than datum for destroyed dam (levels by Bureau of Indian Affairs).
- Extremes for current year: Maximum contents observed, 12,720 acre-ft June 4 (elevation, 4,883.3 ft); minimum observed, 618 acre-ft Oct. 1 (elevation, 4,862.7 ft). Extremes for period of record: Maximum contents observed, 20,930 acre-ft June 8, 1964 (elevation, 4,883.8 ft, datum and capacity table then in use), dam overtopped; possibly no storage at times in some years.
- Reservoir is formed by earthfill dam with concrete spillway and control works; construction began in September 1965, completed in November 1967. Storage began Dec. 1, 1967. Former dam 250 ft upstream completed in 1913 and destroyed by flood of June 8, 1964. Usable capacity at new dam, 11,880 acre-ft between elevation 4,861.0 ft (bottom of outlet) and 4,882 ft (spillway crest). Dead storage, about 2,000 acre-ft near upper end of reservoir below elevation 4,861.0 ft. Prior to June 8, 1964, usable capacity was 16,620 acre-ft between elevation 4,848.00 ft, datum then in use (elevation of natural outlet) and 4,878.0 ft, datum then in use (spillway crest). Dead storage was unknown. Figures given herein represent usable contents. Water is used for irrigation and recreation. Records furnished by Bureau of Indian Affairs.
- Revisions, WSP 1729: Drainage area.

## Smaller reservoirs in Missouri River basin in Montana--Continued

06093000 FOUR HORNS LAKE.--Lat 48°20'33", long 112°41'48", in sec.19, T.30 N., R.8 W., Glacier County, at dam 7 miles northeast of Heart Butte. Period of record, September 1938 to current year. Records prior to October 1940, published only in WSP 1309 and those for December 1958 to August 1959, published only in WSP 1729. April to July 1953 scattered daily elevations and contents, published in WSP 1320-B. Prior to 1950, published as Four Horns Reservoir near Heart Butte. Nonrecording gage read at or near end of month. Datum of gage is at mean sea level (levels by Bureau of Indian Affairs).

Extremes for current year: Maximum contents observed, 13,980 acre-ft June 1 (elevation, 4,108.7 ft); minimum observed, 8,770 acre-ft Aug. 2 (elevation, 4,101.3 ft). Extremes for period of record: Maximum contents observed, 16,320 acre-ft Aug. 5, 1958 (elevation, 4,111.6 ft); minimum observed, 2,840 acre-ft July 31, 1949 (elevation, 4,090.0 ft).

This is an offstream reservoir formed by earthfill dam completed in 1932. Stored water is diverted from Badger Creek in NE¼ sec.24, T.30 N., R.10 W., 5 miles north of Heart Butte. Usable capacity, 19,250 acre-ft between elevation 4,081.0 ft (gate sill) and 4,115.0 ft (maximum design level). No dead storage. Figures given herein represent usable contents. Water is used for irrigation and recreation. Records furnished by Bureau of Indian Affairs.

06094000 SWIFT RESERVOIR.--Lat 48°09'53", long 112°52'20", in NE¼ sec.27, T.28 N., R.10 W., Pondera County, at Swift Dam on Birch Creek, 17 miles west of Dupuyer. Drainage area, 75.3 sq mi. Period of record, January 1936 to June 1964 (dam destroyed), June 1967 to current year. Records prior to October 1940, published only in WSP 1309. April to July 1953 scattered daily elevations and contents, published in WSP 1320-B. April to June 1964 scattered daily elevations and contents, published in WSP 1840-B. Prior to 1950, published as Birch Creek Reservoir near Dupuyer. Nonrecording gage read monthly. Datum of gage is at mean sea level (levels by Bureau of Reclamation) and is 63.7 ft lower than datum for destroyed dam (levels by Pondera County Canal and Reservoir Co.).

Extremes for current year: Maximum contents observed, 30,150 acre-ft June 1 (elevation, 4,883.9 ft); minimum observed, 9,810 acre-ft Nov. 30 (elevation, 4,828.7 ft). Extremes for period of record: Maximum contents observed, 34,300 acre-ft June 8, 1964 (elevation, 4,956.3 ft, datum then in use); minimum observed, 20 acre-ft Sept. 30, 1952 (elevation, 4,810.0 ft, datum then in use).

Reservoir is formed by concrete arch dam; construction began in 1965; completed in 1967. Storage began June 22, 1967. Former dam, in same location, was built about 1915 and destroyed by flood of June 8, 1964. Usable capacity at new dam, 29,980 acre-ft between elevation 4,748.0 ft (bottom of outlet) and 4,883.5 ft (spillway crest). Dead storage, 35 acre-ft below elevation 4,748.0 ft. Prior to June 8, 1964, usable capacity, 30,000 acre-ft between elevation 4,808.2 ft (bottom of outlet) and 4,947.0 ft (spillway crest). Dead storage was negligible. Figures given herein represent usable contents. Water is used for irrigation. Records furnished by Pondera County Canal and Reservoir Co. Revisions WSP 1729: Drainage area.

06095500 LAKE FRANCES.--Lat 48°15'48", long 112°12'24", in NE¼ sec.23, T.29 N., R.5 W., Pondera County, at dam 3 miles southeast of Valier. Period of record, January 1936 to current year. Records prior to October 1940, published only in WSP 1309. April to July 1953 scattered daily elevations and contents, published in WSP 1320-B. Nonrecording gage read at or near end of month. Datum of gage is at mean sea level (levels by Pondera County Canal and Reservoir Co.).

Extremes for current year: Maximum contents observed, 99,380 acre-ft May 31 (elevation, 3,813.65 ft); minimum observed, 64,110 acre-ft Sept. 30 (elevation, 3,806.37 ft). Extremes for period of record: Maximum contents observed, 111,400 acre-ft June 4, 1953 (elevation, 3,815.92 ft); minimum observed, 4,560 acre-ft Jan. 31, 1938 (elevation, 3,789.36 ft).

This is an offstream reservoir formed by earthfill dam completed about 1913. Stored water is diverted from Birch Creek in sec.28, T.29 N., R.8 W., and Dupuyer Creek in sec.28, T.29 N., R.6 W., at points 20 miles and 6 miles, respectively, west of dam. Usable capacity, 111,900 acre-ft between elevation 3,787.40 ft (outlet sill) and 3,816.00 ft (maximum design level). Dead storage is estimated at 5,000 acre-ft below elevation 3,787.40 ft. Figures given herein represent usable contents. Water is used for irrigation. Records furnished by Pondera County Canal and Reservoir Co.

06110500 ACKLEY LAKE.--Lat 46°57'19", long 109°55'55", in SE¼ sec.22, T.14 N., R.14 E., Judith Basin County, at dam 4 miles southwest of Hobson. Period of record, June 1938 to September 1960 (total contents), October 1960 to current year (usable contents). Records prior to October 1939, published only in WSP 1309. Nonrecording gage read usually at or near middle and end of month. Altitude of gage is about 4,300 ft (from topographic map).

Extremes for current year: Maximum contents observed, 4,790 acre-ft July 10 (gage height, 78.4 ft); minimum, 3,000 acre-ft Sept. 30 (estimated). Extremes for period of record: Maximum contents observed (corrected to usable contents), 5,650 acre-ft May 31, 1942, May 31, June 30, 1944, June 30, 1950, July 1, 1970 (gage height, 82.0 ft); minimum observed, 1,480 acre-ft Apr. 30, 1962 (gage height, 60.0 ft).

This is an offstream reservoir formed by earthfill dam with concrete conduits completed in 1938. Water is diverted from Judith River near center of east line of sec.14, T.14 N., R.13 E., 7.5 miles west of Hobson. Usable capacity, 5,820 acre-ft between gage height 45.0 ft (bottom of outlet) and 82.67 ft (spillway crest). Dead storage, 325 acre-ft below gage height 45.0 ft. Figures given herein represent usable contents. Water is used for irrigation. Records furnished by Montana Water Resources Board.

06116500 BAIR RESERVOIR.--Lat 46°34'47", long 110°33'24", in S½ sec.35, T.10 N., R.9 E., Meagher County, at dam on North Fork Musselshell River, 1 mile northwest of Delpine and 14 miles northwest of Martinsdale. Drainage area, 48.6 sq mi. Period of record, November 1939 to September 1960 (total contents), winter records incomplete some years during 1951-59, October 1960 to current year (usable contents). Records for November 1939, published only in WSP 1309. Prior to October 1969, published as Durand Reservoir. Nonrecording gage read at or near middle and end of month. Datum of gage is at mean sea level (levels by Montana Water Resources Board).

Extremes for current year: Maximum contents observed, 7,010 acre-ft June 15, 29 (elevation, 5,325.0 ft); minimum observed, 1,020 acre-ft Sept. 19 (elevation, 5,285.0 ft). Extremes for period of record: Maximum contents observed, 7,150 acre-ft June 15, 1967 (elevation, 5,325.5 ft); no storage July 31, 1961.

Reservoir is formed by earthfill dam with concrete spillway completed in 1939. Usable capacity, 7,000 acre-ft between elevation 5,253.2 ft (bottom of inlet) and 5,325.0 ft (spillway crest). Dead storage, 24 acre-ft below elevation 5,253.2 ft. Supplemental water can be diverted from Checherboard Creek in S½ sec.5, T.9 N., R.9 E., but seldom used. Figures given herein represent usable contents. Water is used for irrigation. Records furnished by Montana Water Resources Board. Revisions, WSP 1729: Drainage area.



## Smaller reservoirs in Missouri River basin in Montana--Continued

- 06119000 MARTINDALE RESERVOIR.**--Lat 46°27'17", long 110°16'02", near center of sec.18, T.8 N., R.12 E., Wheatland County, at north dam 2 miles east of Martinsdale, lat 46°26'33", long 110°15'30", in NE¼ sec.20, T.8 N., R.12 E., at south dam 3 miles southeast of Martinsdale. Period of record, November 1939 to September 1960 (total contents), winter records incomplete for some years during 1951-59, October 1960 to current year (usable contents). Records for November 1939, published only in WSP 1309. Nonrecording gage read at or near middle and end of month. Datum of gage is at mean sea level (levels by Montana Water Resources Board).  
Extremes for current year: Maximum contents observed, 20,750 acre-ft June 28 (elevation, 4,776.5 ft); minimum observed, 7,810 acre-ft Sept. 18 (elevation, 4,758.5 ft). Extremes for period of record: Maximum contents observed, 22,920 acre-ft July 1, 1965 (elevation, 4,778.8 ft); no storage July 31, Aug. 31, Sept. 30, Oct. 31, 1961.  
This is an offstream reservoir formed by two earthfill dams with concrete conduit and spillway completed in 1939. Stored water is diverted from South Fork Musselshell River in N¼ sec.15, T.8 N., R.11 E., at a point 1 mile west of Martinsdale. Usable capacity, 23,110 acre-ft between elevation 4,714.67 ft (bottom of outlet) and 4,779.0 ft (spillway crest). Dead storage, 73 acre-ft below elevation 4,714.67 ft. South Fork Musselshell River flow above diversion is supplemented at times with return flow from lands irrigated by water diverted from North Fork Musselshell River. Figures given herein represent usable contents. Water is used for irrigation. Records furnished by Montana Water Resources Board.
- 06122500 DEADMAN'S BASIN RESERVOIR.**--Lat 46°20'24", long 109°24'35", in NE¼ sec.25, T.7 N., R.18 E., Wheatland County, at dam 6 miles east of Shawmut. Period of record, June 1941 to June 1955 (some contents may be total), July 1955 to current year (usable contents), incomplete 1942, 1951-59. Nonrecording gage read at or near middle and end of month. Datum of gage is at mean sea level (levels by Montana Water Resources Board).  
Extremes for current year: Maximum contents observed, 63,780 acre-ft May 4 (elevation, 3,916.8 ft); minimum observed, 25,700 acre-ft Sept. 18 (elevation, 3,895.2 ft). Extremes for period of record: Maximum contents observed, 72,420 acre-ft June 15, 1967 (elevation, 3,921.1 ft); minimum observed, 3,290 acre-ft Oct. 31, 1961 (elevation, 3,876.3 ft).  
This is an offstream reservoir formed by earthfill dam completed in 1941. Stored water is diverted from Musselshell River in NW¼ sec.8, T.7 N., R.17 E., 6 miles northwest of Shawmut. Usable capacity, 72,220 acre-ft between elevation 3,872.0 ft (bottom of outlet) and 3,921.0 ft (maximum design level). Prior to 1958, usable capacity was 52,500 acre-ft at elevation 3,911.0 ft. Dead storage, 4,600 acre-ft below elevation 3,872.0 ft. Figures given herein represent usable contents. Water is used for irrigation. Records furnished by Montana Water Resources Board.
- 06136500 FRESNO RESERVOIR.**--Lat 48°36'04", long 109°56'45", in SE¼ sec.19, T.33 N., R.14 E., Hill County, at dam on Milk River, 13 miles west of Havre and at mile 440. Drainage area, 3,766 sq mi, of which 670 sq mi is probably noncontributing. Period of record, January 1940 to current year. Records prior to September 1940, published only in WSP 1309. March to May 1952 daily elevations and contents, published in WSP 1260-B. April to July 1953 scattered daily elevations and contents, published in WSP 1320-B. Records of daily contents in files of Helena district office. Nonrecording gage read daily. Datum of gage is at mean sea level (levels by Bureau of Reclamation).  
Extremes for current year: Maximum contents observed, 124,600 acre-ft May 2 (elevation, 2,574.55 ft); minimum observed, 15,360 acre-ft Sept. 9 (elevation, 2,543.22 ft). Extremes for period of record: Maximum contents observed, 154,000 acre-ft Apr. 3, 1952 (elevation, 2,579.35 ft), of which 26,800 acre-ft was uncontrolled storage; no storage Feb. 18 to Mar. 6, 1950.  
Reservoir is formed by earthfill dam with concrete spillway completed in 1939. Usable capacity, 127,200 acre-ft between elevation 2,530.00 ft (crest of tunnel inlet) and 2,575.00 ft (spillway crest). Elevation of maximum water surface is 2,591 ft (243,600 acre-ft) and crest of dam is 2,595 ft. There are no gates in the spillway. Dead storage, 1,860 acre-ft below elevation 2,530 ft. Figures given herein represent usable contents. Water is used for irrigation and recreation. Records furnished by Bureau of Reclamation. Revisions, WSP 1729: Drainage area.
- 06155000 NELSON RESERVOIR.**--Lat 48°31'42", long 107°31'00", in SE¼ sec.14, T.32 N., R.32 E., Phillips County, at dam 10 miles northwest of Saco. Period of record, March 1928 to current year. Records prior to October 1940, published only in WSP 1309. Nonrecording gage read on first and last day of month and more often during high stages. Datum of gage is at mean sea level (levels by Bureau of Reclamation).  
Extremes for current year: Maximum contents observed, 51,440 acre-ft May 11 (elevation, 2,219.4 ft); minimum observed, 25,280 acre-ft Aug. 31, Sept. 1 (elevation, 2,211.8 ft). Extremes for period of record: Maximum contents observed, 60,570 acre-ft July 12-14, 1965 (elevation, 2,221.6 ft); minimum observed, 4,600 acre-ft Mar. 31, 1937 (elevation, 2,202.6 ft).  
This is an offstream reservoir formed by earthfill dam completed in 1922. Stored water is diverted from Milk River at Dodson Dam in SE¼ sec.26, T.31 N., R.26 E., 6 miles west of Dodson. Usable capacity, 66,800 acre-ft between elevation 2,200.0 ft (gate sill) and 2,223.0 ft (maximum design level). Dead storage, 18,650 acre-ft below elevation 2,200.0 ft. Reservoir has never been operated to maximum capacity. Figures given herein represent usable contents. Water is used for irrigation, recreation and wildlife. Records furnished by Bureau of Reclamation.
- 06204000 MYSTIC LAKE.**--Lat 45°13'30", long 109°45'36", in sec.9, T.7 S., R.16 E., (unsurveyed), Stillwater County, at dam on West Rosebud Creek, 15 miles southwest of Roscoe and 25 miles southwest of Absarokee. Drainage area, 46.9 sq mi. Period of record, January 1936 to current year. Records prior to September 1939, published only in WSP 1309. Record of daily elevations since October 1965 available in files of Helena district office. Water-stage recorder. Prior to October 1965, only monthend figures furnished. Datum of gage is at mean sea level (levels by The Montana Power Co.).  
Extremes for current year: Maximum contents observed, 21,000 acre-ft Aug. 5, 31, Sept. 1, 3, 4 (elevation, 7,673.50 ft); minimum observed, 791 acre-ft May 25 (elevation, 7,617.43 ft). Extremes for period of record: Maximum contents observed, 21,070 acre-ft July 31, 1947 (elevation, 7,673.68 ft); minimum observed, 260 acre-ft Apr. 4, 1938 (elevation, 7,612.93 ft).  
Reservoir is formed by thin-section reinforced concrete arch dam completed in 1925. Usable capacity, 21,000 acre-ft between elevation 7,612.0 ft (minimum operating level) and 7,673.50 ft (top of 3½ ft stop logs). No dead storage. Figures given herein represent usable contents. Water is used for power development and recreation. Records furnished by The Montana Power Co. Revisions, WSP 1916: Drainage area.

## Smaller reservoirs in Missouri River basin in Montana--Continued

06212000 COONEY RESERVOIR.--Lat 45°26'47", long 109°11'57", in N½NE¼ sec.36, T.4 S., R.20 E., Carbon County, at dam on Red Lodge Creek, 1 mile upstream from Cottonwood Creek and 6.6 miles west of Boyd. Drainage area, 206 sq mi. Period of record, May 1937 to September 1960 (total contents), incomplete 1954-60, October 1960 to current year (usable contents). Records prior to October 1939, published only in WSP 1309. Nonrecording gage read at or near middle and end of month. Datum of gage is at mean sea level.

Extremes for current year: Maximum contents observed, 21,020 acre-ft Apr. 2 (elevation, 4,242.0 ft); minimum observed, 5,110 acre-ft Oct. 31 (elevation, 4,210.5 ft). Extremes for period of record: Maximum contents observed, 26,990 acre-ft June 15, 1967 (elevation, 4,249.5 ft); minimum observed, 120 acre-ft Sept. 30, 1960 (elevation, 4,175.0 ft).

Reservoir is formed by earthfill dam with concrete spillway completed in 1936. Usable capacity, 24,400 acre-ft between elevation 4,175.0 ft (bottom of tunnel) and 4,250.0 ft (top of 4-foot flashboards). Dead storage, 120 acre-ft below elevation 4,175.0 ft. Figures given herein represent usable contents. Water is used for irrigation. Records furnished by Montana Water Resources Board. Revisions, WSP 1729: Drainage area.

06307000 TONGUE RIVER RESERVOIR.--Lat 45°07'48", long 106°46'13", in E½ sec.13, T.8 S., R.40 E., Big Horn County, at dam on Tongue River, 4 miles upstream from Post Creek, 7 miles northeast of Decker, and at mile 162.8. Drainage area, 1,770 sq mi. Period of record, December 1938 to current year. Records prior to September 1939, published only in WSP 1309 and those for January, February 1956, published only in WSP 1729. Nonrecording gage read daily but only weekly readings supplied. Datum of gage is at mean sea level (levels by Bureau of Reclamation).

Extremes for current year: Maximum contents observed, 58,860 acre-ft Feb. 17 (elevation, 3,421.6 ft); minimum observed, 22,600 acre-ft Sept. 17-21 (elevation, 3,405.0 ft). Extremes for period of record (corrected), 73,620 acre-ft June 16, 1967 (elevation, 3,425.9 ft), datum and capacity table now in use; no storage October 1939 to February 1940.

Reservoir is formed by earthfill dam with concrete spillway completed in May 1939. Usable capacity, 68,040 acre-ft between elevation 3,374.4 ft (bottom of outlet) and 3,424.4 ft (spillway crest). Prior to October 1947, usable contents was 73,950 acre-ft at same elevations, due to sedimentation study. Dead storage, 1,400 acre-ft below elevation 3,374.4 ft. Figures given herein represent usable contents. Water is used for irrigation. Records furnished by Montana Water Resources Board. Revisions (water years), WSP 1309: 1947-50. WSP 1729: 1951, drainage area.



## MISSOURI RIVER BASIN

Smaller reservoirs in Missouri River basin in Montana--Continued

Monthend contents, in acre-feet, water year October 1970 to September 1971

| Date     | Lima Reservoir            | Ruby River Reservoir | Willow Creek Reservoir | Hebgen Lake      | Ennis Lake        | Middle Creek Reservoir | Lake Helena           |
|----------|---------------------------|----------------------|------------------------|------------------|-------------------|------------------------|-----------------------|
| Sept. 30 | 39,210                    | 9,000                | b10,660                | 326,400          | 37,400            | 3,700                  | c10,450               |
| Oct. 31  | 39,930                    | 9,000                | b4,390                 | 301,200          | 38,580            | b3,150                 | c10,450               |
| Nov. 30  | 39,930                    | 16,220               | b2,650                 | 266,500          | 36,280            | 2,970                  | 10,450                |
| Dec. 31  | 41,370                    | 20,450               | b7,220                 | 266,500          | 36,100            | b3,410                 | 10,670                |
| Jan. 31  | 41,920                    | 27,040               | b8,940                 | 266,500          | 36,100            | b3,990                 | 11,110                |
| Feb. 28  | 42,120                    | 29,640               | b11,800                | 266,500          | 34,800            | 4,510                  | 10,450                |
| Mar. 31  | 45,720                    | 31,450               | b13,750                | 282,000          | 36,020            | b4,820                 | 10,240                |
| Apr. 30  | 60,610                    | 31,450               | b15,340                | 241,200          | 36,100            | b3,840                 | 10,450                |
| May 31   | 79,380                    | 36,940               | b14,540                | 295,400          | 36,540            | 5,010                  | 9,820                 |
| June 30  | 82,950                    | 38,850               | b17,730                | 377,200          | 36,770            | 7,720                  | 10,890                |
| July 31  | 73,390                    | 30,550               | b15,340                | 373,900          | 38,350            | 6,940                  | 10,670                |
| Aug. 31  | 53,080                    | 19,210               | b10,660                | 341,300          | 39,500            | b3,370                 | 11,110                |
| Sept. 30 | 42,720                    | 13,560               | b8,940                 | 320,900          | 38,350            | b2,570                 | 10,240                |
| Date     | Hauser Lake               | Holter Lake          | Smith River Reservoir  | Gibson Reservoir | Pishkun Reservoir | Willow Creek Reservoir | Nilan Reservoir       |
| Sept. 30 | 44,950                    | 73,920               | b4,210                 | 20,100           | 11,870            | 19,700                 | 5,330                 |
| Oct. 31  | 48,940                    | 80,870               | c4,500                 | 18,570           | 17,490            | 19,940                 | 6,170                 |
| Nov. 30  | 51,420                    | 73,560               | c4,800                 | 21,210           | 17,490            | 20,060                 | 6,540                 |
| Dec. 31  | 51,790                    | 81,920               | c5,200                 | 23,190           | 17,490            | 20,650                 | 6,510                 |
| Jan. 31  | 52,520                    | 79,650               | c5,700                 | b24,800          | b17,360           | b31,590                | 6,470                 |
| Feb. 28  | 51,420                    | 80,590               | b6,080                 | 42,920           | 16,970            | 22,940                 | 6,590                 |
| Mar. 31  | 51,050                    | 80,680               | a6,520                 | 46,930           | 16,710            | 23,890                 | 6,540                 |
| Apr. 30  | 51,420                    | 79,550               | a8,820                 | 51,710           | 26,730            | 28,110                 | 7,940                 |
| May 31   | 50,320                    | 77,300               | b11,500                | 93,020           | 31,240            | 30,490                 | 9,880                 |
| June 30  | 52,150                    | 78,520               | a11,420                | 101,300          | 23,040            | 31,510                 | 9,520                 |
| July 31  | 51,790                    | 81,020               | a8,980                 | 87,130           | 17,100            | 25,390                 | 7,940                 |
| Aug. 31  | 52,520                    | 74,340               | a5,170                 | 40,560           | 26,580            | 19,230                 | 5,220                 |
| Sept. 30 | 51,050                    | 63,520               | b3,740                 | 34,480           | 19,040            | 19,470                 | 5,400                 |
| Date     | Lower Two Medicine Lake   | Four Horns Lake      | Swift Reservoir        | Lake Frances     | Ackley Lake       | Bair Reservoir         | Martinsdale Reservoir |
| Sept. 30 | b618                      | b13,280              | 18,530                 | 90,510           | 4,260             | b2,830                 | b10,160               |
| Oct. 31  | a1,290                    | a13,210              | 13,510                 | 86,760           | 4,480             | c3,300                 | c10,000               |
| Nov. 30  | -                         | a13,270              | 9,810                  | 85,780           | 4,480             | c3,800                 | c9,900                |
| Dec. 31  | -                         | a13,350              | b12,980                | 85,480           | c4,500            | c4,200                 | c9,700                |
| Jan. 31  | -                         | a13,430              | b14,980                | 85,830           | c4,500            | c4,650                 | c9,500                |
| Feb. 28  | -                         | a13,500              | a17,090                | 85,980           | c4,500            | b5,280                 | b9,300                |
| Mar. 31  | -                         | b13,590              | 18,130                 | 85,830           | c4,500            | a6,000                 | a9,140                |
| Apr. 30  | c9,000                    | c13,590              | 23,650                 | 89,110           | c4,500            | a6,960                 | a11,430               |
| May 31   | a12,300                   | b13,980              | b30,150                | 99,380           | 4,570             | b6,950                 | b18,430               |
| June 30  | 12,490                    | 11,590               | a29,790                | 94,090           | a4,680            | a6,980                 | a20,680               |
| July 31  | a12,250                   | a8,940               | b21,110                | 77,320           | a4,130            | a5,520                 | a14,560               |
| Aug. 31  | 9,700                     | 11,100               | 18,750                 | 69,250           | c3,200            | a2,040                 | a7,950                |
| Sept. 30 | b5,670                    | b9,550               | 16,990                 | 64,110           | c3,000            | b1,140                 | b8,260                |
| Date     | Deadman's Basin Reservoir | Fresno Reservoir     | Nelson Reservoir       | Mystic Lake      | Cooney Reservoir  | Tongue River Reservoir |                       |
| Sept. 30 | b32,300                   | 72,950               | 51,040                 | 19,140           | 11,120            | 27,400                 |                       |
| Oct. 31  | c37,500                   | 70,850               | 53,870                 | 17,620           | 5,110             | 26,890                 |                       |
| Nov. 30  | c45,000                   | 69,000               | 52,650                 | 15,130           | 8,870             | 27,060                 |                       |
| Dec. 31  | c48,000                   | 66,060               | 51,040                 | 12,080           | 10,850            | 29,820                 |                       |
| Jan. 31  | c50,500                   | 61,810               | 49,440                 | 8,850            | 13,930            | 35,800                 |                       |
| Feb. 28  | b54,980                   | 80,250               | 48,260                 | 5,920            | 17,310            | 44,900                 |                       |
| Mar. 31  | a58,430                   | 97,820               | 47,090                 | 3,510            | a20,710           | 34,600                 |                       |
| Apr. 30  | a63,060                   | 123,500              | 49,440                 | 1,800            | 19,140            | 37,220                 |                       |
| May 31   | b60,000                   | 102,100              | 46,320                 | 3,350            | 20,080            | 32,230                 |                       |
| June 30  | a55,690                   | 69,920               | 42,130                 | 20,210           | 20,230            | 52,230                 |                       |
| July 31  | a42,450                   | 44,540               | 29,700                 | 20,590           | 20,230            | 44,400                 |                       |
| Aug. 31  | a29,490                   | 16,480               | 25,280                 | 21,000           | 17,000            | 28,760                 |                       |
| Sept. 30 | b27,220                   | 37,360               | 33,860                 | 17,960           | b17,310           | 23,500                 |                       |

a Interpolated.

b Figure of contents for first day of following month.

c Estimate.

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

LOCATION.--Lat 45°32'49", long 103°58'23", in SW $\frac{1}{4}$  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 present datum.

AVERAGE DISCHARGE.--18 years, 133 cfs (96,360 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 4,440 cfs June 5 (gage height, 10.52 ft); minimum daily, 0.30 cfs Jan. 12-15.

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 1970 TO SEPTEMBER 1971

| DAY         | OCT   | NOV        | DEC   | JAN   | FEB   | MAR    | APR    | MAY    | JUN    | JUL     | AUG   | SEP     |
|-------------|-------|------------|-------|-------|-------|--------|--------|--------|--------|---------|-------|---------|
| 1           | .48   | 3.3        | 4.5   | 2.5   | 1.3   | 60     | 3,040  | 648    | 958    | 70      | 17    | 46      |
| 2           | .46   | 3.1        | 4.5   | 2.0   | 1.3   | 60     | 2,870  | 486    | 1,370  | 65      | 12    | 79      |
| 3           | .54   | 3.5        | 4.0   | 1.5   | 1.3   | 90     | 2,770  | 379    | 2,050  | 60      | 11    | 44      |
| 4           | .56   | 3.2        | 4.0   | 1.0   | 1.0   | 150    | 2,680  | 293    | 1,470  | 55      | 10    | 37      |
| 5           | .53   | 3.3        | 4.0   | .90   | 1.5   | 300    | 2,520  | 234    | 2,880  | 55      | 11    | 150     |
| 6           | .72   | 3.4        | 4.0   | .80   | 1.0   | 350    | 1,950  | 189    | 2,970  | 50      | 11    | 176     |
| 7           | .92   | 3.5        | 4.0   | .70   | 1.0   | 400    | 1,200  | 161    | 1,930  | 48      | 9.1   | 1,060   |
| 8           | 1.2   | 5.2        | 4.0   | 1.0   | 1.5   | 450    | 905    | 142    | 1,270  | 46      | 12    | 335     |
| 9           | 1.7   | 4.9        | 3.0   | .80   | 3.0   | 500    | 773    | 132    | 1,010  | 46      | 11    | 109     |
| 10          | 1.9   | 4.9        | 2.5   | .70   | 5.0   | 600    | 782    | 134    | 842    | 46      | 7.8   | 70      |
| 11          | 2.0   | 4.3        | 2.0   | .50   | 6.0   | 786    | 965    | 121    | 782    | 52      | 7.4   | 53      |
| 12          | 2.0   | 4.9        | 2.0   | .30   | 7.0   | 1,010  | 1,120  | 112    | 1,080  | 46      | 6.6   | 40      |
| 13          | 2.0   | 4.8        | 2.0   | .30   | 8.0   | 1,410  | 1,060  | 103    | 1,890  | 36      | 9.1   | 32      |
| 14          | 3.6   | 5.3        | 1.5   | .30   | 9.0   | 1,690  | 825    | 100    | 1,770  | 28      | 11    | 25      |
| 15          | 2.0   | 5.1        | 1.5   | .30   | 10    | 1,880  | 638    | 100    | 855    | 24      | 11    | 21      |
| 16          | 2.0   | 4.0        | 1.3   | 1.0   | 20    | 2,000  | 447    | 91     | 616    | 24      | 12    | 20      |
| 17          | 2.3   | 4.0        | 1.0   | 1.5   | 30    | 1,500  | 312    | 85     | 551    | 24      | 12    | 19      |
| 18          | 2.5   | 4.0        | .70   | 1.0   | 40    | 1,500  | 250    | 78     | 438    | 21      | 12    | 17      |
| 19          | 2.5   | 3.7        | .50   | 1.0   | 40    | 1,500  | 269    | 74     | 350    | 18      | 11    | 14      |
| 20          | 2.6   | 3.7        | .50   | 1.5   | 40    | 1,540  | 518    | 69     | 300    | 20      | 9.9   | 14      |
| 21          | 2.7   | 3.5        | .50   | 1.5   | 30    | 1,330  | 835    | 68     | 250    | 22      | 9.9   | 13      |
| 22          | 2.6   | 3.0        | .50   | 1.0   | 40    | 1,140  | 1,350  | 272    | 200    | 21      | 14    | 12      |
| 23          | 2.6   | 3.0        | .50   | 1.5   | 50    | 1,000  | 1,620  | 365    | 150    | 21      | 10    | 11      |
| 24          | 2.9   | 3.5        | .70   | 2.0   | 60    | 958    | 1,460  | 626    | 100    | 15      | 10    | 9.1     |
| 25          | 3.0   | 4.0        | 1.0   | 2.5   | 70    | 743    | 1,190  | 911    | 100    | 15      | 10    | 8.6     |
| 26          | 3.1   | 4.0        | 1.5   | 2.0   | 70    | 713    | 905    | 1,050  | 90     | 17      | 8.6   | 7.8     |
| 27          | 3.0   | 4.0        | 1.0   | 1.5   | 70    | 1,000  | 687    | 1,060  | 85     | 16      | 7.4   | 8.2     |
| 28          | 2.9   | 4.0        | 1.5   | 2.0   | 70    | 2,860  | 551    | 1,070  | 80     | 17      | 6.6   | 9.5     |
| 29          | 3.6   | 4.3        | 2.0   | 2.5   | ----- | 3,720  | 667    | 875    | 80     | 16      | 4.3   | 7.8     |
| 30          | 4.0   | 4.5        | 2.5   | 2.0   | ----- | 3,600  | 769    | 512    | 75     | 17      | 13    | 6.6     |
| 31          | 3.4   | -----      | 3.0   | 1.5   | ----- | 3,340  | -----  | 475    | -----  | 15      | 17    | -----   |
| TOTAL       | 66.31 | 119.9      | 66.20 | 39.60 | 687.9 | 38,180 | 35,928 | 11,015 | 26,592 | 1,026   | 324.7 | 2,454.6 |
| MEAN        | 2.14  | 4.00       | 2.14  | 1.28  | 24.6  | 1,232  | 1,198  | 355    | 886    | 33.1    | 10.5  | 81.8    |
| MAX         | 4.0   | 5.3        | 4.5   | 2.5   | 70    | 3,720  | 3,040  | 1,070  | 2,970  | 70      | 17    | 1,060   |
| MIN         | .46   | 3.0        | .50   | .30   | 1.0   | 60     | 250    | 68     | 75     | 15      | 4.3   | 6.6     |
| AC-FT       | 132   | 238        | 131   | 79    | 1,360 | 75,730 | 71,260 | 21,850 | 52,750 | 2,040   | 644   | 4,870   |
| CAL YR 1970 | TOTAL | 35,639.02  | MEAN  | 97.6  | MAX   | 340    | MIN    | .46    | AC-FT  | 70,690  |       |         |
| WTR YR 1971 | TOTAL | 116,500.21 | MEAN  | 319   | MAX   | 3,720  | MIN    | .30    | AC-FT  | 231,100 |       |         |

## PEAK DISCHARGE (BASE, 1,000 CFS)

| DATE | TIME | G.HT. | DISCHARGE | DATE | TIME | G.HT. | DISCHARGE |
|------|------|-------|-----------|------|------|-------|-----------|
| 3-16 | -    | -     | 2,450     | 5-26 | 2000 | 4.57  | 1,070     |
| 3-29 | 1215 | 10.36 | 3,960     | 6-5  | 2000 | 10.52 | 4,440     |
| 4-12 | 1645 | 4.92  | 1,150     | 6-14 | 0330 | 7.33  | 2,100     |
| 4-23 | 0530 | 6.24  | 1,650     | 9-7  | 1330 | 5.22  | 1,250     |

## LITTLE MISSOURI RIVER BASIN

06334630 Box Elder Creek near Webster, Mont.

LOCATION.--Lat 45°54'25", long 104°03'30", in NE¼ sec.30, T.2 N., R.62 E., Fallon County, on left bank at Wayne Cox Ranch, 0.5 mile west of Montana-South Dakota State line, 2 miles upstream from Coal Bank Creek, 17 miles southeast of Webster, and 33 miles southeast of Baker.

DRAINAGE AREA.--1,092 sq mi.

PERIOD OF RECORD.--September 1959 to current year.

GAGE.--Water-stage recorder. Altitude of gage is 2,950 ft (from topographic map). Prior to Nov. 8, 1960, non-recording gage at site 300 ft upstream at different datum.

AVERAGE DISCHARGE.--12 years, 84.7 cfs (61,370 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 4,490 cfs Apr. 1 (gage height, 8.33 ft); minimum daily, 0.10 cfs Jan. 12.

Period of record: Maximum discharge, 7,340 cfs May 9, 1967 (gage height, 10.26 ft); maximum gage height, 13.09 ft Mar. 25, 1969, from floodmark (ice jam); no flow at times.

REMARKS.--Records fair except those for the winter period, which are poor. Diversions for irrigation of about 14,000 acres above station.

REVISIONS.--WSP 1729: Drainage area.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY   | OCT  | NOV   | DEC    | JAN   | FEB      | MAR    | APR    | MAY   | JUN    | JUL   | AUG   | SEP   |
|-------|------|-------|--------|-------|----------|--------|--------|-------|--------|-------|-------|-------|
| 1     | 1.8  | 3.0   | 8.8    | .60   | 2.6      | 40     | 4,330  | 73    | 77     | 48    | 12    | 5.2   |
| 2     | 1.0  | 3.0   | 9.6    | .50   | 2.2      | 35     | 3,190  | 62    | 126    | 41    | 13    | 5.2   |
| 3     | 1.0  | 3.0   | 8.0    | .40   | 1.8      | 60     | 2,010  | 55    | 212    | 41    | 14    | 4.4   |
| 4     | 2.0  | 3.2   | 7.8    | .30   | 1.4      | 50     | 1,420  | 53    | 1,440  | 40    | 13    | 13    |
| 5     | 2.0  | 3.5   | 7.3    | .30   | 1.0      | 40     | 1,080  | 52    | 2,790  | 37    | 11    | 238   |
| 6     | 2.0  | 4.0   | 9.5    | .20   | .80      | 35     | 790    | 62    | 1,720  | 35    | 7.8   | 79    |
| 7     | 2.3  | 4.6   | 16     | .20   | .70      | 40     | 636    | 58    | 1,380  | 35    | 11    | 106   |
| 8     | 2.0  | 5.6   | 13     | .20   | .60      | 60     | 552    | 52    | 1,550  | 34    | 12    | 94    |
| 9     | 3.1  | 7.6   | 10     | .20   | 2.0      | 80     | 504    | 46    | 1,710  | 33    | 12    | 87    |
| 10    | 2.7  | 6.5   | 5.3    | .20   | 5.0      | 150    | 423    | 44    | 1,590  | 32    | 11    | 81    |
| 11    | 2.7  | 6.0   | 2.6    | .20   | 6.5      | 250    | 355    | 36    | 1,240  | 28    | 12    | 39    |
| 12    | 3.1  | 5.6   | 1.6    | .10   | 15       | 500    | 277    | 34    | 710    | 35    | 11    | 26    |
| 13    | 3.5  | 5.4   | 1.4    | .20   | 45       | 400    | 212    | 32    | 388    | 33    | 10    | 19    |
| 14    | 6.0  | 5.2   | 1.2    | .20   | 120      | 300    | 170    | 31    | 274    | 24    | 10    | 13    |
| 15    | 5.0  | 6.2   | 1.1    | .20   | 500      | 250    | 135    | 29    | 219    | 22    | 11    | 10    |
| 16    | 4.5  | 7.0   | 1.0    | .40   | 900      | 200    | 116    | 27    | 930    | 22    | 7.8   | 8.0   |
| 17    | 3.5  | 6.0   | .90    | .40   | 800      | 180    | 101    | 25    | 700    | 22    | 7.4   | 7.8   |
| 18    | 3.5  | 6.0   | .80    | .40   | 450      | 300    | 90     | 23    | 596    | 21    | 6.8   | 8.5   |
| 19    | 3.5  | 4.5   | .80    | .90   | 250      | 500    | 110    | 23    | 464    | 20    | 6.2   | 7.8   |
| 20    | 3.5  | 4.5   | .90    | 1.1   | 150      | 800    | 146    | 22    | 361    | 20    | 5.8   | 7.4   |
| 21    | 3.5  | 4.7   | .90    | 1.0   | 90       | 500    | 221    | 24    | 331    | 19    | 4.9   | 11    |
| 22    | 3.5  | 5.0   | .90    | .80   | 65       | 450    | 322    | 130   | 201    | 20    | 4.6   | 9.0   |
| 23    | 3.5  | 5.3   | .80    | 1.4   | 55       | 400    | 402    | 56    | 166    | 19    | 4.2   | 7.8   |
| 24    | 3.5  | 6.0   | .60    | 2.2   | 70       | 350    | 361    | 112   | 154    | 16    | 4.0   | 7.4   |
| 25    | 3.5  | 5.2   | .40    | 1.8   | 100      | 400    | 254    | 343   | 102    | 15    | 4.9   | 7.4   |
| 26    | 3.5  | 4.7   | .30    | 1.4   | 200      | 600    | 186    | 272   | 80     | 16    | 4.9   | 7.4   |
| 27    | 3.5  | 4.2   | .30    | 2.6   | 150      | 700    | 130    | 184   | 67     | 13    | 4.6   | 7.4   |
| 28    | 3.5  | 3.8   | .20    | 3.5   | 70       | 800    | 102    | 116   | 61     | 12    | 4.4   | 8.0   |
| 29    | 3.4  | 6.4   | .30    | 4.0   | -----    | 2,440  | 90     | 79    | 55     | 13    | 4.6   | 8.5   |
| 30    | 3.2  | 11    | .40    | 3.5   | -----    | 3,060  | 79     | 85    | 54     | 13    | 5.5   | 8.5   |
| 31    | 3.1  | ----- | .60    | 3.0   | -----    | 3,790  | -----  | 102   | -----  | 13    | 5.8   | ----- |
| TOTAL | 96.4 | 156.7 | 113.30 | 32.40 | 4,054.60 | 17,760 | 18,794 | 2,342 | 19,748 | 792   | 257.2 | 941.7 |
| MEAN  | 3.11 | 5.22  | 3.65   | 1.05  | 145      | 573    | 626    | 75.5  | 658    | 25.5  | 8.30  | 31.4  |
| MAX   | 6.0  | 11    | 16     | 4.0   | 900      | 3,790  | 4,330  | 343   | 2,790  | 48    | 14    | 238   |
| MIN   | 1.0  | 3.0   | .20    | .10   | .60      | 35     | 79     | 22    | 54     | 12    | 4.0   | 4.4   |
| AC-FT | 191  | 311   | 225    | 64    | 8,040    | 35,230 | 37,280 | 4,650 | 39,170 | 1,570 | 510   | 1,870 |

CAL YR 1970 TOTAL 16,721.75 MEAN 45.8 MAX 730 MIN .05 AC-FT 33,170  
WTR YR 1971 TOTAL 65,088.30 MEAN 178 MAX 4,330 MIN .10 AC-FT 129,100

## PEAK DISCHARGE (BASE, 1,000 CFS)

| DATE | TIME | G.HT. | DISCHARGE | DATE | TIME | G.HT. | DISCHARGE |
|------|------|-------|-----------|------|------|-------|-----------|
| 4-1  | 2200 | 8.33  | 4,490     | 6-16 | 2000 | 5.17  | 1,360     |
| 6-5  | 0400 | 8.04  | 4,240     |      |      |       |           |

NOTE.--Stage-discharge relation affected by ice Nov. 20 to Mar. 28 (no gage-height record Nov. 21-24, 26-28, Dec. 10-16, 18, 19, Dec. 25 to Jan. 14, 26, Feb. 1-5, 8, 9, Feb. 20 to Mar. 2, 4-19).

## LITTLE MISSOURI RIVER BASIN

189

06335000 Little Beaver Creek near Marmarth, N. Dak.

LOCATION.--Lat 46°16'29", long 103°58'33", in NE¼ sec.7, T.132 N., R.106 W., Bowman County, on right bank 150 ft downstream from concreted ford, 0.8 mile downstream from Corral Creek, 3 miles southwest of Marmarth, and 5 miles upstream from mouth.

DRAINAGE AREA.--587 sq mi, approximately.

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

GAGE.--Water-stage recorder. Datum of gage is 2,733.14 ft above mean sea level. Prior to May 17, 1968, water-stage recorder 300 ft upstream at datum 10.00 ft higher. See WSP 1729 or 1917 for history of changes to June 28, 1951, to May 17, 1968.

AVERAGE DISCHARGE.--33 years, 42.0 cfs (30,430 acre-ft per year); median of yearly mean discharges, 28 cfs (20,300 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 6,480 cfs June 5 (gage height, 22.55 ft); minimum, 0.30 cfs Jan.7, 8.

Period of record: Maximum discharge, 12,700 cfs Apr. 6, 1952 (gage height, 13.9 ft, from floodmark, site and datum then in use), from rating curve extended above 4,500 cfs on basis of slope-area measurement of peak flow; no flow at times in most years.

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

REVISIONS (WATER YEARS).--WSP 1279: 1939(M), 1940, 1943-44(M), 1945, 1948.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| CAY   | OCT  | NOV   | DEC  | JAN   | FEB     | MAR      | APR    | MAY   | JUN    | JUL   | AUG   | SEP     |
|-------|------|-------|------|-------|---------|----------|--------|-------|--------|-------|-------|---------|
| 1     | 1.8  | 4.2   | 3.3  | 1.1   | 2.1     | 57       | 862    | 44    | 57     | 36    | 6.7   | 2.3     |
| 2     | 1.8  | 4.0   | 3.2  | 1.1   | 2.1     | 31       | 277    | 40    | 39     | 33    | 6.4   | 2.0     |
| 3     | 1.9  | 3.8   | 3.3  | 1.0   | 2.0     | 21       | 216    | 35    | 31     | 31    | 5.8   | 2.1     |
| 4     | 1.9  | 5.4   | 3.2  | .84   | 1.8     | 15       | 215    | 35    | 2,520  | 30    | 5.8   | 59      |
| 5     | 2.0  | 3.0   | 3.3  | .71   | 2.0     | 11       | 242    | 30    | 3,540  | 29    | 5.2   | 635     |
| 6     | 2.0  | 3.2   | 3.2  | .40   | 2.4     | 6.5      | 232    | 30    | 931    | 27    | 4.9   | 704     |
| 7     | 2.0  | 3.5   | 3.3  | .30   | 2.4     | 4.5      | 204    | 28    | 244    | 23    | 5.2   | 466     |
| 8     | 2.0  | 3.7   | 3.1  | .30   | 2.3     | 4.5      | 179    | 25    | 155    | 21    | 4.5   | 404     |
| 9     | 2.0  | 4.0   | 3.2  | .60   | 2.3     | 4.5      | 174    | 25    | 137    | 20    | 4.9   | 424     |
| 10    | 2.0  | 3.5   | 3.2  | .55   | 3.1     | 4.5      | 116    | 25    | 131    | 19    | 4.4   | 274     |
| 11    | 2.0  | 3.5   | 3.1  | .60   | 3.4     | 6.0      | 94     | 23    | 340    | 20    | 4.4   | 212     |
| 12    | 2.0  | 3.5   | 3.1  | .60   | 3.1     | 210      | 75     | 22    | 200    | 17    | 4.4   | 46      |
| 13    | 2.0  | 3.5   | 3.1  | .70   | 4.0     | 1,850    | 64     | 20    | 132    | 15    | 4.4   | 15      |
| 14    | 2.0  | 3.5   | 3.1  | .80   | 3.8     | 1,940    | 59     | 21    | 116    | 14    | 4.2   | 6.7     |
| 15    | 2.1  | 3.5   | 3.0  | .80   | 4.0     | 819      | 58     | 19    | 104    | 13    | 3.8   | 4.6     |
| 16    | 2.3  | 3.5   | 3.0  | .90   | 30      | 470      | 57     | 18    | 94     | 12    | 3.8   | 4.0     |
| 17    | 2.3  | 3.4   | 2.8  | 1.0   | 480     | 494      | 55     | 18    | 356    | 11    | 3.8   | 3.8     |
| 18    | 2.3  | 3.4   | 2.7  | 1.1   | 632     | 402      | 99     | 17    | 652    | 10    | 3.8   | 3.4     |
| 19    | 2.3  | 3.4   | 2.5  | 1.3   | 424     | 239      | 415    | 17    | 262    | 8.8   | 4.0   | 3.2     |
| 20    | 2.3  | 3.4   | 2.3  | 1.4   | 150     | 293      | 433    | 17    | 137    | 9.3   | 4.0   | 2.9     |
| 21    | 2.1  | 3.3   | 2.1  | 1.7   | 140     | 699      | 691    | 16    | 165    | 9.8   | 3.8   | 2.9     |
| 22    | 2.3  | 3.2   | 1.9  | 1.8   | 90      | 492      | 235    | 49    | 124    | 10    | 3.8   | 2.9     |
| 23    | 2.3  | 3.0   | 1.8  | 1.9   | 85      | 258      | 133    | 44    | 88     | 9.3   | 3.8   | 2.9     |
| 24    | 2.4  | 2.9   | 1.6  | 1.9   | 105     | 167      | 94     | 23    | 119    | 8.3   | 3.8   | 2.9     |
| 25    | 2.3  | 3.0   | 1.6  | 1.9   | 100     | 181      | 91     | 17    | 82     | 7.3   | 3.8   | 6.1     |
| 26    | 2.5  | 3.2   | 1.5  | 1.9   | 70      | 282      | 79     | 16    | 67     | 7.0   | 2.8   | 13      |
| 27    | 2.5  | 3.3   | 1.4  | 1.9   | 50      | 970      | 74     | 14    | 59     | 6.7   | 2.7   | 14      |
| 28    | 3.1  | 3.4   | 1.4  | 1.9   | 60      | 2,730    | 62     | 14    | 52     | 6.7   | 2.7   | 16      |
| 29    | 3.4  | 3.4   | 1.4  | 2.0   | -----   | 2,560    | 55     | 13    | 49     | 6.7   | 2.7   | 17      |
| 30    | 3.8  | 3.4   | 1.4  | 2.1   | -----   | 2,060    | 50     | 17    | 42     | 6.7   | 2.5   | 17      |
| 31    | 4.0  | ----- | 1.4  | 2.1   | -----   | 1,580    | -----  | 30    | -----  | 6.7   | 2.5   | -----   |
| TOTAL | 71.6 | 105.0 | 78.8 | 37.20 | 2,456.8 | 18,851.5 | 5,650  | 762   | 11,029 | 484.3 | 129.7 | 3,376.7 |
| MEAN  | 2.31 | 3.50  | 2.54 | 1.20  | 87.7    | 608      | 188    | 24.6  | 368    | 15.6  | 4.18  | 113     |
| MAX   | 4.0  | 5.4   | 3.3  | 2.1   | 632     | 2,730    | 862    | 49    | 3,540  | 36    | 6.7   | 708     |
| MIN   | 1.8  | 2.9   | 1.4  | .30   | 1.8     | 4.5      | 50     | 13    | 31     | 6.7   | 2.5   | 2.0     |
| AC-FT | 142  | 208   | 156  | 74    | 4,870   | 37,390   | 11,210 | 1,510 | 21,880 | 961   | 257   | 6,700   |

CAL YR 1970 TOTAL 9,054.51 MEAN 24.8 MAX 1,760 MIN 0 AC-FT 17,960  
 WTR YR 1971 TOTAL 43,632.60 MEAN 118 MAX 3,540 MIN .30 AC-FT 85,360

## KOOTENAI RIVER BASIN

12300000 Kootenay River at Newgate, British Columbia

(International gaging station)

LOCATION.--Lat 49°00'52", long 115°10'24", on left bank at old highway bridge site, 1.1 miles north of international boundary, 1.2 miles southeast of Newgate, and at mile 272.1.

DRAINAGE AREA.--7,660 sq mi, approximately.

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

GAGE.--Water-stage recorder. Datum of gage is 2,310.23 ft above mean sea level (datum of Geodetic Survey of Canada). Prior to Oct. 1, 1940, nonrecording gage at same site at datum 1.00 ft higher. Oct. 1, 1940, to Apr. 30, 1947, nonrecording gage at present site and datum.

AVERAGE DISCHARGE.--41 years, 10,520 cfs (18.65 inches per year, 7,622,000 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 60,200 cfs May 29 (gage height, 11.35 ft); minimum daily, 1,570 cfs Jan. 5.

Period of record: Maximum discharge, 98,200 cfs May 28, 1948 (gage height, 15.02 ft); minimum observed, 99+ cfs Feb. 7, 1936; minimum gage height observed, 0.21 ft Jan. 11, 1944.

REMARKS.--Records good. Diversions for irrigation of about 8,500 acres above station. Records give total flow of main channel and slough.

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

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT             | NOV         | DEC        | JAN       | FEB       | MAR      | APR             | MAY      | JUN      | JUL     | AUG     | SEP     |
|-------------|-----------------|-------------|------------|-----------|-----------|----------|-----------------|----------|----------|---------|---------|---------|
| 1           | 4,640           | 3,260       | 2,610      | 2,550     | 4,270     | 2,660    | 2,600           | 12,500   | 50,800   | 27,200  | 16,300  | 7,920   |
| 2           | 4,610           | 3,250       | 2,620      | 2,180     | 4,480     | 2,620    | 2,520           | 14,200   | 47,000   | 27,300  | 16,300  | 8,320   |
| 3           | 4,540           | 3,230       | 2,690      | 1,860     | 4,580     | 2,520    | 2,510           | 18,000   | 46,600   | 27,200  | 16,400  | 8,390   |
| 4           | 4,500           | 3,170       | 2,720      | 1,680     | 4,480     | 2,470    | 2,500           | 24,100   | 48,600   | 26,100  | 16,300  | 8,010   |
| 5           | 4,470           | 3,160       | 2,610      | 1,570     | 4,180     | 2,460    | 2,530           | 29,300   | 51,900   | 24,300  | 15,500  | 7,550   |
| 6           | 4,570           | 3,170       | 2,480      | 1,950     | 3,830     | 2,430    | 2,670           | 31,000   | 54,800   | 23,300  | 14,600  | 7,110   |
| 7           | 4,730           | 3,210       | 2,820      | 2,300     | 3,410     | 2,400    | 3,130           | 31,100   | 55,500   | 22,300  | 14,200  | 6,960   |
| 8           | 4,760           | 3,240       | 2,970      | 2,400     | 3,050     | 2,400    | 3,650           | 30,600   | 56,100   | 20,400  | 13,700  | 7,410   |
| 9           | 4,610           | 3,290       | 2,980      | 2,580     | 2,830     | 2,410    | 3,980           | 32,400   | 56,500   | 19,000  | 13,200  | 7,710   |
| 10          | 4,560           | 3,350       | 2,900      | 2,630     | 2,710     | 2,400    | 4,750           | 34,300   | 50,400   | 20,000  | 12,800  | 7,180   |
| 11          | 4,430           | 3,270       | 2,870      | 2,600     | 2,830     | 2,420    | 4,940           | 35,500   | 42,400   | 24,100  | 12,300  | 6,840   |
| 12          | 4,320           | 3,250       | 2,870      | 2,300     | 2,990     | 2,450    | 4,670           | 38,900   | 38,800   | 25,100  | 11,700  | 6,700   |
| 13          | 4,260           | 3,220       | 2,690      | 2,180     | 3,100     | 2,450    | 4,340           | 46,100   | 39,100   | 25,000  | 11,400  | 6,790   |
| 14          | 4,190           | 3,170       | 2,470      | 2,180     | 3,270     | 2,450    | 4,310           | 53,700   | 41,800   | 23,400  | 11,000  | 6,610   |
| 15          | 4,100           | 3,110       | 2,630      | 2,230     | 3,460     | 2,440    | 4,710           | 47,400   | 41,000   | 22,900  | 10,500  | 6,130   |
| 16          | 4,010           | 3,060       | 2,780      | 2,500     | 3,760     | 2,430    | 5,340           | 36,700   | 36,200   | 22,900  | 10,000  | 5,900   |
| 17          | 4,120           | 3,120       | 2,810      | 2,700     | 3,900     | 2,400    | 5,410           | 30,000   | 32,100   | 23,700  | 9,530   | 5,570   |
| 18          | 3,900           | 3,090       | 2,790      | 2,850     | 3,810     | 2,370    | 5,220           | 25,800   | 29,900   | 25,200  | 9,100   | 5,490   |
| 19          | 3,670           | 3,070       | 2,690      | 2,900     | 3,630     | 2,320    | 5,090           | 23,200   | 29,100   | 25,000  | 8,790   | 5,340   |
| 20          | 3,780           | 3,070       | 2,530      | 2,840     | 3,440     | 2,270    | 5,490           | 22,200   | 29,800   | 25,100  | 8,480   | 5,210   |
| 21          | 3,800           | 2,930       | 2,400      | 2,820     | 3,250     | 2,240    | 6,400           | 21,600   | 32,600   | 25,500  | 8,220   | 5,120   |
| 22          | 3,810           | 2,590       | 2,410      | 2,820     | 3,110     | 2,220    | 7,700           | 21,500   | 36,300   | 25,800  | 8,120   | 4,990   |
| 23          | 3,810           | 2,690       | 2,410      | 2,830     | 3,020     | 2,170    | 8,990           | 22,700   | 41,700   | 25,500  | 8,210   | 4,870   |
| 24          | 3,830           | 2,860       | 1,990      | 2,840     | 2,960     | 2,220    | 10,800          | 26,300   | 47,600   | 24,900  | 8,380   | 4,760   |
| 25          | 3,870           | 2,470       | 2,240      | 2,880     | 2,970     | 2,290    | 13,600          | 33,300   | 48,600   | 24,200  | 8,060   | 4,660   |
| 26          | 3,790           | 2,490       | 2,410      | 2,940     | 2,980     | 2,370    | 14,700          | 39,900   | 45,500   | 21,500  | 7,610   | 4,620   |
| 27          | 3,680           | 2,500       | 2,410      | 2,900     | 2,900     | 2,390    | 14,100          | 48,200   | 40,200   | 19,200  | 7,470   | 4,560   |
| 28          | 3,560           | 2,400       | 2,460      | 3,000     | 2,750     | 2,350    | 13,300          | 56,900   | 33,800   | 18,200  | 7,030   | 4,660   |
| 29          | 3,380           | 2,390       | 2,620      | 3,000     | -----     | 2,330    | 12,300          | 59,600   | 29,300   | 17,900  | 7,040   | 4,750   |
| 30          | 3,310           | 2,470       | 2,640      | 3,330     | -----     | 2,450    | 12,000          | 55,700   | 27,200   | 17,300  | 7,100   | 4,750   |
| 31          | 3,290           | -----       | 2,640      | 3,920     | -----     | 2,610    | -----           | 52,900   | -----    | 16,500  | 7,520   | -----   |
| TOTAL       | 126,900         | 89,550      | 81,160     | 80,260    | 95,950    | 74,410   | 194,250         | 1,055.6M | 1,261.2M | 716,000 | 336,860 | 184,880 |
| MEAN        | 4,094           | 2,985       | 2,618      | 2,589     | 3,427     | 2,400    | 6,475           | 34,050   | 42,040   | 23,100  | 10,870  | 6,163   |
| MAX         | 4,760           | 3,350       | 2,980      | 3,920     | 4,580     | 2,660    | 14,700          | 59,600   | 56,500   | 27,300  | 16,400  | 8,390   |
| MIN         | 3,290           | 2,390       | 1,990      | 1,570     | 2,710     | 2,170    | 2,500           | 12,500   | 27,200   | 16,500  | 7,030   | 4,560   |
| CFSM        | .53             | .39         | .34        | .34       | .45       | .31      | .85             | 4.45     | 5.49     | 3.02    | 1.42    | .80     |
| IN.         | .62             | .43         | .39        | .39       | .47       | .36      | .94             | 5.13     | 6.12     | 3.48    | 1.64    | .90     |
| AC-FT       | 251,700         | 177,600     | 161,000    | 159,200   | 190,300   | 147,600  | 385,300         | 2,094M   | 2,502M   | 1,420M  | 668,200 | 366,700 |
| CAL YR 1970 | TOTAL 2,770,120 | MEAN 7,589  | MAX 50,200 | MIN 1,290 | CFSM .99  | IN 13.45 | AC-FT 5,495,000 |          |          |         |         |         |
| WTR YR 1971 | TOTAL 4,297,020 | MEAN 11,770 | MAX 59,600 | MIN 1,570 | CFSM 1.54 | IN 20.87 | AC-FT 8,523,000 |          |          |         |         |         |



## KOOTENAI RIVER BASIN

191

12301300 Tobacco River near Eureka, Mont.

LOCATION.--Lat 48°53'37", long 115°05'13", in NW¼SE¼ sec.9, T.36 N., R.27 W., Lincoln County, on right bank 0.2 mile upstream from Indian Creek, 1.8 miles northwest of Eureka, and 6.0 miles upstream from mouth.

DRAINAGE AREA.--440 sq mi.

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

GAGE.--Water-stage recorder. Datum of gage is 2,518.85 ft above mean sea level.

AVERAGE DISCHARGE.--13 years, 280 cfs (8.64 inches per year, 202,900 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 1,800 cfs May 14 (gage height, 5.96 ft); minimum daily, 45 cfs Jan. 5.

Period of record: Maximum discharge, 2,320 cfs June 9, 1964 (gage height, 6.74 ft); maximum gage height, 7.12 ft May 27, 1961; minimum daily discharge, 20 cfs Jan. 11, 1963.

Flood of about May 22, 1948 reached a discharge of 2,810 cfs, from slope-area measurement of peak flow at site 1.5 miles downstream.

REMARKS.--Records good. Diversions for irrigation of about 4,500 acres above station. Records of chemical analyses and water temperatures for the current year are published in Part 2 of this report.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT           | NOV      | DEC       | JAN    | FEB      | MAR     | APR           | MAY    | JUN    | JUL    | AUG   | SEP   |
|-------------|---------------|----------|-----------|--------|----------|---------|---------------|--------|--------|--------|-------|-------|
| 1           | 71            | 64       | 90        | 75     | 204      | 104     | 128           | 730    | 1,060  | 572    | 196   | 136   |
| 2           | 72            | 63       | 87        | 70     | 231      | 127     | 131           | 820    | 995    | 550    | 190   | 136   |
| 3           | 72            | 61       | 83        | 60     | 216      | 122     | 128           | 1,030  | 945    | 514    | 184   | 136   |
| 4           | 71            | 67       | 89        | 50     | 198      | 115     | 133           | 1,330  | 935    | 488    | 181   | 126   |
| 5           | 72            | 74       | 90        | 45     | 166      | 110     | 144           | 1,530  | 1,290  | 472    | 175   | 121   |
| 6           | 82            | 77       | 98        | 50     | 125      | 110     | 167           | 1,570  | 1,550  | 464    | 175   | 116   |
| 7           | 76            | 70       | 106       | 60     | 120      | 108     | 217           | 1,390  | 1,300  | 444    | 172   | 114   |
| 8           | 74            | 67       | 100       | 70     | 120      | 107     | 253           | 1,290  | 1,300  | 420    | 162   | 112   |
| 9           | 86            | 71       | 90        | 80     | 125      | 104     | 281           | 1,350  | 1,260  | 408    | 154   | 110   |
| 10          | 87            | 73       | 83        | 70     | 245      | 104     | 316           | 1,330  | 1,060  | 545    | 146   | 105   |
| 11          | 91            | 72       | 98        | 60     | 307      | 112     | 330           | 1,310  | 980    | 572    | 144   | 103   |
| 12          | 83            | 72       | 79        | 55     | 168      | 113     | 298           | 1,390  | 925    | 514    | 139   | 101   |
| 13          | 83            | 70       | 84        | 50     | 168      | 114     | 281           | 1,600  | 965    | 472    | 133   | 99    |
| 14          | 75            | 69       | 91        | 60     | 171      | 109     | 298           | 1,700  | 990    | 444    | 128   | 97    |
| 15          | 74            | 67       | 90        | 80     | 179      | 106     | 348           | 1,270  | 880    | 416    | 123   | 97    |
| 16          | 74            | 68       | 85        | 100    | 173      | 104     | 388           | 1,080  | 800    | 396    | 121   | 95    |
| 17          | 71            | 71       | 81        | 104    | 163      | 96      | 368           | 1,040  | 748    | 368    | 116   | 93    |
| 18          | 71            | 72       | 79        | 92     | 154      | 95      | 337           | 940    | 721    | 348    | 114   | 93    |
| 19          | 70            | 75       | 76        | 143    | 153      | 99      | 333           | 890    | 734    | 333    | 114   | 93    |
| 20          | 72            | 75       | 79        | 146    | 143      | 105     | 380           | 870    | 734    | 316    | 110   | 95    |
| 21          | 73            | 75       | 83        | 139    | 141      | 97      | 464           | 840    | 716    | 305    | 110   | 92    |
| 22          | 73            | 60       | 70        | 153    | 137      | 92      | 617           | 795    | 748    | 356    | 110   | 92    |
| 23          | 73            | 55       | 50        | 117    | 135      | 100     | 676           | 785    | 825    | 305    | 133   | 90    |
| 24          | 72            | 80       | 60        | 116    | 134      | 110     | 761           | 835    | 775    | 277    | 123   | 88    |
| 25          | 73            | 113      | 70        | 112    | 136      | 110     | 875           | 935    | 743    | 260    | 116   | 88    |
| 26          | 71            | 98       | 80        | 108    | 127      | 116     | 945           | 1,080  | 698    | 253    | 112   | 90    |
| 27          | 69            | 93       | 85        | 111    | 115      | 125     | 870           | 1,320  | 644    | 242    | 105   | 90    |
| 28          | 67            | 90       | 87        | 111    | 120      | 119     | 770           | 1,490  | 599    | 232    | 103   | 97    |
| 29          | 66            | 85       | 80        | 113    | -----    | 117     | 730           | 1,310  | 635    | 226    | 103   | 99    |
| 30          | 65            | 89       | 75        | 144    | -----    | 125     | 730           | 1,210  | 608    | 214    | 116   | 101   |
| 31          | 64            | -----    | 78        | 185    | -----    | 134     | -----         | 1,180  | -----  | 205    | 133   | ----- |
| TOTAL       | 2,276         | 2,237    | 2,580     | 2,929  | 4,574    | 3,409   | 12,697        | 36,240 | 27,163 | 11,931 | 4,241 | 3,105 |
| MEAN        | 73.4          | 74.6     | 83.2      | 94.5   | 163      | 110     | 423           | 1,169  | 905    | 385    | 137   | 104   |
| MAX         | 87            | 113      | 106       | 185    | 307      | 134     | 945           | 1,700  | 1,550  | 572    | 196   | 136   |
| MIN         | 64            | 55       | 50        | 45     | 115      | 92      | 128           | 730    | 599    | 205    | 103   | 88    |
| CFSM        | .17           | .17      | .19       | .21    | .37      | .25     | .96           | 2.66   | 2.06   | .88    | .31   | .24   |
| IN.         | .19           | .19      | .22       | .25    | .39      | .29     | 1.07          | 3.06   | 2.30   | 1.01   | .36   | .26   |
| AC-FT       | 4,510         | 4,440    | 5,120     | 5,810  | 9,070    | 6,760   | 25,180        | 71,880 | 53,880 | 23,670 | 8,410 | 6,160 |
| CAL YR 1970 | TOTAL 75,897  | MEAN 208 | MAX 1,180 | MIN 50 | CFSM .47 | IN 6.42 | AC-FT 150,500 |        |        |        |       |       |
| WTR YR 1971 | TOTAL 113,382 | MEAN 311 | MAX 1,700 | MIN 45 | CFSM .71 | IN 9.59 | AC-FT 224,900 |        |        |        |       |       |

## KOOTENAI RIVER BASIN

12301500 Kootenai River near Rexford, Mont.

LOCATION.--Lat 48°52'28", long 115°13'37", in SE 1/4 NW 1/4 sec. 21, T. 36 N., R. 28 W., Lincoln County, near right bank on downstream side of bridge on State Highway 37, 300 ft downstream from Sullivan Creek, 1.1 miles southwest of Rexford, 3.5 miles downstream from Tobacco River, and at mile 260.5.

DRAINAGE AREA.--8,420 sq mi, approximately.

PERIOD OF RECORD.--March 1929 to November 1940, October 1967 to September 1971 (discontinued).

GAGE.--Nonrecording gage read once or twice daily. Datum of gage is 2,244.10 ft above mean sea level (Corps of Engineers bench mark). Mar. 24, 1929, to Oct. 15, 1931, nonrecording gage, Oct. 16, 1931, to June 4, 1932, water-stage recorder, June 5, 1932, to Nov. 18, 1940, nonrecording gages, all at present site at datum 13.14 ft higher.

AVERAGE DISCHARGE.--15 years, 10,130 cfs (16.34 inches per year, 7,339,000 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 67,400 cfs May 29 (gage height, 26.30 ft, from graph based on gage readings); minimum daily, 1,400 cfs Dec. 24.

Period of record: Maximum discharge observed, 79,900 cfs June 18, 1933 (gage height, 28.84 ft, present datum); minimum, 1,100 cfs Feb. 7, 1936; minimum gage height, 13.26 ft Dec. 7, 1936 (present datum).

Flood of May 28, 1948 reached a stage of 31.06 ft, present datum, from flood marks (discharge, about 100,000 cfs).

REMARKS.--Records good except those for winter period, which are poor. Diversions for irrigation of about 13,900 acres above station. Records for chemical analyses, water temperatures, and suspended sediment loads for the current year are published in Part 2 of this report.

REVISIONS (WATER YEARS).--WSP 1042: 1933.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT             | NOV         | DEC        | JAN       | FEB       | MAR      | APR             | MAY      | JUN      | JUL     | AUG     | SEP     |
|-------------|-----------------|-------------|------------|-----------|-----------|----------|-----------------|----------|----------|---------|---------|---------|
| 1           | 4,910           | 3,600       | 2,800      | 3,000     | 4,100     | 3,020    | 3,040           | 13,500   | 56,900   | 31,700  | 18,300  | 8,230   |
| 2           | 4,910           | 3,650       | 2,880      | 2,500     | 4,600     | 3,020    | 3,000           | 14,900   | 52,600   | 31,700  | 18,300  | 8,620   |
| 3           | 4,860           | 3,600       | 2,880      | 2,000     | 4,620     | 2,860    | 2,950           | 18,500   | 52,600   | 31,500  | 18,300  | 8,800   |
| 4           | 4,770           | 3,620       | 2,880      | 1,800     | 4,620     | 2,820    | 2,910           | 24,800   | 54,200   | 29,700  | 18,100  | 8,470   |
| 5           | 4,770           | 3,480       | 2,900      | 1,700     | 4,500     | 2,840    | 2,960           | 31,700   | 57,500   | 28,200  | 17,300  | 7,870   |
| 6           | 4,880           | 3,560       | 2,900      | 1,600     | 4,000     | 2,760    | 3,210           | 36,000   | 60,700   | 26,700  | 16,300  | 7,510   |
| 7           | 5,080           | 3,620       | 3,360      | 1,900     | 3,500     | 2,830    | 3,330           | 36,700   | 61,400   | 25,300  | 15,700  | 7,310   |
| 8           | 5,130           | 3,640       | 3,780      | 2,000     | 3,000     | 2,840    | 3,760           | 35,600   | 62,500   | 23,100  | 15,100  | 7,480   |
| 9           | 5,020           | 3,670       | 3,670      | 2,100     | 3,200     | 2,840    | 4,150           | 37,000   | 63,100   | 21,200  | 14,700  | 8,110   |
| 10          | 4,880           | 3,730       | 3,400      | 2,000     | 3,400     | 2,880    | 4,800           | 39,200   | 57,100   | 25,400  | 14,200  | 7,680   |
| 11          | 4,710           | 3,680       | 3,200      | 1,900     | 3,600     | 2,910    | 4,970           | 40,100   | 51,100   | 30,100  | 13,900  | 7,400   |
| 12          | 4,580           | 3,670       | 3,000      | 1,800     | 3,800     | 2,910    | 4,770           | 42,900   | 45,500   | 29,100  | 13,000  | 7,030   |
| 13          | 4,580           | 3,620       | 2,800      | 1,900     | 4,000     | 2,910    | 4,500           | 50,200   | 45,000   | 28,000  | 12,500  | 6,950   |
| 14          | 4,420           | 3,570       | 2,700      | 2,000     | 4,200     | 2,880    | 4,440           | 56,600   | 48,100   | 26,900  | 11,900  | 6,950   |
| 15          | 4,320           | 3,510       | 2,900      | 2,100     | 4,060     | 2,860    | 4,820           | 51,500   | 47,300   | 26,100  | 11,500  | 6,600   |
| 16          | 4,220           | 3,510       | 3,000      | 2,200     | 4,020     | 2,780    | 5,380           | 43,600   | 42,400   | 27,200  | 10,900  | 6,340   |
| 17          | 4,220           | 3,460       | 3,100      | 2,400     | 3,900     | 2,800    | 5,500           | 36,700   | 38,000   | 28,700  | 10,300  | 5,900   |
| 18          | 4,180           | 3,420       | 3,200      | 2,700     | 3,720     | 2,750    | 5,380           | 31,200   | 35,800   | 29,300  | 9,780   | 5,830   |
| 19          | 4,000           | 3,420       | 3,100      | 3,000     | 3,420     | 2,730    | 5,210           | 28,000   | 34,300   | 28,500  | 9,340   | 5,710   |
| 20          | 4,060           | 3,420       | 3,000      | 3,500     | 3,380     | 2,730    | 5,500           | 26,700   | 34,500   | 29,500  | 8,950   | 5,660   |
| 21          | 4,680           | 3,400       | 2,700      | 3,800     | 3,380     | 2,710    | 6,420           | 26,000   | 37,100   | 30,000  | 8,440   | 5,590   |
| 22          | 4,090           | 2,500       | 2,300      | 3,800     | 3,380     | 2,700    | 7,680           | 25,500   | 41,900   | 29,900  | 8,440   | 5,470   |
| 23          | 3,910           | 2,000       | 1,800      | 3,500     | 3,300     | 2,680    | 9,070           | 26,700   | 47,900   | 28,800  | 8,560   | 5,300   |
| 24          | 4,110           | 2,200       | 1,400      | 3,200     | 3,240     | 2,700    | 11,300          | 30,100   | 52,900   | 28,200  | 8,680   | 5,150   |
| 25          | 4,110           | 2,820       | 1,800      | 3,200     | 3,300     | 2,730    | 14,400          | 36,600   | 54,300   | 25,100  | 8,500   | 5,060   |
| 26          | 4,110           | 2,820       | 2,100      | 3,300     | 3,210     | 2,790    | 16,700          | 45,400   | 52,100   | 22,900  | 8,140   | 5,060   |
| 27          | 4,000           | 2,820       | 2,400      | 3,400     | 3,110     | 2,830    | 16,100          | 53,100   | 46,100   | 21,400  | 7,930   | 4,990   |
| 28          | 3,910           | 2,750       | 2,600      | 3,500     | 3,020     | 2,820    | 14,800          | 63,100   | 39,300   | 20,400  | 7,310   | 4,990   |
| 29          | 3,670           | 2,680       | 2,800      | 3,700     | -----     | 2,800    | 13,800          | 65,800   | 34,500   | 20,000  | 7,400   | 5,080   |
| 30          | 3,600           | 2,780       | 3,000      | 4,020     | -----     | 2,920    | 13,300          | 62,000   | 32,400   | 18,900  | 7,590   | 4,930   |
| 31          | 3,600           | -----       | 3,000      | 3,680     | -----     | 3,020    | -----           | 59,000   | -----    | 18,100  | 7,790   | -----   |
| TOTAL       | 135,690         | 98,220      | 87,350     | 83,200    | 103,580   | 87,670   | 208,150         | 1,188,7M | 1,439.1M | 821,600 | 367,150 | 196,070 |
| MEAN        | 4,377           | 3,274       | 2,818      | 2,684     | 3,699     | 2,828    | 6,938           | 38,350   | 47,970   | 26,500  | 11,840  | 6,536   |
| MAX         | 5,130           | 3,730       | 3,780      | 4,020     | 4,620     | 3,020    | 16,700          | 65,800   | 63,100   | 31,700  | 18,300  | 8,800   |
| MIN         | 3,600           | 2,000       | 1,400      | 1,600     | 3,000     | 2,680    | 2,910           | 13,500   | 32,400   | 18,100  | 7,310   | 4,930   |
| CFSM        | .52             | .39         | .33        | .32       | .44       | .34      | .82             | 4.55     | 5.70     | 3.15    | 1.41    | .78     |
| IN.         | .60             | .43         | .39        | .37       | .46       | .39      | .92             | 5.25     | 6.36     | 3.63    | 1.62    | .87     |
| AC-FT       | 269,100         | 194,800     | 173,300    | 165,000   | 205,500   | 173,900  | 412,900         | 2,358M   | 2,854M   | 1,630M  | 728,200 | 388,900 |
| CAL YR 1970 | TOTAL 2,952,280 | MEAN 8,088  | MAX 49,600 | MIN 1,300 | CFSM .96  | IN 13.04 | AC-FT 5,856,000 |          |          |         |         |         |
| WTR YR 1971 | TOTAL 4,816,480 | MEAN 13,200 | MAX 65,800 | MIN 1,400 | CFSM 1.57 | IN 21.28 | AC-FT 9,553,000 |          |          |         |         |         |

NOTE.--Stage-discharge relation affected by ice Dec. 10 to Jan. 29 (no gage-height record Dec. 20, 22, 27, Jan 24, 27, 29).

## KOOTENAI RIVER BASIN

193

12301850 Kootenai River at Warland Bridge, near Libby, Mont.

LOCATION.--Lat 48°30'00", long 115°17'02", in NW 1/4 NE 1/4 sec. 34, T. 32 N., R. 29 W., Lincoln County, on right bank at county road bridge, 0.1 mile downstream from Barron Creek, 14.5 miles northeast of Libby, and at mile 228.6.

DRAINAGE AREA.--8,892 sq mi, approximately.

PERIOD OF RECORD.--July 1961 to September 1971 (discontinued).

GAGE.--Water-stage recorder. Datum of gage is 2,145.4 ft above mean sea level (levels by Corps of Engineers). Prior to Apr. 9, 1962, nonrecording gage on bridge at same site and datum.

AVERAGE DISCHARGE.--10 years, 11,920 cfs (18.20 inches per year, 8,636,000 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, about 68,000 cfs May 29; maximum gage height, 17.90 ft May 29 (backwater from Libby dam); minimum daily discharge, 1,300 cfs Dec. 25.

Period of record: Maximum discharge, 74,400 cfs June 4, 1967 (gage height, 15.80 ft); maximum gage height, 17.90 ft May 29, 1971 (backwater from Libby dam); minimum daily discharge, 1,100 cfs Jan. 12, 1963.

REMARKS.--Records good except those for winter period, which are fair. Diversions for irrigation of about 14,000 acres from tributaries above station in Canada and the United States. Records of water temperatures for the current year are published in Part 2 of this report.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY    | GCT     | NOV             | DEC         | JAN        | FEB       | MAR       | APR      | MAY             | JUN       | JUL     | AUG     | SEP     |
|--------|---------|-----------------|-------------|------------|-----------|-----------|----------|-----------------|-----------|---------|---------|---------|
| 1      | 5,060   | 3,730           | 2,900       | 2,900      | 7,000     | 3,260     | 3,320    | 14,700          | 57,000    | 29,900  | 17,300  | 8,100   |
| 2      | 5,030   | 3,760           | 3,000       | 2,600      | 6,600     | 3,130     | 3,260    | 16,200          | 53,000    | 30,000  | 17,400  | 8,500   |
| 3      | 5,000   | 3,760           | 3,100       | 2,200      | 6,200     | 3,180     | 3,240    | 19,600          | 53,000    | 29,800  | 18,000  | 8,570   |
| 4      | 4,940   | 3,730           | 3,000       | 1,900      | 5,600     | 3,160     | 3,240    | 25,200          | 55,000    | 28,900  | 17,500  | 8,350   |
| 5      | 4,910   | 3,640           | 2,900       | 1,600      | 5,000     | 3,050     | 3,290    | 32,100          | 58,000    | 27,000  | 17,000  | 7,940   |
| 6      | 4,880   | 3,700           | 2,800       | 1,400      | 4,000     | 2,920     | 3,430    | 37,200          | 61,000    | 25,300  | 16,500  | 7,610   |
| 7      | 4,970   | 3,700           | 3,400       | 1,600      | 3,000     | 2,920     | 3,810    | 37,600          | 62,000    | 24,400  | 16,000  | 7,400   |
| 8      | 5,190   | 3,730           | 3,900       | 1,700      | 2,700     | 2,970     | 4,480    | 36,800          | 63,000    | 22,700  | 15,500  | 7,500   |
| 9      | 5,120   | 3,810           | 4,000       | 1,800      | 2,500     | 2,970     | 4,910    | 38,000          | 64,000    | 21,000  | 15,000  | 7,830   |
| 10     | 5,030   | 3,870           | 3,700       | 1,900      | 3,000     | 2,970     | 5,560    | 40,600          | 58,000    | 20,800  | 14,500  | 7,500   |
| 11     | 4,540   | 3,870           | 3,500       | 1,800      | 3,500     | 2,990     | 6,120    | 41,800          | 52,000    | 24,900  | 14,000  | 7,120   |
| 12     | 4,810   | 3,840           | 3,300       | 1,700      | 4,000     | 3,070     | 5,920    | 44,900          | 44,800    | 28,500  | 12,900  | 7,080   |
| 13     | 4,720   | 3,780           | 3,100       | 1,600      | 4,500     | 3,070     | 5,500    | 52,000          | 43,400    | 27,700  | 12,100  | 6,910   |
| 14     | 4,660   | 3,730           | 3,000       | 1,700      | 5,000     | 3,020     | 5,340    | 58,000          | 46,400    | 25,300  | 11,600  | 6,940   |
| 15     | 4,570   | 3,670           | 3,100       | 1,900      | 5,500     | 2,990     | 5,600    | 53,000          | 47,800    | 24,300  | 11,100  | 6,630   |
| 16     | 4,450   | 3,640           | 3,200       | 2,100      | 6,000     | 2,940     | 6,350    | 45,000          | 42,400    | 24,600  | 10,600  | 6,350   |
| 17     | 4,450   | 3,640           | 3,300       | 2,300      | 5,600     | 2,890     | 6,590    | 37,200          | 36,800    | 25,800  | 10,100  | 6,090   |
| 18     | 4,450   | 3,670           | 3,400       | 2,600      | 5,300     | 2,840     | 6,490    | 31,600          | 33,600    | 27,200  | 9,610   | 5,960   |
| 19     | 4,190   | 3,640           | 3,300       | 2,900      | 5,000     | 2,760     | 6,250    | 27,900          | 32,300    | 26,800  | 9,220   | 5,830   |
| 20     | 4,190   | 3,620           | 3,000       | 3,400      | 4,570     | 2,710     | 6,390    | 25,800          | 32,400    | 26,800  | 9,200   | 5,730   |
| 21     | 4,220   | 3,620           | 2,800       | 3,900      | 4,190     | 2,760     | 7,500    | 25,200          | 34,600    | 27,700  | 8,800   | 5,660   |
| 22     | 4,220   | 3,100           | 2,400       | 4,100      | 3,960     | 2,740     | 9,030    | 24,500          | 38,800    | 27,800  | 8,600   | 5,530   |
| 23     | 4,250   | 2,300           | 1,900       | 4,000      | 3,780     | 2,710     | 10,500   | 25,100          | 44,600    | 27,300  | 8,600   | 5,440   |
| 24     | 4,250   | 1,900           | 1,600       | 3,900      | 3,780     | 2,690     | 12,600   | 28,200          | 50,000    | 26,500  | 8,800   | 5,280   |
| 25     | 4,300   | 2,300           | 1,300       | 3,900      | 3,810     | 2,810     | 15,500   | 34,800          | 53,000    | 25,800  | 8,700   | 5,120   |
| 26     | 4,250   | 3,000           | 1,600       | 3,800      | 3,760     | 2,890     | 17,900   | 45,000          | 52,000    | 23,700  | 8,300   | 5,060   |
| 27     | 4,190   | 2,900           | 1,900       | 3,800      | 3,590     | 2,990     | 17,200   | 54,000          | 47,100    | 20,900  | 8,000   | 5,000   |
| 28     | 4,070   | 2,700           | 2,200       | 3,700      | 3,400     | 2,940     | 16,300   | 64,000          | 39,200    | 19,500  | 7,600   | 4,970   |
| 29     | 3,960   | 2,500           | 2,500       | 3,700      | -----     | 2,890     | 15,200   | 67,000          | 33,500    | 19,000  | 7,400   | 5,060   |
| 30     | 3,840   | 2,700           | 2,800       | 4,500      | -----     | 2,970     | 14,600   | 63,000          | 30,300    | 18,600  | 7,500   | 5,060   |
| 31     | 3,780   | -----           | 3,000       | 6,000      | -----     | 3,210     | -----    | 60,000          | -----     | 17,700  | 7,700   | -----   |
| TOTAL  | 140,890 | 101,550         | 88,900      | 86,900     | 124,840   | 91,410    | 235,420  | 1,206,000       | 1,419,000 | 776,200 | 365,130 | 196,120 |
| MEAN   | 4,545   | 3,385           | 2,868       | 2,803      | 4,455     | 2,949     | 7,847    | 38,900          | 47,300    | 25,040  | 11,780  | 6,537   |
| MAX    | 5,190   | 3,870           | 4,000       | 6,000      | 7,000     | 3,260     | 17,900   | 67,000          | 64,000    | 30,000  | 18,000  | 8,570   |
| MIN    | 3,780   | 1,900           | 1,300       | 1,400      | 2,500     | 2,690     | 3,240    | 14,700          | 30,300    | 17,700  | 7,400   | 4,970   |
| CFSM   | .51     | .38             | .32         | .32        | .50       | .33       | .88      | 4.37            | 5.32      | 2.82    | 1.32    | .74     |
| IN.    | .59     | .42             | .37         | .36        | .52       | .38       | .98      | 5.05            | 5.94      | 3.25    | 1.53    | .82     |
| AC-FT  | 279,500 | 201,400         | 176,300     | 172,400    | 247,600   | 181,300   | 467,000  | 2,392M          | 2,815M    | 1,540M  | 724,200 | 389,000 |
| CAL YR | 970     | TOTAL 3,053,020 | MEAN 8,364  | MAX 50,300 | MIN 1,300 | CFSM .94  | IN 12.77 | AC-FT 6,056,000 |           |         |         |         |
| WTR YR | 971     | TOTAL 4,832,360 | MEAN 13,240 | MAX 67,000 | MIN 1,300 | CFSM 1.49 | IN 20.22 | AC-FT 9,585,000 |           |         |         |         |

NOTE.--Stage-discharge relation affected by ice Nov. 22 to Feb. 19 (no gage-height record Nov. 27 to Dec. 11, Jan. 4-7).

## KOOTENAI RIVER BASIN

12301999 Wolf Creek near Libby, Mont.

LOCATION.--Lat 48°14'00", long 115°16'25", in NE $\frac{1}{4}$ SW $\frac{1}{4}$  sec.35, T.29 N., R.29 W., Lincoln County, on right bank 1 mile upstream from mouth and 17.0 miles southeast of Libby.

DRAINAGE AREA.--216 sq mi.

PERIOD OF RECORD.--August 1967 to current year.

GAGE.--Water-stage recorder. Datum of gage is 2,544.88 ft above mean sea level (Corps of Engineers bench mark).

EXTREMES.--Current year: Maximum discharge, 960 cfs May 4 (gage height, 5.26 ft); minimum daily, 7.0 cfs Jan. 4.

Period of record: Maximum discharge, 1,660 cfs Apr. 24, 1969 (gage height, 6.52 ft); minimum, 4.6 cfs Oct. 11, 1967 (gage height, 2.01 ft), caused by temporary storage from road construction upstream, but may have been less during period of ice effect.

REMARKS.--Records good except those for winter period, which are poor. Diversions for irrigation of about 62 acres above station.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY   | OCT   | NOV   | DEC   | JAN     | FEB   | MAR   | APR    | MAY    | JUN   | JUL   | AUG   | SEP   |
|-------|-------|-------|-------|---------|-------|-------|--------|--------|-------|-------|-------|-------|
| 1     | 8.7   | 10    | 11    | 8.5     | 257   | 70    | 107    | 472    | 182   | 134   | 24    | 15    |
| 2     | 9.2   | 10    | 11    | 8.0     | 248   | 70    | 118    | 543    | 166   | 117   | 23    | 15    |
| 3     | 8.8   | 9.5   | 9.9   | 7.5     | 200   | 75    | 124    | 727    | 166   | 98    | 24    | 15    |
| 4     | 8.9   | 9.5   | 9.9   | 7.0     | 100   | 70    | 134    | 903    | 156   | 83    | 24    | 14    |
| 5     | 9.0   | 11    | 8.5   | 7.5     | 70    | 65    | 152    | 937    | 153   | 76    | 23    | 14    |
| 6     | 11    | 10    | 10    | 8.0     | 60    | 60    | 198    | 863    | 171   | 70    | 21    | 13    |
| 7     | 11    | 9.5   | 11    | 8.5     | 50    | 65    | 303    | 711    | 157   | 68    | 21    | 13    |
| 8     | 9.9   | 9.3   | 11    | 9.0     | 45    | 67    | 351    | 613    | 149   | 64    | 20    | 13    |
| 9     | 10    | 10    | 9.5   | 9.5     | 40    | 61    | 369    | 626    | 152   | 62    | 19    | 13    |
| 10    | 12    | 10    | 9.0   | 10      | 40    | 56    | 418    | 605    | 136   | 82    | 19    | 13    |
| 11    | 11    | 9.9   | 9.5   | 9.0     | 45    | 51    | 411    | 548    | 129   | 116   | 18    | 12    |
| 12    | 11    | 9.9   | 9.0   | 8.0     | 55    | 45    | 341    | 535    | 122   | 104   | 17    | 12    |
| 13    | 11    | 9.6   | 8.5   | 7.5     | 70    | 44    | 303    | 549    | 112   | 90    | 16    | 12    |
| 14    | 9.9   | 9.4   | 9.0   | 8.0     | 90    | 42    | 312    | 498    | 113   | 77    | 16    | 12    |
| 15    | 9.6   | 9.2   | 9.5   | 9.0     | 120   | 39    | 369    | 383    | 118   | 68    | 15    | 12    |
| 16    | 9.5   | 9.2   | 10    | 11      | 150   | 37    | 414    | 346    | 106   | 62    | 15    | 11    |
| 17    | 9.5   | 9.2   | 10    | 13      | 140   | 36    | 383    | 350    | 94    | 55    | 15    | 12    |
| 18    | 9.5   | 9.5   | 9.5   | 15      | 130   | 36    | 334    | 329    | 88    | 51    | 15    | 12    |
| 19    | 9.5   | 9.5   | 9.5   | 20      | 120   | 36    | 318    | 325    | 86    | 47    | 14    | 12    |
| 20    | 9.5   | 9.6   | 9.0   | 50      | 110   | 36    | 362    | 303    | 81    | 44    | 14    | 12    |
| 21    | 9.5   | 9.0   | 8.5   | 80      | 110   | 36    | 494    | 283    | 75    | 41    | 14    | 12    |
| 22    | 9.9   | 8.0   | 8.0   | 95      | 100   | 35    | 668    | 256    | 66    | 38    | 14    | 12    |
| 23    | 9.5   | 9.0   | 8.0   | 75      | 100   | 35    | 719    | 240    | 62    | 37    | 14    | 12    |
| 24    | 9.8   | 15    | 8.5   | 65      | 95    | 39    | 775    | 240    | 62    | 34    | 14    | 12    |
| 25    | 9.9   | 20    | 8.5   | 51      | 90    | 47    | 815    | 247    | 57    | 32    | 14    | 12    |
| 26    | 9.9   | 18    | 9.0   | 37      | 85    | 58    | 805    | 251    | 54    | 31    | 14    | 11    |
| 27    | 9.9   | 15    | 9.0   | 34      | 80    | 74    | 665    | 264    | 51    | 29    | 14    | 12    |
| 28    | 9.8   | 14    | 9.5   | 28      | 75    | 70    | 575    | 271    | 52    | 28    | 13    | 12    |
| 29    | 10    | 13    | 9.5   | 32      | ----- | 70    | 543    | 206    | 92    | 27    | 13    | 12    |
| 30    | 9.5   | 12    | 9.5   | 112     | ----- | 97    | 498    | 196    | 131   | 26    | 14    | 12    |
| 31    | 9.5   | ----- | 9.0   | 255     | ----- | 120   | -----  | 209    | ----- | 24    | 15    | ----- |
| TOTAL | 305.7 | 326.8 | 291.3 | 1,098.0 | 2,875 | 1,742 | 12,378 | 13,829 | 3,339 | 1,915 | 526   | 376   |
| MEAN  | 9.86  | 10.9  | 9.40  | 35.4    | 103   | 56.2  | 413    | 446    | 111   | 61.8  | 17.0  | 12.5  |
| MAX   | 12    | 20    | 11    | 255     | 257   | 120   | 815    | 937    | 182   | 134   | 24    | 15    |
| MIN   | 8.7   | 8.0   | 8.0   | 7.0     | 40    | 35    | 107    | 196    | 51    | 24    | 13    | 11    |
| CFSM  | .05   | .05   | .04   | .16     | .48   | .26   | 1.91   | 2.06   | .51   | .29   | .08   | .06   |
| IN.   | .05   | .06   | .05   | .19     | .50   | .30   | 2.13   | 2.38   | .58   | .33   | .09   | .06   |
| AC-FT | 606   | 648   | 578   | 2,180   | 5,700 | 3,460 | 24,550 | 27,430 | 6,620 | 3,800 | 1,040 | 746   |

CAL YR 1970 TOTAL 20,360.1 MEAN 55.8 MAX 774 MIN 7.0 CFSM .26 IN 3.51 AC-FT 40,380  
 WTR YR 1971 TOTAL 39,001.8 MEAN 107 MAX 937 MIN 7.0 CFSM .50 IN 6.72 AC-FT 77,360

NOTE.--Stage-discharge relation affected by ice Dec. 4 to Jan. 21, Feb. 3 to Mar. 7.

## KOOTENAI RIVER BASIN

195

12302055 Fisher River near Libby, Mont.

LOCATION.--Lat 48°21'20", long 115°18'50", in NW¼NE¼NW¼ sec.21, T.30 N., R.29 W., Lincoln County, on left bank 0.8 mile upstream from mouth and 11.4 miles east of Libby.

DRAINAGE AREA.--838 sq mi.

PERIOD OF RECORD.--September 1967 to current year.

GAGE.--Water-stage recorder. Datum of gage is 2,134.10 ft above mean sea level (Corps of Engineers bench mark).

EXTREMES.--Current year: Maximum discharge, 4,620 cfs May 5 (gage height, 7.57 ft); maximum gage height, 7.81 ft Jan. 20 (ice jam); minimum discharge, 75 cfs Nov. 23 (gage height, 2.90 ft, result of freezeup).

Period of record: Maximum discharge, 4,730 cfs Apr. 24, 1969 (gage height, 7.54 ft); maximum gage height, 7.81 ft Jan. 20, 1971 (ice jam); minimum discharge, 75 cfs Nov. 23, 1970 (gage height, 2.90 ft), result of freezeup.

Flood of about May 22, 1948 reached a discharge of 6,560 cfs, by slope-area measurement at site 0.5 mile upstream.

REMARKS.--Records excellent. Diversions for irrigation of about 700 acres above station. Records of chemical analyses, water temperatures, and suspended sediment loads for the current year are published in Part 2 of this report.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT           | NOV      | DEC       | JAN    | FEB      | MAR      | APR           | MAY     | JUN    | JUL    | AUG    | SEP   |
|-------------|---------------|----------|-----------|--------|----------|----------|---------------|---------|--------|--------|--------|-------|
| 1           | 109           | 113      | 191       | 160    | 2,850    | 490      | 691           | 2,280   | 2,080  | 814    | 276    | 195   |
| 2           | 108           | 112      | 177       | 130    | 2,240    | 510      | 731           | 2,490   | 1,900  | 801    | 268    | 206   |
| 3           | 107           | 110      | 171       | 110    | 1,740    | 480      | 735           | 3,220   | 1,780  | 757    | 285    | 208   |
| 4           | 106           | 109      | 165       | 100    | 1,400    | 450      | 750           | 3,970   | 1,600  | 709    | 303    | 199   |
| 5           | 107           | 111      | 137       | 90     | 1,170    | 430      | 793           | 4,480   | 1,540  | 667    | 275    | 189   |
| 6           | 121           | 114      | 190       | 110    | 954      | 410      | 899           | 4,230   | 1,590  | 644    | 297    | 181   |
| 7           | 129           | 115      | 266       | 130    | 823      | 400      | 1,140         | 3,690   | 1,500  | 622    | 284    | 178   |
| 8           | 120           | 115      | 369       | 160    | 731      | 390      | 1,310         | 3,430   | 1,470  | 575    | 258    | 173   |
| 9           | 120           | 121      | 329       | 190    | 660      | 380      | 1,420         | 3,650   | 1,430  | 561    | 244    | 168   |
| 10          | 128           | 141      | 272       | 210    | 682      | 370      | 1,690         | 3,690   | 1,350  | 750    | 234    | 166   |
| 11          | 129           | 137      | 276       | 190    | 675      | 360      | 1,710         | 3,520   | 1,250  | 766    | 226    | 163   |
| 12          | 133           | 131      | 214       | 170    | 637      | 370      | 1,530         | 3,610   | 1,180  | 683    | 217    | 159   |
| 13          | 146           | 130      | 174       | 150    | 664      | 370      | 1,410         | 3,850   | 1,190  | 625    | 213    | 156   |
| 14          | 138           | 127      | 167       | 180    | 783      | 360      | 1,390         | 3,610   | 1,280  | 586    | 213    | 152   |
| 15          | 130           | 124      | 231       | 210    | 945      | 350      | 1,490         | 2,790   | 1,130  | 559    | 207    | 153   |
| 16          | 126           | 124      | 220       | 230    | 1,080    | 340      | 1,580         | 2,440   | 1,020  | 538    | 201    | 152   |
| 17          | 124           | 144      | 195       | 250    | 1,040    | 330      | 1,550         | 2,230   | 959    | 523    | 194    | 150   |
| 18          | 122           | 154      | 177       | 260    | 966      | 336      | 1,450         | 1,960   | 931    | 494    | 190    | 150   |
| 19          | 121           | 148      | 172       | 270    | 910      | 362      | 1,370         | 1,820   | 938    | 474    | 186    | 150   |
| 20          | 120           | 144      | 187       | 500    | 940      | 360      | 1,420         | 1,680   | 945    | 453    | 183    | 156   |
| 21          | 122           | 141      | 207       | 790    | 745      | 351      | 1,740         | 1,540   | 896    | 437    | 179    | 155   |
| 22          | 124           | 100      | 180       | 596    | 721      | 348      | 2,190         | 1,450   | 910    | 424    | 178    | 150   |
| 23          | 124           | 90       | 150       | 538    | 673      | 346      | 2,620         | 1,450   | 973    | 401    | 189    | 149   |
| 24          | 129           | 150      | 160       | 497    | 655      | 358      | 2,990         | 1,610   | 910    | 379    | 187    | 148   |
| 25          | 137           | 396      | 170       | 445    | 650      | 386      | 3,120         | 1,980   | 854    | 358    | 179    | 147   |
| 26          | 130           | 277      | 175       | 409    | 600      | 429      | 3,220         | 2,220   | 896    | 342    | 175    | 151   |
| 27          | 125           | 241      | 180       | 417    | 556      | 497      | 2,930         | 2,870   | 763    | 327    | 170    | 152   |
| 28          | 120           | 218      | 185       | 378    | 530      | 502      | 2,650         | 2,920   | 721    | 316    | 166    | 154   |
| 29          | 118           | 213      | 190       | 359    | -----    | 513      | 2,530         | 2,430   | 889    | 309    | 164    | 155   |
| 30          | 116           | 214      | 190       | 726    | -----    | 597      | 2,370         | 2,270   | 854    | 298    | 171    | 154   |
| 31          | 114           | -----    | 180       | 2,860  | -----    | 693      | -----         | 2,290   | -----  | 286    | 194    | ----- |
| TOTAL       | 3,803         | 4,568    | 6,247     | 11,815 | 26,920   | 12,868   | 51,419        | 85,670  | 35,729 | 16,478 | 6,706  | 4,919 |
| MEAN        | 123           | 152      | 202       | 381    | 961      | 415      | 1,714         | 2,764   | 1,191  | 532    | 216    | 164   |
| MAX         | 146           | 396      | 369       | 2,860  | 2,850    | 693      | 3,220         | 4,480   | 2,080  | 814    | 303    | 208   |
| MIN         | 106           | 90       | 137       | 90     | 530      | 330      | 691           | 1,450   | 721    | 286    | 164    | 147   |
| CFSM        | .15           | .18      | .24       | .45    | 1.15     | .50      | 2.05          | 3.30    | 1.42   | .63    | .26    | .20   |
| IN.         | .17           | .20      | .28       | .52    | 1.20     | .57      | 2.28          | 3.80    | 1.59   | .73    | .30    | .22   |
| AC-FT       | 7,540         | 9,060    | 12,390    | 23,440 | 53,400   | 25,520   | 102,000       | 169,900 | 70,870 | 32,680 | 13,300 | 9,760 |
| CAL YR 1970 | TOTAL 148,313 | MEAN 406 | MAX 2,790 | MIN 80 | CFSM .48 | IN 6.58  | AC-FT 294,200 |         |        |        |        |       |
| WTR YR 1971 | TOTAL 267,142 | MEAN 732 | MAX 4,480 | MIN 90 | CFSM .87 | IN 11.86 | AC-FT 529,900 |         |        |        |        |       |



## KOOTENAI RIVER BASIN

12303000 Kootenai River at Libby, Mont.

LOCATION.--Lat 48°24'03", long 115°33'08", in SW 1/4 sec. 34, T.31 N., R.31 W., Lincoln County, on right bank 1,800 ft downstream from highway bridge at Libby, 0.8 mile downstream from Libby Creek, and at mile 204.3.

DRAINAGE AREA.--10,240 sq mi, approximately.

PERIOD OF RECORD.--October 1910 to current year. Monthly discharge only for some periods, published in WSP 1316.

GAGE.--Water-stage recorder. Datum of gage is 2,041.54 ft above mean sea level. Prior to Apr. 28, 1931, non-recording gages at site 1,800 ft upstream at different datum.

AVERAGE DISCHARGE.--61 years, 12,110 cfs (16.06 inches per year, 8,774,000 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 69,200 cfs May 29 (gage height, 13.29 ft); minimum daily, 1,700 cfs Jan. 6.

Period of record: Maximum discharge, 121,000 cfs June 21, 1916 (gage height, 20.7 ft, present datum, derived from gage-relation study); minimum observed, 895 cfs Jan. 11, 1930 (discharge measurement).

REMARKS.--Records excellent. Diversions for irrigation of about 14,500 acres from tributaries above station in Canada and the United States. Records of chemical analyses for the current year are published in Part 2 of this report.

REVISIONS (WATER YEARS).--WSP 1042: 1933. WSP 1246: 1912(M), 1915(M), 1916, 1918-19(M), 1924-27(M).

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT             | NOV         | DEC        | JAN       | FEB       | MAR      | APR              | MAY      | JUN      | JUL     | AUG     | SEP     |
|-------------|-----------------|-------------|------------|-----------|-----------|----------|------------------|----------|----------|---------|---------|---------|
| 1           | 5,100           | 3,880       | 3,100      | 3,340     | 10,400    | 3,840    | 4,220            | 19,000   | 60,500   | 31,600  | 18,200  | 8,130   |
| 2           | 5,070           | 3,870       | 3,290      | 3,170     | 10,400    | 3,550    | 4,220            | 20,500   | 56,700   | 31,800  | 15,700  | 8,550   |
| 3           | 5,050           | 3,860       | 3,300      | 3,140     | 9,120     | 3,720    | 4,180            | 24,700   | 54,300   | 31,600  | 15,500  | 8,940   |
| 4           | 4,980           | 3,840       | 3,290      | 2,500     | 8,040     | 3,570    | 4,180            | 31,400   | 54,500   | 30,900  | 16,900  | 8,880   |
| 5           | 4,970           | 3,780       | 3,110      | 2,000     | 6,960     | 3,570    | 4,260            | 39,300   | 57,100   | 29,100  | 17,400  | 8,460   |
| 6           | 5,020           | 3,780       | 2,890      | 1,700     | 5,880     | 3,460    | 4,480            | 44,100   | 61,000   | 27,100  | 17,300  | 7,950   |
| 7           | 5,120           | 3,810       | 3,470      | 1,800     | 5,000     | 3,400    | 5,150            | 44,300   | 62,400   | 26,000  | 16,800  | 7,530   |
| 8           | 5,310           | 3,830       | 3,920      | 1,900     | 4,280     | 3,420    | 6,080            | 43,100   | 62,600   | 24,300  | 16,200  | 7,320   |
| 9           | 5,330           | 3,890       | 4,330      | 2,000     | 4,080     | 3,460    | 6,720            | 44,600   | 63,400   | 22,300  | 15,600  | 7,860   |
| 10          | 5,250           | 3,980       | 3,880      | 2,100     | 4,200     | 3,420    | 7,860            | 47,200   | 61,500   | 22,400  | 15,000  | 7,980   |
| 11          | 5,120           | 3,980       | 3,850      | 2,000     | 4,630     | 3,480    | 8,640            | 47,900   | 53,600   | 25,600  | 14,400  | 7,440   |
| 12          | 5,050           | 3,920       | 3,500      | 1,900     | 4,880     | 3,570    | 8,280            | 50,300   | 47,300   | 29,800  | 13,800  | 7,110   |
| 13          | 4,980           | 3,860       | 3,290      | 1,800     | 4,980     | 3,610    | 7,590            | 56,800   | 45,600   | 29,600  | 13,200  | 6,960   |
| 14          | 4,880           | 3,810       | 3,230      | 1,900     | 5,330     | 3,590    | 7,260            | 63,400   | 47,500   | 27,000  | 12,800  | 7,020   |
| 15          | 4,760           | 3,760       | 3,250      | 2,000     | 5,980     | 3,530    | 7,590            | 62,400   | 48,700   | 25,600  | 12,200  | 6,780   |
| 16          | 4,640           | 3,740       | 3,460      | 2,200     | 6,600     | 3,500    | 8,460            | 52,500   | 45,400   | 25,600  | 11,600  | 6,450   |
| 17          | 4,560           | 3,730       | 3,590      | 2,400     | 6,550     | 3,460    | 8,880            | 43,300   | 40,000   | 26,800  | 11,000  | 6,230   |
| 18          | 4,620           | 3,810       | 3,550      | 2,700     | 6,100     | 3,400    | 8,640            | 36,700   | 36,300   | 28,200  | 10,300  | 5,980   |
| 19          | 4,430           | 3,770       | 3,520      | 3,040     | 5,800     | 3,350    | 8,250            | 32,400   | 34,600   | 28,300  | 9,840   | 5,880   |
| 20          | 4,270           | 3,730       | 3,160      | 4,400     | 5,350     | 3,310    | 8,430            | 29,900   | 34,400   | 27,900  | 9,450   | 5,780   |
| 21          | 4,350           | 3,770       | 2,790      | 4,630     | 4,850     | 3,310    | 10,000           | 28,900   | 36,000   | 28,700  | 9,060   | 5,650   |
| 22          | 4,360           | 3,340       | 2,560      | 4,700     | 4,600     | 3,310    | 12,400           | 27,700   | 40,000   | 29,000  | 8,790   | 5,550   |
| 23          | 4,370           | 2,870       | 2,200      | 4,460     | 4,420     | 3,240    | 14,800           | 28,200   | 45,400   | 28,700  | 8,730   | 5,430   |
| 24          | 4,400           | 2,550       | 2,000      | 4,480     | 4,320     | 3,260    | 17,500           | 31,200   | 50,500   | 27,800  | 8,820   | 5,280   |
| 25          | 4,460           | 3,140       | 1,800      | 4,540     | 4,360     | 3,350    | 20,300           | 38,100   | 53,900   | 27,100  | 8,880   | 5,180   |
| 26          | 4,450           | 3,350       | 2,000      | 4,380     | 4,300     | 3,520    | 23,300           | 47,200   | 52,200   | 25,300  | 8,520   | 5,080   |
| 27          | 4,350           | 3,190       | 2,200      | 4,260     | 4,140     | 3,710    | 22,700           | 55,800   | 47,800   | 22,200  | 8,070   | 5,050   |
| 28          | 4,240           | 2,840       | 2,400      | 4,160     | 3,980     | 3,690    | 21,500           | 63,400   | 41,700   | 20,700  | 7,830   | 5,000   |
| 29          | 4,120           | 2,550       | 2,530      | 4,180     | -----     | 3,670    | 20,200           | 68,700   | 36,200   | 20,000  | 7,470   | 5,080   |
| 30          | 3,980           | 2,850       | 2,870      | 5,200     | -----     | 3,820    | 19,300           | 67,800   | 32,600   | 19,700  | 7,500   | 5,150   |
| 31          | 3,920           | -----       | 3,290      | 9,540     | -----     | 4,120    | -----            | 63,300   | -----    | 18,900  | 7,740   | -----   |
| TOTAL       | 145,510         | 107,080     | 95,620     | 102,520   | 159,530   | 109,210  | 315,370          | 1,354,1M | 1,463,7M | 819,600 | 374,600 | 199,680 |
| MEAN        | 4,694           | 3,569       | 3,085      | 3,307     | 5,698     | 3,523    | 10,510           | 43,680   | 48,790   | 26,440  | 12,080  | 6,656   |
| MAX         | 5,330           | 3,980       | 4,330      | 9,540     | 10,400    | 4,120    | 23,300           | 68,700   | 63,400   | 31,800  | 18,200  | 8,940   |
| MIN         | 3,920           | 2,550       | 1,800      | 1,700     | 3,980     | 3,240    | 4,180            | 19,000   | 32,600   | 18,900  | 7,470   | 5,000   |
| CFSM        | .46             | .35         | .30        | .32       | .56       | .34      | 1.03             | 4.27     | 4.76     | 2.58    | 1.18    | .65     |
| IN.         | .53             | .39         | .35        | .37       | .58       | .40      | 1.15             | 4.92     | 5.32     | 2.98    | 1.36    | .73     |
| AC-FT       | 288,600         | 212,400     | 189,700    | 203,300   | 316,400   | 216,600  | 625,500          | 2,686M   | 2,903M   | 1,626M  | 743,000 | 396,100 |
| CAL YR 1970 | TOTAL 3,312,710 | MEAN 9,076  | MAX 56,200 | MIN 1,650 | CFSM .89  | IN 12.03 | AC-FT 6,571,000  |          |          |         |         |         |
| WTR YR 1971 | TOTAL 5,246,520 | MEAN 14,370 | MAX 68,700 | MIN 1,700 | CFSM 1.40 | IN 19.06 | AC-FT 10,410,000 |          |          |         |         |         |

## KOOTENAI RIVER BASIN

197

12303100 Flower Creek near Libby, Mont.

LOCATION.--Lat 48°20'41", long 115°36'20", in NW<sup>1</sup>SE<sup>4</sup>SE<sup>4</sup> sec.19, T.30 N., R.31 W., Lincoln County, Kootenai National Forest, on left bank 30 ft downstream from road bridge, 0.3 mile upstream from South Fork, 1.0 mile upstream from reservoir, 4.0 miles southwest of Libby, and 4.5 miles upstream from mouth.

DRAINAGE AREA.--14.9 sq mi.

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

GAGE.--Water-stage recorder. Altitude of gage is 2,866 ft (revised), from topographic map.

AVERAGE DISCHARGE.--11 years, 28.1 cfs (25.61 inches per year, 20,360 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 258 cfs May 27 (gage height, 3.84 ft); maximum gage height, 4.62 ft Jan. 19 (backwater from ice); minimum daily discharge, 5.5 cfs Jan. 5.

Period of record: Maximum discharge, 305 cfs May 27, 1961 (gage height, 3.97 ft); maximum gage height, 5.71 ft Feb. 5, 1963 (backwater from ice); minimum discharge, 3.8 cfs Jan. 26, 1962; minimum gage height, 1.61 ft Jan. 3, 1961.

REMARKS.--Records good.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY   | OCT   | NOV   | DEC   | JAN   | FEB   | MAR   | APR   | MAY   | JUN   | JUL   | AUG   | SEP   |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1     | 6.5   | 7.3   | 10    | 8.4   | 74    | 10    | 10    | 50    | 143   | 75    | 24    | 14    |
| 2     | 6.3   | 7.3   | 10    | 9.0   | 58    | 9.0   | 10    | 75    | 145   | 87    | 23    | 14    |
| 3     | 6.1   | 7.1   | 9.9   | 7.0   | 45    | 10    | 10    | 125   | 127   | 80    | 23    | 13    |
| 4     | 5.8   | 7.1   | 9.9   | 6.0   | 37    | 9.5   | 10    | 147   | 118   | 74    | 22    | 12    |
| 5     | 6.9   | 7.1   | 9.7   | 5.5   | 28    | 9.5   | 11    | 156   | 120   | 67    | 22    | 11    |
| 6     | 8.4   | 7.3   | 11    | 6.2   | 26    | 10    | 13    | 138   | 124   | 63    | 21    | 11    |
| 7     | 7.5   | 7.3   | 15    | 6.4   | 24    | 10    | 20    | 127   | 120   | 50    | 20    | 11    |
| 8     | 7.1   | 7.3   | 14    | 6.6   | 22    | 10    | 22    | 140   | 131   | 46    | 19    | 10    |
| 9     | 7.3   | 8.8   | 11    | 6.8   | 20    | 9.9   | 22    | 152   | 120   | 51    | 18    | 9.9   |
| 10    | 7.9   | 8.4   | 10    | 6.6   | 18    | 9.9   | 26    | 152   | 117   | 90    | 17    | 9.7   |
| 11    | 8.2   | 7.9   | 9.5   | 6.4   | 17    | 11    | 25    | 164   | 110   | 84    | 16    | 9.4   |
| 12    | 11    | 7.7   | 9.0   | 6.2   | 16    | 11    | 22    | 188   | 112   | 70    | 15    | 9.0   |
| 13    | 9.2   | 7.5   | 8.5   | 6.0   | 18    | 10    | 20    | 226   | 127   | 62    | 15    | 9.8   |
| 14    | 8.6   | 7.3   | 9.0   | 6.5   | 19    | 10    | 21    | 151   | 129   | 58    | 14    | 8.6   |
| 15    | 8.2   | 7.3   | 9.5   | 7.0   | 23    | 9.9   | 24    | 109   | 102   | 58    | 14    | 8.6   |
| 16    | 7.9   | 7.7   | 9.4   | 9.0   | 24    | 9.7   | 23    | 98    | 91    | 61    | 13    | 8.4   |
| 17    | 7.7   | 8.4   | 9.2   | 10    | 23    | 9.7   | 22    | 80    | 88    | 62    | 13    | 8.4   |
| 18    | 7.7   | 7.9   | 9.0   | 9.0   | 21    | 9.7   | 20    | 66    | 87    | 56    | 12    | 8.2   |
| 19    | 7.9   | 7.7   | 8.8   | 30    | 20    | 9.4   | 20    | 62    | 91    | 54    | 12    | 8.2   |
| 20    | 8.6   | 7.7   | 8.6   | 50    | 18    | 9.0   | 23    | 55    | 98    | 49    | 11    | 9.0   |
| 21    | 9.0   | 7.5   | 8.4   | 24    | 16    | 8.8   | 34    | 50    | 102   | 46    | 11    | 8.4   |
| 22    | 8.8   | 7.0   | 8.0   | 19    | 15    | 8.8   | 39    | 52    | 129   | 43    | 11    | 8.2   |
| 23    | 8.8   | 7.5   | 7.5   | 18    | 15    | 8.8   | 57    | 70    | 147   | 39    | 13    | 7.9   |
| 24    | 8.8   | 9.0   | 7.5   | 18    | 14    | 9.0   | 56    | 112   | 124   | 37    | 11    | 7.9   |
| 25    | 8.6   | 10    | 7.9   | 17    | 14    | 8.8   | 56    | 147   | 124   | 34    | 11    | 7.9   |
| 26    | 8.2   | 9.5   | 7.7   | 16    | 13    | 9.2   | 55    | 177   | 115   | 32    | 11    | 8.6   |
| 27    | 7.9   | 9.0   | 7.5   | 15    | 12    | 9.4   | 50    | 222   | 90    | 30    | 10    | 8.6   |
| 28    | 7.9   | 9.5   | 7.3   | 12    | 11    | 9.9   | 47    | 205   | 77    | 29    | 9.9   | 8.6   |
| 29    | 7.7   | 10    | 7.5   | 11    | ----- | 9.7   | 47    | 169   | 74    | 27    | 9.7   | 8.8   |
| 30    | 7.5   | 10    | 7.7   | 26    | ----- | 9.9   | 46    | 224   | 68    | 26    | 11    | 8.4   |
| 31    | 7.5   | ----- | 8.4   | 73    | ----- | 10    | ----- | 190   | ----- | 25    | 14    | ----- |
| TOTAL | 245.5 | 241.1 | 286.4 | 456.6 | 661   | 299.5 | 861   | 4,079 | 3,350 | 1,665 | 466.6 | 285.5 |
| MEAN  | 7.92  | 8.04  | 9.24  | 14.7  | 23.6  | 9.66  | 28.7  | 132   | 112   | 53.7  | 15.1  | 9.52  |
| MAX   | 11    | 10    | 15    | 73    | 74    | 11    | 57    | 226   | 147   | 90    | 24    | 14    |
| MIN   | 5.8   | 7.0   | 7.3   | 5.5   | 11    | 8.8   | 10    | 50    | 68    | 25    | 9.7   | 7.9   |
| CFSM  | .53   | .54   | .62   | .99   | 1.58  | .65   | 1.93  | 8.86  | 7.52  | 3.60  | 1.01  | .64   |
| IN.   | .61   | .60   | .72   | 1.14  | 1.65  | .75   | 2.15  | 10.18 | 8.36  | 4.16  | 1.16  | .71   |
| AC-FT | 487   | 478   | 568   | 906   | 1,310 | 594   | 1,710 | 8,090 | 6,640 | 3,300 | 926   | 566   |

CAL YR 1970 TOTAL 7,990.6 MEAN 21.9 MAX 175 MIN 4.7 CFSM 1.47 IN 19.95 AC-FT 15,850

WTR YR 1971 TOTAL 12,897.2 MEAN 35.3 MAX 226 MIN 5.5 CFSM 2.37 IN 32.20 AC-FT 25,580

## PEAK DISCHARGE (BASE, 200 CFS)

| DATE | TIME | G.HT. | DISCHARGE | DATE | TIME | G.HT. | DISCHARGE |
|------|------|-------|-----------|------|------|-------|-----------|
| 5-13 | 1330 | 3.77  | 244       | 5-30 | 1000 | 3.77  | 244       |
| 5-27 | 2330 | 3.84  | 258       |      |      |       |           |

## KOOTENAI RIVER BASIN

12304500 Yaak River near Troy, Mont.

LOCATION.--Lat 48°33'43", long 115°58'09", in NE¼SE¼SE¼ sec.5, T.32 N., R.34 W., Lincoln County, Kootenai National Forest, on right bank 500 ft upstream from bridge on U.S. Highway 2, 0.2 mile upstream from mouth, and 7.7 miles northwest of Troy.

DRAINAGE AREA.--766 sq mi.

PERIOD OF RECORD.--October 1910 to September 1916 (fragmentary record), March 1956 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,839.2 ft above mean sea level. Oct. 15, 1910, to Sept. 30, 1916, nonrecording gage at several sites within 11 miles of present site at various datums.

AVERAGE DISCHARGE.--15 years, 927 cfs (16.44 inches per year, 671,600 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 9,220 cfs May 13 (gage height, 8.61 ft); minimum daily, 95 cfs Jan. 5.

Period of record: Maximum discharge, 12,100 cfs May 21, 1956 (gage height, 9.70 ft in gage well, 10.8 ft from outside gage); minimum daily, 80 cfs Jan. 19, 1957, Jan. 2, 1958, Dec. 13, 1967.

Flood in May to June 1948 reached a stage of 11.0 ft from floodmarks (discharge, 12,500 cfs). Flood in May 1954 reached a stage of 11.4 ft from floodmarks (discharge, 13,400 cfs).

REMARKS.--Records good except those for winter period, which are poor. Diversions for irrigation of about 30 acres above station. Records of water temperatures for the current year are published in Part 2 of this report.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT           | NOV   | DEC    | JAN        | FEB       | MAR    | APR       | MAY      | JUN           | JUL    | AUG    | SEP   |
|-------------|---------------|-------|--------|------------|-----------|--------|-----------|----------|---------------|--------|--------|-------|
| 1           | 126           | 120   | 180    | 140        | 1,200     | 377    | 454       | 3,780    | 4,270         | 1,080  | 274    | 251   |
| 2           | 123           | 121   | 170    | 120        | 1,320     | 356    | 456       | 4,430    | 4,160         | 1,050  | 263    | 231   |
| 3           | 120           | 125   | 160    | 110        | 1,030     | 384    | 469       | 5,710    | 3,870         | 973    | 254    | 216   |
| 4           | 119           | 126   | 150    | 100        | 847       | 374    | 495       | 7,000    | 3,570         | 903    | 243    | 191   |
| 5           | 122           | 120   | 140    | 95         | 688       | 361    | 561       | 7,960    | 3,650         | 861    | 234    | 174   |
| 6           | 137           | 128   | 200    | 110        | 518       | 341    | 701       | 7,990    | 3,580         | 837    | 226    | 165   |
| 7           | 134           | 137   | 450    | 140        | 458       | 335    | 1,130     | 7,120    | 3,280         | 815    | 224    | 171   |
| 8           | 130           | 135   | 350    | 170        | 441       | 333    | 1,360     | 6,960    | 3,290         | 743    | 216    | 168   |
| 9           | 135           | 161   | 250    | 190        | 431       | 321    | 1,950     | 7,430    | 3,000         | 715    | 206    | 159   |
| 10          | 137           | 183   | 220    | 180        | 482       | 319    | 2,860     | 7,630    | 2,740         | 888    | 196    | 156   |
| 11          | 138           | 166   | 230    | 160        | 482       | 334    | 2,250     | 7,600    | 2,550         | 969    | 189    | 156   |
| 12          | 150           | 156   | 220    | 140        | 456       | 332    | 1,760     | 8,050    | 2,410         | 840    | 182    | 161   |
| 13          | 145           | 147   | 200    | 130        | 448       | 322    | 1,530     | 8,890    | 2,620         | 752    | 175    | 151   |
| 14          | 139           | 141   | 210    | 150        | 472       | 313    | 1,540     | 7,750    | 2,710         | 711    | 167    | 147   |
| 15          | 132           | 134   | 220    | 180        | 609       | 304    | 1,750     | 5,800    | 2,390         | 673    | 161    | 139   |
| 16          | 127           | 140   | 230    | 210        | 700       | 300    | 1,850     | 4,700    | 2,090         | 642    | 157    | 136   |
| 17          | 124           | 158   | 210    | 250        | 657       | 287    | 1,690     | 4,040    | 1,940         | 607    | 153    | 133   |
| 18          | 123           | 163   | 180    | 300        | 609       | 274    | 1,500     | 3,680    | 1,840         | 572    | 150    | 139   |
| 19          | 126           | 155   | 150    | 400        | 572       | 284    | 1,500     | 3,580    | 1,840         | 532    | 148    | 138   |
| 20          | 130           | 147   | 130    | 500        | 526       | 291    | 1,770     | 3,430    | 1,800         | 506    | 144    | 152   |
| 21          | 146           | 138   | 110    | 485        | 498       | 285    | 2,560     | 3,160    | 1,750         | 478    | 141    | 154   |
| 22          | 148           | 110   | 100    | 406        | 486       | 275    | 3,270     | 3,160    | 1,830         | 461    | 143    | 153   |
| 23          | 154           | 130   | 110    | 373        | 470       | 279    | 4,500     | 3,610    | 1,900         | 441    | 175    | 148   |
| 24          | 169           | 160   | 120    | 341        | 469       | 291    | 4,890     | 4,350    | 1,720         | 408    | 170    | 142   |
| 25          | 166           | 210   | 130    | 324        | 467       | 292    | 5,030     | 5,030    | 1,660         | 385    | 160    | 139   |
| 26          | 153           | 190   | 135    | 313        | 440       | 320    | 4,870     | 5,250    | 1,560         | 360    | 147    | 140   |
| 27          | 138           | 180   | 140    | 314        | 402       | 329    | 4,340     | 5,940    | 1,340         | 344    | 138    | 147   |
| 28          | 126           | 170   | 145    | 311        | 403       | 316    | 3,890     | 5,850    | 1,220         | 325    | 133    | 176   |
| 29          | 120           | 160   | 150    | 305        | -----     | 325    | 3,730     | 5,110    | 1,180         | 314    | 130    | 191   |
| 30          | 122           | 170   | 155    | 499        | -----     | 389    | 3,640     | 4,990    | 1,120         | 299    | 139    | 192   |
| 31          | 122           | ----- | 160    | 1,040      | -----     | 455    | -----     | 4,830    | -----         | 287    | 205    | ----- |
| TOTAL       | 4,181         | 4,481 | 5,705  | 8,486      | 16,581    | 10,098 | 68,296    | 174,810  | 72,880        | 19,771 | 5,643  | 4,916 |
| MEAN        | 135           | 149   | 184    | 274        | 592       | 326    | 2,277     | 5,639    | 2,429         | 638    | 182    | 164   |
| MAX         | 169           | 210   | 450    | 1,040      | 1,320     | 455    | 5,030     | 8,890    | 4,270         | 1,080  | 274    | 251   |
| MIN         | 119           | 110   | 100    | 95         | 402       | 274    | 454       | 3,160    | 1,120         | 287    | 130    | 133   |
| CFSM        | .18           | .19   | .24    | .36        | .77       | .43    | 2.97      | 7.36     | 3.17          | .83    | .24    | .21   |
| IN.         | .20           | .22   | .28    | .41        | .81       | .49    | 3.32      | 8.49     | 3.54          | .96    | .27    | .24   |
| AC-FT       | 8,290         | 8,890 | 11,320 | 16,830     | 32,890    | 20,030 | 135,500   | 346,700  | 144,600       | 39,220 | 11,190 | 9,750 |
| CAL YR 1970 | TOTAL 240,176 |       |        | MEAN 658   | MAX 5,240 | MIN 95 | CFSM .86  | IN 11.66 | AC-FT 476,400 |        |        |       |
| WTR YR 1971 | TOTAL 395,848 |       |        | MEAN 1,085 | MAX 8,890 | MIN 95 | CFSM 1.42 | IN 19.22 | AC-FT 785,200 |        |        |       |

## PEAK DISCHARGE (BASE, 5,000 CFS)

NOTE.--Stage-discharge relation affected by ice Nov. 22 to Jan. 20.

| DATE | TIME | G.HT. | DISCHARGE | DATE | TIME | G.HT. | DISCHARGE |
|------|------|-------|-----------|------|------|-------|-----------|
| 4-26 | 0100 | 7.31  | 5,200     | 5-27 | 2300 | 7.85  | 6,730     |
| 5-13 | 0145 | 8.61  | 9,220     |      |      |       |           |

# KOOTENAI RIVER BASIN

199

12305000 Kootenai River at Leonia, Idaho

LOCATION.--Lat 48°37'04", long 116°02'47", in NW¼ sec.20, T.33 N., R.34 W., Principal meridian, Lincoln County, Mont., on right bank at Leonia, 450 ft east of Montana-Idaho State Line, 0.5 mile upstream from Boulder Creek, and at mile 171.6.

DRAINAGE AREA.--11,740 sq mi, approximately.

PERIOD OF RECORD.--March 1928 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,790.25 ft above mean sea level. Prior to Oct. 1, 1970, at datum 90 ft lower. Prior to Nov. 13, 1928, nonrecording gage on bridge 250 ft upstream at datum 0.41 ft lower.

AVERAGE DISCHARGE.--43 years, 14,050 cfs (16.25 inches per year, 10,180,000 acre-ft per year); 15-year base period (1952-67), 15,290 cfs.

EXTREMES.--Current year: Maximum discharge, 80,900 cfs May 30 (gage height, 27.27 ft); minimum daily, 2,380 cfs Dec. 26.

Period of record: Maximum discharge, 123,000 cfs May 28, 1948 (gage height, 33.40 ft); minimum, 996 cfs Dec. 9, 1936; minimum gage height, 7.56 ft Dec. 10, 1929.

Flood of June 1894 and 1916 reached stages of 34.6 and 31.6 ft, respectively, from information by Great Northern Railway.

REMARKS.--Records excellent except those for winter periods, which are good. Diversions above station for irrigation of about 14,600 acres. Records of water temperatures for current year are published in Part 2 of this report.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT             | NOV         | DEC        | JAN       | FEB       | MAR      | APR              | MAY      | JUN      | JUL     | AUG     | SEP     |
|-------------|-----------------|-------------|------------|-----------|-----------|----------|------------------|----------|----------|---------|---------|---------|
| 1           | 5,860           | 4,200       | 3,100      | 3,000     | 15,200    | 5,420    | 5,940            | 26,000   | 71,900   | 36,400  | 19,300  | 9,480   |
| 2           | 5,820           | 4,150       | 3,300      | 2,750     | 14,900    | 5,070    | 5,960            | 28,400   | 68,100   | 36,100  | 17,900  | 9,750   |
| 3           | 5,820           | 4,120       | 3,400      | 2,550     | 13,500    | 5,070    | 5,960            | 34,900   | 64,900   | 35,900  | 15,300  | 10,100  |
| 4           | 5,760           | 4,060       | 3,300      | 2,500     | 12,100    | 4,970    | 6,000            | 44,000   | 64,100   | 35,400  | 17,300  | 10,100  |
| 5           | 5,700           | 4,040       | 3,200      | 2,450     | 10,800    | 4,860    | 6,200            | 53,700   | 65,500   | 33,700  | 17,700  | 9,870   |
| 6           | 5,820           | 4,010       | 3,000      | 2,450     | 9,570     | 4,760    | 6,690            | 59,200   | 68,900   | 31,400  | 17,800  | 9,420   |
| 7           | 5,840           | 3,990       | 3,300      | 2,500     | 8,700     | 4,620    | 7,960            | 58,900   | 70,500   | 29,900  | 17,400  | 9,000   |
| 8           | 5,960           | 4,030       | 4,100      | 2,600     | 7,720     | 4,610    | 9,390            | 58,000   | 70,800   | 28,300  | 16,900  | 8,700   |
| 9           | 6,110           | 4,170       | 4,400      | 2,850     | 6,780     | 4,590    | 10,700           | 59,800   | 71,000   | 26,100  | 16,300  | 8,670   |
| 10          | 6,070           | 4,340       | 4,450      | 3,100     | 6,640     | 4,560    | 12,700           | 62,800   | 69,900   | 25,200  | 15,800  | 8,970   |
| 11          | 5,980           | 4,400       | 4,250      | 3,000     | 6,780     | 4,660    | 13,100           | 63,800   | 63,200   | 27,000  | 15,200  | 8,670   |
| 12          | 5,900           | 4,350       | 3,800      | 2,850     | 7,120     | 4,770    | 12,400           | 66,500   | 56,200   | 31,700  | 14,700  | 8,310   |
| 13          | 5,860           | 4,270       | 3,700      | 2,700     | 7,240     | 4,800    | 11,500           | 73,500   | 53,500   | 33,500  | 14,100  | 8,040   |
| 14          | 5,700           | 4,220       | 3,700      | 2,700     | 7,540     | 4,740    | 11,000           | 78,200   | 54,800   | 31,300  | 13,500  | 7,850   |
| 15          | 5,540           | 4,120       | 3,710      | 2,800     | 8,500     | 4,640    | 11,300           | 75,600   | 56,000   | 29,000  | 13,000  | 7,830   |
| 16          | 5,370           | 4,090       | 3,850      | 2,950     | 9,480     | 4,560    | 12,000           | 65,600   | 53,500   | 28,200  | 12,600  | 7,570   |
| 17          | 5,240           | 4,170       | 3,900      | 3,200     | 9,600     | 4,470    | 12,400           | 54,900   | 47,800   | 28,800  | 12,200  | 7,240   |
| 18          | 5,220           | 4,240       | 3,850      | 3,600     | 9,120     | 4,360    | 12,100           | 47,100   | 44,000   | 30,100  | 11,700  | 6,980   |
| 19          | 5,120           | 4,300       | 3,550      | 4,000     | 8,620     | 4,310    | 11,700           | 42,400   | 41,700   | 31,000  | 11,200  | 6,780   |
| 20          | 4,840           | 4,230       | 3,150      | 5,260     | 8,140     | 4,270    | 11,800           | 39,200   | 40,900   | 30,400  | 10,900  | 6,660   |
| 21          | 4,860           | 4,220       | 2,950      | 5,900     | 7,520     | 4,220    | 13,700           | 37,300   | 40,600   | 30,700  | 10,500  | 6,510   |
| 22          | 4,900           | 3,950       | 2,750      | 6,000     | 7,100     | 4,190    | 17,000           | 35,700   | 44,400   | 31,200  | 10,200  | 6,350   |
| 23          | 4,900           | 2,970       | 2,600      | 6,000     | 6,780     | 4,180    | 21,000           | 36,600   | 49,600   | 31,100  | 10,100  | 6,240   |
| 24          | 4,970           | 2,600       | 2,450      | 6,000     | 6,410     | 4,100    | 24,900           | 40,200   | 55,000   | 30,400  | 10,100  | 6,140   |
| 25          | 5,010           | 3,000       | 2,400      | 5,900     | 6,620     | 4,280    | 28,200           | 48,300   | 59,300   | 29,400  | 10,100  | 5,980   |
| 26          | 4,990           | 3,500       | 2,380      | 5,800     | 6,400     | 4,530    | 32,200           | 57,500   | 59,300   | 28,200  | 10,100  | 5,880   |
| 27          | 4,910           | 3,400       | 2,400      | 5,800     | 6,060     | 4,860    | 31,900           | 67,300   | 54,800   | 25,200  | 9,630   | 5,760   |
| 28          | 4,770           | 3,000       | 2,450      | 5,900     | 5,800     | 4,860    | 29,600           | 75,200   | 48,600   | 22,700  | 9,390   | 5,730   |
| 29          | 4,610           | 2,700       | 2,700      | 6,180     | -----     | 4,830    | 27,900           | 79,900   | 43,500   | 21,400  | 9,150   | 5,750   |
| 30          | 4,450           | 2,700       | 3,000      | 7,290     | -----     | 5,050    | 26,500           | 80,000   | 38,900   | 20,900  | 9,060   | 5,780   |
| 31          | 4,250           | -----       | 3,300      | 12,500    | -----     | 5,670    | -----            | 75,600   | -----    | 20,200  | 9,150   | -----   |
| TOTAL       | 166,150         | 115,540     | 102,390    | 133,080   | 240,740   | 144,880  | 449,700          | 1,726,1M | 1,691,2M | 910,800 | 408,280 | 230,110 |
| MEAN        | 5,360           | 3,851       | 3,303      | 4,293     | 8,598     | 4,674    | 14,990           | 55,680   | 56,370   | 29,380  | 13,170  | 7,670   |
| MAX         | 6,110           | 4,400       | 4,450      | 12,500    | 15,200    | 5,670    | 32,200           | 80,000   | 71,900   | 36,400  | 19,300  | 10,100  |
| MIN         | 4,250           | 2,600       | 2,380      | 2,450     | 5,800     | 4,100    | 5,940            | 26,000   | 38,900   | 20,200  | 9,060   | 5,730   |
| CFSM        | .46             | .33         | .28        | .37       | .73       | .40      | 1.28             | 4.74     | 4.80     | 2.50    | 1.12    | .65     |
| IN.         | .53             | .37         | .32        | .42       | .76       | .46      | 1.42             | 5.47     | 5.36     | 2.89    | 1.29    | .73     |
| AC-FT       | 329,600         | 229,200     | 203,100    | 264,000   | 477,500   | 287,400  | 892,000          | 3,424M   | 3,334M   | 1,807M  | 809,800 | 456,400 |
| CAL YR 1970 | TOTAL 3,830,368 | MEAN 10,490 | MAX 61,000 | MIN 1,850 | CFSM .89  | IN 12.14 | AC-FT 7,598,000  |          |          |         |         |         |
| WTR YR 1971 | TOTAL 6,318,970 | MEAN 17,310 | MAX 80,000 | MIN 2,380 | CFSM 1.47 | IN 20.02 | AC-FT 12,530,000 |          |          |         |         |         |



## PEND OREILLE RIVER BASIN

12324100 Racetrack Creek below Granite Creek, near Anaconda, Mont.

LOCATION.--Lat 46°16'44", long 112°55'07", near center of NW¼NE¼ sec.13, T.6 N., R.11 W., Powell County, Deer Lodge National Forest, on right bank 30 ft upstream from bridge, 1.6 miles downstream from Granite Creek, 9.5 miles upstream from mouth, and 10.3 miles north of Anaconda.

DRAINAGE AREA.--39.5 sq mi.

PERIOD OF RECORD.--April 1914 to September 1917 (gage heights only, published as "near Anaconda"). July 1957 to current year. Records for July 1911 to November 1912 at site 3 miles upstream, published as "near Anaconda", not equivalent owing to inflow.

GAGE.--Water-stage recorder. Altitude of gage is 5,420 ft (from topographic map). Prior to September 1917, at site 0.3 mile downstream at different datum.

AVERAGE DISCHARGE.--14 years, 59.4 cfs (20.42 inches per year, 43,040 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 330 cfs June 23 (gage height, 4.39 ft); minimum, 8.4 cfs Feb. 20 (gage height, 1.77 ft), result of freezeup.

Period of record: Maximum discharge, 537 cfs June 17, 1965 (gage height, 5.74 ft); minimum, 6.2 cfs Mar. 19, 1970 (gage height, 1.65 ft), result of freezeup.

REMARKS.--Records good. Some regulation by Racetrack and Fisher Lakes.

REVISIONS.--WSP 1316: Drainage area.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT          | NOV       | DEC     | JAN    | FEB       | MAR      | APR          | MAY   | JUN    | JUL   | AUG   | SEP   |
|-------------|--------------|-----------|---------|--------|-----------|----------|--------------|-------|--------|-------|-------|-------|
| 1           | 32           | 26        | 23      | 19     | 32        | 18       | 19           | 34    | 219    | 156   | 95    | 55    |
| 2           | 31           | 25        | 24      | 16     | 28        | 19       | 19           | 44    | 204    | 154   | 97    | 55    |
| 3           | 31           | 24        | 22      | 16     | 23        | 20       | 19           | 55    | 194    | 150   | 99    | 53    |
| 4           | 30           | 24        | 22      | 17     | 22        | 20       | 19           | 71    | 195    | 140   | 97    | 48    |
| 5           | 31           | 26        | 23      | 18     | 21        | 20       | 20           | 80    | 198    | 132   | 94    | 44    |
| 6           | 33           | 25        | 24      | 19     | 21        | 19       | 22           | 82    | 203    | 125   | 101   | 42    |
| 7           | 33           | 25        | 23      | 20     | 23        | 20       | 23           | 81    | 191    | 118   | 107   | 44    |
| 8           | 32           | 25        | 23      | 21     | 22        | 19       | 22           | 91    | 219    | 113   | 96    | 42    |
| 9           | 33           | 25        | 23      | 21     | 22        | 19       | 22           | 104   | 253    | 111   | 92    | 40    |
| 10          | 36           | 25        | 20      | 21     | 26        | 19       | 22           | 119   | 237    | 108   | 92    | 38    |
| 11          | 32           | 24        | 23      | 20     | 25        | 19       | 21           | 132   | 236    | 105   | 91    | 37    |
| 12          | 36           | 25        | 17      | 19     | 24        | 19       | 21           | 153   | 234    | 100   | 89    | 36    |
| 13          | 33           | 25        | 16      | 19     | 24        | 19       | 21           | 185   | 268    | 96    | 87    | 35    |
| 14          | 30           | 23        | 21      | 20     | 23        | 19       | 23           | 179   | 294    | 93    | 85    | 34    |
| 15          | 29           | 24        | 23      | 20     | 23        | 19       | 26           | 165   | 265    | 104   | 83    | 34    |
| 16          | 29           | 24        | 23      | 20     | 22        | 19       | 24           | 169   | 250    | 102   | 85    | 34    |
| 17          | 29           | 24        | 22      | 21     | 21        | 19       | 23           | 139   | 240    | 100   | 81    | 35    |
| 18          | 29           | 24        | 18      | 20     | 22        | 18       | 23           | 120   | 233    | 103   | 80    | 35    |
| 19          | 28           | 23        | 21      | 21     | 22        | 18       | 22           | 107   | 240    | 99    | 76    | 35    |
| 20          | 28           | 24        | 20      | 22     | 16        | 19       | 25           | 98    | 262    | 109   | 74    | 36    |
| 21          | 28           | 19        | 20      | 18     | 18        | 19       | 28           | 90    | 273    | 111   | 71    | 36    |
| 22          | 27           | 16        | 19      | 17     | 22        | 18       | 27           | 83    | 299    | 109   | 69    | 36    |
| 23          | 27           | 22        | 19      | 22     | 23        | 19       | 28           | 78    | 307    | 105   | 67    | 35    |
| 24          | 28           | 36        | 20      | 21     | 21        | 19       | 34           | 81    | 285    | 102   | 64    | 34    |
| 25          | 26           | 32        | 21      | 20     | 20        | 18       | 38           | 93    | 260    | 100   | 61    | 34    |
| 26          | 26           | 27        | 20      | 20     | 17        | 19       | 31           | 120   | 245    | 99    | 59    | 37    |
| 27          | 26           | 25        | 21      | 20     | 19        | 19       | 29           | 165   | 226    | 99    | 57    | 39    |
| 28          | 26           | 25        | 21      | 20     | 20        | 19       | 28           | 222   | 208    | 98    | 55    | 40    |
| 29          | 26           | 24        | 21      | 21     | -----     | 19       | 28           | 261   | 191    | 100   | 55    | 38    |
| 30          | 26           | 24        | 20      | 31     | -----     | 21       | 30           | 280   | 169    | 98    | 71    | 37    |
| 31          | 26           | -----     | 20      | 37     | -----     | 20       | -----        | 247   | -----  | 96    | 63    | ----- |
| TOTAL       | 917          | 740       | 653     | 637    | 622       | 591      | 737          | 3,928 | 7,098  | 3,435 | 2,493 | 1,178 |
| MEAN        | 29.6         | 24.7      | 21.1    | 20.5   | 22.2      | 19.1     | 24.6         | 127   | 237    | 111   | 80.4  | 39.3  |
| MAX         | 36           | 36        | 24      | 37     | 32        | 21       | 38           | 280   | 307    | 156   | 107   | 55    |
| MIN         | 26           | 16        | 16      | 16     | 16        | 18       | 19           | 34    | 169    | 93    | 55    | 34    |
| CFSM        | .75          | .63       | .53     | .52    | .56       | .48      | .62          | 3.22  | 6.00   | 2.81  | 2.04  | .99   |
| IN.         | .86          | .70       | .61     | .60    | .59       | .56      | .69          | 3.70  | 6.68   | 3.23  | 2.35  | 1.11  |
| AC-FT       | 1,820        | 1,470     | 1,300   | 1,260  | 1,230     | 1,170    | 1,460        | 7,790 | 14,080 | 6,810 | 4,940 | 2,340 |
| CAL YR 1970 | TOTAL 23,202 | MEAN 63.6 | MAX 406 | MIN 16 | CFSM 1.61 | IN 21.85 | AC-FT 46,020 |       |        |       |       |       |
| WTR YR 1971 | TOTAL 23,029 | MEAN 63.1 | MAX 307 | MIN 16 | CFSM 1.60 | IN 21.69 | AC-FT 45,680 |       |        |       |       |       |

## PEAK DISCHARGE (BASE, 250 CFS)

| DATE | TIME | G.HT. | DISCHARGE | DATE | TIME | G.HT. | DISCHARGE |
|------|------|-------|-----------|------|------|-------|-----------|
| 5-30 | 0130 | 4.30  | 314       | 6-23 | 0200 | 4.39  | 330       |
| 6-14 | 0200 | 4.32  | 318       |      |      |       |           |



## PEND OREILLE RIVER BASIN

201

12325500 Flint Creek near Southern Cross, Mont.

LOCATION.--Lat 46°14'02", long 113°17'43", in SE1/4 sec.36, T.6 N., R.14 W., Granite County, on left wing of weir 0.5 mile downstream from powerplant, 2.0 miles downstream from Georgetown Dam, 3.5 miles northwest of Southern Cross, 6.8 miles south of Philipsburg, and at mile 36.8.

DRAINAGE AREA.--52.6 sq mi.

PERIOD OF RECORD.--October 1940 to current year.

GAGE.--Nonrecording gage and sharp-crested weir. Altitude of gage is 5,630 ft (from topographic map).

AVERAGE DISCHARGE.--31 years, 28.5 cfs (20,650 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 63 cfs July 17-19 (gage height, 1.25 ft); minimum daily, 8.4 cfs Dec. 2-9.

Period of record: Maximum discharge, 174 cfs June 13, 1942 (gage height, 1.86 ft); maximum gage height, 2.15 ft June 26, 27, 1969; probably no flow for parts of Aug. 20, 1943, May 23, 1952, Oct. 6, 1954, Nov. 29, Dec. 1, 1966 and no flow Nov. 30, 1966, when generator was shut down.

REMARKS.--Records good. Flow regulated by Georgetown Lake (see p. 233). Flow may be augmented by transbasin diversion from Silver Lake to Georgetown Lake or reduced by pumping from Georgetown Lake to Silver Lake.

COOPERATION.--Gage-height record furnished by The Montana Power Co. under general supervision of Geological Survey in connection with a Federal Power Commission project.

REVISIONS (WATER YEARS).--WSP 1216: 1942(M). WSP 1246: Drainage area.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY   | OCT   | NOV   | DEC   | JAN   | FEB   | MAR   | APR   | MAY   | JUN   | JUL   | AUG   | SEP   |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1     | 27    | 27    | 8.7   | 9.1   | 9.1   | 8.7   | 9.1   | 11    | 40    | 42    | 33    | 24    |
| 2     | 27    | 27    | 8.4   | 9.1   | 9.1   | 8.7   | 9.1   | 11    | 40    | 36    | 33    | 26    |
| 3     | 27    | 27    | 8.4   | 9.1   | 9.1   | 8.7   | 9.1   | 12    | 39    | 36    | 32    | 26    |
| 4     | 27    | 27    | 8.4   | 9.1   | 9.1   | 8.7   | 9.1   | 13    | 40    | 36    | 32    | 26    |
| 5     | 27    | 27    | 8.4   | 9.1   | 8.7   | 8.7   | 9.1   | 14    | 40    | 36    | 32    | 26    |
| 6     | 27    | 22    | 8.4   | 8.7   | 8.7   | 8.7   | 9.1   | 14    | 40    | 36    | 32    | 26    |
| 7     | 27    | 13    | 8.4   | 8.7   | 8.7   | 8.7   | 9.1   | 14    | 40    | 36    | 32    | 26    |
| 8     | 27    | 13    | 8.4   | 8.7   | 8.7   | 8.7   | 9.5   | 14    | 39    | 36    | 32    | 26    |
| 9     | 27    | 13    | 8.4   | 8.7   | 8.7   | 8.7   | 9.5   | 14    | 39    | 36    | 32    | 26    |
| 10    | 27    | 13    | 8.7   | 8.7   | 8.7   | 8.7   | 9.5   | 13    | 39    | 36    | 32    | 26    |
| 11    | 27    | 13    | 8.7   | 8.7   | 8.7   | 8.7   | 9.5   | 12    | 39    | 36    | 31    | 26    |
| 12    | 27    | 13    | 8.7   | 8.7   | 8.7   | 8.7   | 9.5   | 13    | 39    | 36    | 26    | 26    |
| 13    | 27    | 13    | 9.7   | 8.7   | 8.7   | 8.7   | 9.5   | 13    | 39    | 43    | 26    | 26    |
| 14    | 27    | 13    | 8.7   | 8.7   | 8.7   | 8.7   | 9.5   | 13    | 39    | 50    | 26    | 26    |
| 15    | 27    | 13    | 8.7   | 8.7   | 8.7   | 8.7   | 9.5   | 12    | 39    | 50    | 26    | 26    |
| 16    | 27    | 13    | 8.7   | 8.7   | 8.7   | 8.7   | 9.5   | 13    | 39    | 50    | 26    | 26    |
| 17    | 27    | 13    | 8.7   | 8.7   | 8.7   | 8.7   | 9.5   | 15    | 39    | 56    | 26    | 26    |
| 18    | 27    | 13    | 8.7   | 8.7   | 8.7   | 9.1   | 9.5   | 20    | 39    | 63    | 26    | 26    |
| 19    | 27    | 13    | 8.7   | 8.7   | 8.7   | 9.1   | 9.5   | 30    | 39    | 63    | 26    | 26    |
| 20    | 27    | 13    | 8.7   | 9.1   | 8.7   | 9.1   | 9.5   | 30    | 39    | 54    | 26    | 27    |
| 21    | 27    | 13    | 8.7   | 9.1   | 8.7   | 9.1   | 11    | 30    | 39    | 45    | 26    | 27    |
| 22    | 27    | 13    | 8.7   | 9.1   | 8.7   | 9.1   | 11    | 29    | 39    | 45    | 26    | 27    |
| 23    | 27    | 13    | 9.1   | 9.1   | 8.7   | 9.1   | 11    | 28    | 39    | 42    | 26    | 26    |
| 24    | 27    | 13    | 9.1   | 9.1   | 8.7   | 9.1   | 11    | 28    | 39    | 33    | 26    | 26    |
| 25    | 27    | 13    | 9.1   | 9.5   | 8.7   | 9.1   | 11    | 40    | 39    | 33    | 26    | 26    |
| 26    | 27    | 13    | 9.1   | 9.1   | 9.1   | 9.1   | 12    | 45    | 39    | 33    | 26    | 26    |
| 27    | 27    | 13    | 9.1   | 9.5   | 9.1   | 9.1   | 11    | 40    | 41    | 33    | 26    | 29    |
| 28    | 27    | 13    | 9.1   | 9.1   | 8.7   | 9.1   | 11    | 40    | 50    | 33    | 26    | 27    |
| 29    | 27    | 13    | 9.1   | 9.1   | ----- | 9.1   | 11    | 40    | 50    | 33    | 26    | 27    |
| 30    | 27    | 11    | 9.1   | 9.5   | ----- | 9.1   | 11    | 40    | 50    | 33    | 26    | 27    |
| 31    | 27    | ----- | 9.1   | 9.5   | ----- | 9.1   | ----- | 40    | ----- | 33    | 26    | ----- |
| TOTAL | 837   | 467   | 270.9 | 278.1 | 246.0 | 275.3 | 297.5 | 701   | 1,211 | 1,263 | 872   | 788   |
| MEAN  | 27.0  | 15.6  | 8.74  | 8.97  | 8.79  | 8.88  | 9.92  | 22.6  | 40.4  | 40.7  | 28.1  | 26.3  |
| MAX   | 27    | 27    | 9.1   | 9.5   | 9.1   | 9.1   | 12    | 45    | 50    | 63    | 33    | 28    |
| MIN   | 27    | 11    | 8.4   | 8.7   | 8.7   | 8.7   | 9.1   | 11    | 39    | 33    | 26    | 26    |
| CFSM  | .51   | .30   | .17   | .17   | .17   | .17   | .19   | .43   | .77   | .77   | .53   | .50   |
| IN.   | .59   | .33   | .19   | .20   | .17   | .19   | .21   | .50   | .86   | .89   | .62   | .56   |
| AC-FT | 1,660 | 926   | 537   | 552   | 488   | 546   | 590   | 1,390 | 2,400 | 2,510 | 1,730 | 1,560 |

WTR YR 1971 TOTAL 7,506.8 MEAN 20.6 MAX 63 MIN 8.4 CFSM .39 IN 5.31 AC-FT 14,890

## PEND OREILLE RIVER BASIN

12329500 Flint Creek at Maxville, Mont.

LOCATION.--Lat 46°28'00", long 113°14'30", in NW¼ sec.9, T.8 N., R.13 W., Granite County, on right bank 0.4 mile west of Maxville and 1 mile upstream from Boulder Creek.

DRAINAGE AREA.--208 sq mi.

PERIOD OF RECORD.--August 1941 to current year. April 1939 to September 1941 at site 0.5 mile upstream (above Maxville siding); records not equivalent owing to diversions.

GAGE.--Water-stage recorder. Datum of gage is 4,828.38 ft above mean sea level.

AVERAGE DISCHARGE.--30 years, 98.6 cfs (71,440 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 496 cfs Jan. 30 (gage height, 4.78 ft); minimum daily, 30 cfs Jan. 5.

Period of record: Maximum discharge, 1,680 cfs Mar. 28, 1943 (gage height, 6.79 ft), from rating curve extended above 600 cfs; maximum gage height, 8.08 ft Feb. 4, 1963 (backwater from ice); minimum daily discharge, 15 cfs Feb. 25, 1962.

REMARKS.--Records good. Some regulation by Georgetown Lake (see p. 233). Diversions for irrigation of about 8,200 acres above station. During irrigation season, flow is supplemented by water from East Fork Creek which is diverted in sec.5, T.4 N., R.14 W., 500 ft below Rock Creek Dam, through a canal into Trout Creek, thence into Flint Creek.

REVISIONS.--WSP 1216: Drainage area.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY   | OCT   | NOV   | DEC   | JAN   | FEB   | MAR   | APR   | MAY   | JUN   | JUL   | AUG   | SEP   |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1     | 104   | 77    | 59    | 45    | 165   | 45    | 59    | 80    | 160   | 100   | 157   | 139   |
| 2     | 102   | 76    | 54    | 40    | 100   | 40    | 58    | 90    | 151   | 99    | 144   | 134   |
| 3     | 100   | 75    | 52    | 35    | 72    | 45    | 55    | 108   | 141   | 107   | 168   | 146   |
| 4     | 98    | 74    | 54    | 32    | 50    | 43    | 54    | 126   | 134   | 97    | 168   | 140   |
| 5     | 98    | 76    | 60    | 30    | 44    | 41    | 56    | 186   | 129   | 95    | 151   | 134   |
| 6     | 101   | 77    | 64    | 34    | 46    | 40    | 61    | 172   | 119   | 88    | 157   | 130   |
| 7     | 97    | 71    | 62    | 38    | 48    | 43    | 70    | 154   | 107   | 81    | 189   | 148   |
| 8     | 101   | 68    | 61    | 40    | 50    | 46    | 63    | 151   | 118   | 82    | 160   | 134   |
| 9     | 104   | 67    | 58    | 42    | 52    | 50    | 61    | 156   | 164   | 84    | 151   | 120   |
| 10    | 113   | 67    | 56    | 45    | 71    | 49    | 65    | 157   | 153   | 87    | 144   | 110   |
| 11    | 108   | 65    | 52    | 45    | 93    | 51    | 58    | 151   | 157   | 79    | 144   | 107   |
| 12    | 104   | 66    | 46    | 43    | 81    | 51    | 59    | 157   | 143   | 74    | 141   | 103   |
| 13    | 102   | 65    | 44    | 40    | 84    | 52    | 56    | 173   | 144   | 71    | 137   | 88    |
| 14    | 100   | 62    | 55    | 41    | 71    | 48    | 59    | 154   | 178   | 71    | 130   | 83    |
| 15    | 99    | 62    | 65    | 42    | 69    | 47    | 67    | 124   | 150   | 76    | 121   | 86    |
| 16    | 98    | 62    | 50    | 43    | 60    | 45    | 64    | 132   | 141   | 84    | 114   | 88    |
| 17    | 98    | 63    | 46    | 50    | 54    | 45    | 65    | 130   | 133   | 88    | 119   | 88    |
| 18    | 97    | 64    | 44    | 55    | 54    | 44    | 65    | 120   | 121   | 92    | 125   | 81    |
| 19    | 94    | 63    | 50    | 69    | 56    | 45    | 60    | 113   | 126   | 96    | 122   | 80    |
| 20    | 90    | 63    | 60    | 112   | 54    | 46    | 65    | 110   | 130   | 99    | 119   | 82    |
| 21    | 88    | 58    | 50    | 76    | 50    | 47    | 78    | 99    | 133   | 109   | 115   | 83    |
| 22    | 89    | 50    | 40    | 58    | 50    | 47    | 74    | 95    | 151   | 129   | 119   | 82    |
| 23    | 88    | 60    | 34    | 50    | 52    | 50    | 78    | 91    | 162   | 137   | 119   | 81    |
| 24    | 89    | 83    | 38    | 56    | 52    | 59    | 88    | 90    | 139   | 136   | 112   | 80    |
| 25    | 86    | 79    | 42    | 56    | 48    | 63    | 104   | 97    | 122   | 137   | 110   | 80    |
| 26    | 84    | 66    | 40    | 56    | 47    | 66    | 92    | 102   | 116   | 154   | 104   | 81    |
| 27    | 82    | 65    | 42    | 66    | 46    | 87    | 86    | 112   | 113   | 156   | 99    | 93    |
| 28    | 81    | 66    | 44    | 64    | 47    | 60    | 86    | 139   | 119   | 156   | 101   | 132   |
| 29    | 80    | 63    | 48    | 60    | ----- | 60    | 79    | 159   | 109   | 160   | 104   | 127   |
| 30    | 79    | 64    | 47    | 133   | ----- | 82    | 76    | 168   | 100   | 166   | 125   | 129   |
| 31    | 78    | ----- | 45    | 336   | ----- | 76    | ----- | 172   | ----- | 164   | 144   | ----- |
| TOTAL | 2,932 | 2,017 | 1,562 | 1,932 | 1,766 | 1,613 | 2,063 | 4,068 | 4,063 | 3,356 | 4,133 | 3,189 |
| MEAN  | 94.6  | 67.2  | 50.4  | 62.3  | 63.1  | 52.0  | 68.8  | 131   | 135   | 108   | 133   | 106   |
| MAX   | 113   | 83    | 65    | 336   | 165   | 87    | 104   | 186   | 178   | 168   | 189   | 148   |
| MIN   | 78    | 50    | 34    | 30    | 44    | 40    | 54    | 80    | 100   | 71    | 99    | 80    |
| AC-FT | 5,820 | 4,000 | 3,100 | 3,830 | 3,500 | 3,200 | 4,090 | 8,070 | 8,060 | 6,660 | 8,200 | 6,330 |

CAL YR 1970 TOTAL 35,573 MEAN 97.5 MAX 490 MIN 32 AC-FT 70,560  
WTR YR 1971 TOTAL 32,694 MEAN 89.6 MAX 336 MIN 30 AC-FT 64,850

12330000 Boulder Creek at Maxville, Mont.

LOCATION.--Lat 46°28'30", long 113°14'00", in SW $\frac{1}{4}$  sec. 4, T.8 N., R.13 W., Granite County, on right bank 0.2 mile upstream from mouth and 0.7 mile north of Maxville.

DRAINAGE AREA.--71.3 sq mi.

PERIOD OF RECORD.--April 1939 to current year. Monthly discharge only for some periods, published in WSP 1316.

GAGE.--Water-stage recorder. Altitude of gage is 4,750 ft (from topographic map). Apr. 15, 1939, to July 7, 1941, nonrecording gage at site 75 ft upstream at different datum. July 8-20, 1941, nonrecording gage at site 175 ft upstream at datum 1.03 ft higher.

AVERAGE DISCHARGE.--32 years, 46.4 cfs (33,620 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 310 cfs May 30 (gage height, 3.10 ft); minimum, 8.0 cfs Sept. 25, result of upstream diversions.

Period of record: Maximum discharge, 764 cfs June 13, 1953; maximum gage height, 4.24 ft June 3, 1948; minimum discharge, 3.0 cfs about Mar. 25, 1964 (gage height, 0.73 ft), result of freezeup.

REMARKS.--Records good except those for winter period, which are poor. Diversions for irrigation of about 350 acres, all of which lies below station.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT                                                   | NOV   | DEC   | JAN   | FEB   | MAR   | APR   | MAY   | JUN   | JUL   | AUG   | SEP   |
|-------------|-------------------------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1           | 22                                                    | 24    | 24    | 21    | 28    | 19    | 20    | 31    | 206   | 68    | 19    | 14    |
| 2           | 19                                                    | 23    | 23    | 19    | 26    | 18    | 20    | 38    | 191   | 63    | 19    | 13    |
| 3           | 18                                                    | 22    | 22    | 17    | 24    | 20    | 20    | 48    | 176   | 62    | 19    | 13    |
| 4           | 19                                                    | 23    | 23    | 16    | 21    | 19    | 20    | 59    | 182   | 56    | 18    | 12    |
| 5           | 22                                                    | 22    | 24    | 15    | 18    | 18    | 20    | 76    | 180   | 57    | 18    | 11    |
| 6           | 23                                                    | 22    | 25    | 17    | 19    | 17    | 21    | 81    | 176   | 56    | 18    | 11    |
| 7           | 22                                                    | 22    | 25    | 19    | 20    | 19    | 24    | 84    | 158   | 58    | 22    | 13    |
| 8           | 22                                                    | 23    | 25    | 20    | 20    | 20    | 22    | 90    | 197   | 54    | 19    | 12    |
| 9           | 22                                                    | 23    | 25    | 21    | 21    | 20    | 22    | 99    | 230   | 52    | 16    | 11    |
| 10          | 24                                                    | 24    | 24    | 21    | 22    | 20    | 22    | 121   | 204   | 51    | 15    | 10    |
| 11          | 23                                                    | 23    | 23    | 20    | 23    | 20    | 20    | 131   | 208   | 49    | 14    | 9.8   |
| 12          | 25                                                    | 23    | 22    | 18    | 23    | 20    | 18    | 164   | 191   | 48    | 14    | 9.5   |
| 13          | 25                                                    | 23    | 21    | 17    | 24    | 20    | 17    | 213   | 216   | 46    | 14    | 9.2   |
| 14          | 22                                                    | 22    | 22    | 19    | 23    | 20    | 18    | 184   | 223   | 45    | 13    | 8.9   |
| 15          | 22                                                    | 23    | 23    | 20    | 23    | 20    | 22    | 148   | 184   | 44    | 13    | 8.9   |
| 16          | 22                                                    | 23    | 24    | 21    | 23    | 20    | 22    | 164   | 164   | 42    | 14    | 8.9   |
| 17          | 22                                                    | 23    | 23    | 22    | 23    | 20    | 22    | 135   | 142   | 35    | 13    | 8.9   |
| 18          | 22                                                    | 23    | 22    | 23    | 23    | 20    | 21    | 103   | 131   | 31    | 13    | 8.6   |
| 19          | 22                                                    | 23    | 23    | 23    | 22    | 20    | 21    | 90    | 139   | 29    | 12    | 8.6   |
| 20          | 22                                                    | 23    | 24    | 23    | 21    | 20    | 23    | 81    | 140   | 29    | 12    | 9.2   |
| 21          | 22                                                    | 20    | 23    | 21    | 20    | 19    | 25    | 72    | 139   | 29    | 12    | 8.6   |
| 22          | 22                                                    | 19    | 21    | 19    | 20    | 20    | 26    | 72    | 144   | 29    | 12    | 8.9   |
| 23          | 22                                                    | 25    | 19    | 20    | 21    | 20    | 27    | 75    | 144   | 28    | 12    | 8.6   |
| 24          | 22                                                    | 34    | 21    | 20    | 22    | 20    | 29    | 82    | 130   | 27    | 12    | 8.6   |
| 25          | 21                                                    | 31    | 23    | 21    | 21    | 20    | 32    | 95    | 113   | 26    | 11    | 8.3   |
| 26          | 21                                                    | 28    | 22    | 21    | 20    | 21    | 30    | 124   | 107   | 25    | 11    | 8.6   |
| 27          | 21                                                    | 27    | 23    | 22    | 19    | 20    | 29    | 178   | 103   | 23    | 9.8   | 9.2   |
| 28          | 21                                                    | 26    | 24    | 22    | 20    | 20    | 29    | 243   | 96    | 22    | 9.8   | 10    |
| 29          | 24                                                    | 26    | 25    | 22    | ----- | 20    | 28    | 280   | 90    | 21    | 9.8   | 11    |
| 30          | 24                                                    | 26    | 24    | 25    | ----- | 21    | 28    | 270   | 77    | 20    | 13    | 20    |
| 31          | 24                                                    | ----- | 23    | 29    | ----- | 20    | ----- | 235   | ----- | 20    | 14    | ----- |
| TOTAL       | 684                                                   | 719   | 715   | 634   | 610   | 611   | 698   | 3,866 | 4,781 | 1,245 | 441.4 | 312.3 |
| MEAN        | 22.1                                                  | 24.0  | 23.1  | 20.5  | 21.8  | 19.7  | 23.3  | 125   | 159   | 40.2  | 14.2  | 10.4  |
| MAX         | 25                                                    | 34    | 25    | 29    | 28    | 21    | 32    | 280   | 230   | 68    | 22    | 20    |
| MIN         | 18                                                    | 19    | 19    | 15    | 18    | 17    | 17    | 31    | 77    | 20    | 9.8   | 8.3   |
| AC-FT       | 1,360                                                 | 1,430 | 1,420 | 1,260 | 1,210 | 1,210 | 1,380 | 7,670 | 9,480 | 2,470 | 876   | 619   |
| CAL YR 1970 | TOTAL 18,841.0 MEAN 51.6 MAX 415 MIN 14 AC-FT 37,370  |       |       |       |       |       |       |       |       |       |       |       |
| WTR YR 1971 | TOTAL 15,316.7 MEAN 42.0 MAX 280 MIN 8.3 AC-FT 30,380 |       |       |       |       |       |       |       |       |       |       |       |

## PEAK DISCHARGE (BASE, 150 CFS)

| DATE | TIME | G.HT. | DISCHARGE | DATE | TIME | G.HT. | DISCHARGE |
|------|------|-------|-----------|------|------|-------|-----------|
| 5-13 | 1800 | 2.76  | 220       | 6-9  | 0100 | 2.89  | 253       |
| 5-30 | 0200 | 3.10  | 310       | 6-14 | 0200 | 2.85  | 243       |

NOTE.--Stage-discharge relation affected by ice Dec. 11 to Jan. 26 (no gage-height record Jan. 4-26).

## PEND OREILLE RIVER BASIN

12332000 Middle Fork Rock Creek near Philipsburg, Mont.

LOCATION.--Lat 46°11'42", long 113°30'00", in SWSE $\frac{1}{4}$  sec.8, T.5 N., R.15 W., Granite County, on right bank 0.3 mile upstream from East Fork, 2.3 miles upstream from West Fork, and 13.7 miles southwest of Philipsburg.

DRAINAGE AREA.--123 sq mi.

PERIOD OF RECORD.--September 1937 to current year. Monthly discharge only January to March 1938, published in WSP 1316.

GAGE.--Water-stage recorder. Datum of gage is 5,385.84 ft above mean sea level. Sept. 21, 1937, to May 10, 1942, nonrecording gage at site 600 ft upstream at different datum. May 11, 1942, to May 11, 1954, nonrecording gages at site 400 ft downstream at different datum. May 12, 1954, to Sept. 30, 1955, nonrecording gage at site 300 ft upstream at datum 5.74 ft higher.

AVERAGE DISCHARGE.--34 years, 122 cfs (13.47 inches per year, 88,390 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 948 cfs May 30 (gage height, 4.34 ft); minimum daily, 20 cfs Jan. 5.

Period of record: Maximum discharge, 1,430 cfs June 13, 1953 (gage height, 3.92 ft, site and datum then in use); minimum daily, 5.3 cfs Feb. 9, 1953.

REMARKS.--Records good except those for winter period, which are poor. A few small diversions for irrigation above station.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT          | NOV      | DEC       | JAN    | FEB       | MAR      | APR           | MAY    | JUN    | JUL    | AUG   | SEP   |
|-------------|--------------|----------|-----------|--------|-----------|----------|---------------|--------|--------|--------|-------|-------|
| 1           | 46           | 42       | 42        | 35     | 58        | 28       | 31            | 96     | 769    | 336    | 108   | 69    |
| 2           | 47           | 41       | 40        | 30     | 60        | 26       | 32            | 130    | 685    | 340    | 105   | 68    |
| 3           | 46           | 40       | 40        | 25     | 55        | 30       | 31            | 182    | 615    | 332    | 115   | 68    |
| 4           | 45           | 42       | 40        | 22     | 50        | 32       | 30            | 243    | 583    | 308    | 111   | 66    |
| 5           | 45           | 42       | 36        | 20     | 45        | 30       | 32            | 353    | 583    | 292    | 113   | 62    |
| 6           | 47           | 42       | 40        | 22     | 40        | 28       | 36            | 348    | 594    | 285    | 110   | 59    |
| 7           | 47           | 42       | 42        | 25     | 42        | 30       | 41            | 363    | 600    | 273    | 108   | 65    |
| 8           | 46           | 41       | 40        | 28     | 44        | 32       | 38            | 400    | 710    | 258    | 100   | 60    |
| 9           | 47           | 41       | 38        | 30     | 46        | 34       | 39            | 418    | 864    | 248    | 94    | 56    |
| 10          | 50           | 41       | 36        | 32     | 48        | 36       | 42            | 450    | 807    | 240    | 89    | 55    |
| 11          | 50           | 40       | 34        | 32     | 50        | 38       | 37            | 486    | 775    | 235    | 86    | 53    |
| 12          | 61           | 41       | 32        | 28     | 52        | 40       | 39            | 582    | 704    | 230    | 82    | 52    |
| 13          | 62           | 40       | 30        | 25     | 54        | 38       | 36            | 751    | 788    | 225    | 79    | 51    |
| 14          | 55           | 38       | 35        | 28     | 52        | 36       | 42            | 765    | 837    | 220    | 78    | 50    |
| 15          | 51           | 40       | 40        | 30     | 50        | 34       | 53            | 665    | 720    | 210    | 77    | 51    |
| 16          | 50           | 40       | 45        | 32     | 48        | 32       | 51            | 689    | 625    | 205    | 76    | 51    |
| 17          | 48           | 39       | 40        | 34     | 46        | 30       | 50            | 577    | 592    | 200    | 74    | 51    |
| 18          | 47           | 38       | 35        | 36     | 44        | 30       | 50            | 500    | 568    | 190    | 74    | 51    |
| 19          | 43           | 38       | 36        | 38     | 42        | 32       | 47            | 444    | 570    | 180    | 69    | 51    |
| 20          | 47           | 38       | 40        | 40     | 38        | 34       | 54            | 401    | 585    | 171    | 67    | 53    |
| 21          | 46           | 35       | 38        | 38     | 36        | 36       | 62            | 364    | 598    | 170    | 65    | 53    |
| 22          | 47           | 30       | 36        | 36     | 38        | 36       | 62            | 335    | 688    | 163    | 63    | 52    |
| 23          | 47           | 35       | 34        | 40     | 40        | 40       | 65            | 314    | 734    | 154    | 63    | 50    |
| 24          | 50           | 50       | 36        | 42     | 42        | 31       | 72            | 322    | 662    | 147    | 62    | 49    |
| 25          | 47           | 80       | 38        | 44     | 40        | 30       | 74            | 336    | 590    | 142    | 59    | 49    |
| 26          | 45           | 60       | 40        | 46     | 36        | 33       | 71            | 409    | 555    | 136    | 56    | 54    |
| 27          | 44           | 50       | 40        | 48     | 32        | 32       | 68            | 578    | 530    | 128    | 55    | 58    |
| 28          | 42           | 42       | 40        | 50     | 30        | 29       | 68            | 788    | 470    | 124    | 54    | 56    |
| 29          | 43           | 44       | 42        | 52     | -----     | 31       | 71            | 904    | 412    | 123    | 54    | 54    |
| 30          | 43           | 46       | 42        | 54     | -----     | 34       | 80            | 903    | 364    | 118    | 74    | 55    |
| 31          | 43           | -----    | 42        | 56     | -----     | 36       | -----         | 869    | -----  | 113    | 73    | ----- |
| TOTAL       | 1,477        | 1,278    | 1,189     | 1,098  | 1,258     | 1,018    | 1,504         | 14,965 | 19,177 | 6,496  | 2,493 | 1,672 |
| MEAN        | 47.6         | 42.6     | 38.4      | 35.4   | 44.9      | 32.8     | 50.1          | 483    | 639    | 210    | 80.4  | 55.7  |
| MAX         | 62           | 80       | 45        | 56     | 60        | 40       | 80            | 904    | 864    | 340    | 115   | 69    |
| MIN         | 42           | 30       | 30        | 20     | 30        | 26       | 30            | 96     | 364    | 113    | 54    | 49    |
| CFSM        | .39          | .35      | .31       | .29    | .37       | .27      | .41           | 3.93   | 5.20   | 1.71   | .65   | .45   |
| IN.         | .45          | .39      | .36       | .33    | .38       | .31      | .45           | 4.53   | 5.80   | 1.96   | .75   | .51   |
| AC-FT       | 2,930        | 2,530    | 2,360     | 2,180  | 2,500     | 2,020    | 2,980         | 29,680 | 38,040 | 12,880 | 4,940 | 3,320 |
| CAL YR 1970 | TOTAL 48,012 | MEAN 132 | MAX 1,140 | MIN 15 | CFSM 1.07 | IN 14.52 | AC-FT 95,230  |        |        |        |       |       |
| WTR YR 1971 | TOTAL 53,625 | MEAN 147 | MAX 904   | MIN 20 | CFSM 1.20 | IN 16.22 | AC-FT 106,400 |        |        |        |       |       |

## PEAK DISCHARGE (BASE, 450 CFS)

NOTE.--Stage-discharge relation affected by ice Nov. 21 to Mar. 23.

| DATE | TIME | G.HT. | DISCHARGE | DATE | TIME | G.HT. | DISCHARGE |
|------|------|-------|-----------|------|------|-------|-----------|
| 5-14 | 0030 | 4.14  | 824       | 6-14 | 0445 | 4.23  | 878       |
| 5-30 | 0330 | 4.34  | 948       | 6-23 | 0600 | 4.08  | 788       |
| 6-9  | 0545 | 4.27  | 902       |      |      |       |           |

12334650 Blackfoot River below Alice Creek, near Lincoln, Mont.

LOCATION.--Lat 46°59'21", long 112°30'40", in SE $\frac{1}{4}$ SE $\frac{1}{4}$ SW $\frac{1}{4}$  sec.5, T.14 N., R.7 W., Lewis and Clark County, on right bank at road bridge, 0.4 mile upstream from mouth of Hogum Creek, 3.0 miles downstream from Alice Creek, and 8.2 miles northeast of Lincoln.

DRAINAGE AREA.--96.9 sq mi.

PERIOD OF RECORD.--October 1970 to September 1971.

GAGE.--Water-stage recorder. Datum of gage is 4,803.44 ft above mean sea level.

EXTREMES.--Current year: Maximum discharge, 874 cfs May 5 (gage height, 6.99 ft); minimum, 6.8 cfs Mar. 21 (gage height, 4.48 ft), result of freezeup.

Flood of June 8 or 9, 1964, reached a stage of 8.89 ft, from floodmark (discharge, 3,500 cfs by step-backwater method in 1970).

REMARKS.--Records good except those for winter period and those prior to Nov. 16, which are poor. Records of chemical analyses, water temperatures, and suspended sediment loads for the current year are published in Part 2 of this report.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY   | OCT   | NOV   | DEC  | JAN   | FEB   | MAR  | APR   | MAY    | JUN   | JUL   | AUG   | SEP   |
|-------|-------|-------|------|-------|-------|------|-------|--------|-------|-------|-------|-------|
| 1     | 20    | 18    | 18   | 16    | 28    | 18   | 17    | 296    | 276   | 57    | 26    | 28    |
| 2     | 20    | 18    | 17   | 16    | 26    | 18   | 18    | 412    | 292   | 53    | 21    | 26    |
| 3     | 20    | 18    | 16   | 15    | 22    | 18   | 19    | 544    | 280   | 51    | 21    | 24    |
| 4     | 20    | 18    | 16   | 15    | 27    | 19   | 19    | 705    | 260   | 49    | 22    | 23    |
| 5     | 20    | 17    | 17   | 15    | 25    | 25   | 21    | 826    | 240   | 55    | 22    | 21    |
| 6     | 20    | 17    | 16   | 15    | 25    | 23   | 29    | 740    | 232   | 49    | 23    | 21    |
| 7     | 20    | 17    | 16   | 16    | 24    | 20   | 41    | 745    | 220   | 47    | 23    | 21    |
| 8     | 20    | 17    | 17   | 17    | 23    | 17   | 55    | 700    | 204   | 46    | 21    | 20    |
| 9     | 20    | 17    | 16   | 16    | 23    | 16   | 65    | 660    | 192   | 46    | 20    | 19    |
| 10    | 20    | 16    | 16   | 15    | 21    | 16   | 77    | 585    | 184   | 46    | 19    | 19    |
| 11    | 21    | 16    | 16   | 13    | 22    | 17   | 75    | 532    | 176   | 43    | 19    | 19    |
| 12    | 22    | 16    | 16   | 11    | 21    | 15   | 65    | 524    | 160   | 41    | 19    | 19    |
| 13    | 23    | 16    | 16   | 10    | 21    | 15   | 65    | 548    | 149   | 40    | 19    | 19    |
| 14    | 22    | 16    | 16   | 11    | 22    | 15   | 77    | 532    | 145   | 38    | 19    | 19    |
| 15    | 21    | 16    | 16   | 12    | 21    | 15   | 101   | 464    | 137   | 37    | 19    | 19    |
| 16    | 20    | 16    | 15   | 14    | 21    | 14   | 110   | 392    | 130   | 35    | 19    | 22    |
| 17    | 20    | 15    | 15   | 16    | 21    | 12   | 107   | 356    | 122   | 34    | 19    | 25    |
| 18    | 20    | 17    | 15   | 22    | 20    | 12   | 92    | 344    | 116   | 32    | 19    | 24    |
| 19    | 20    | 17    | 13   | 25    | 20    | 13   | 87    | 312    | 110   | 31    | 18    | 23    |
| 20    | 20    | 17    | 14   | 25    | 20    | 15   | 101   | 288    | 101   | 30    | 18    | 24    |
| 21    | 20    | 17    | 14   | 19    | 17    | 13   | 116   | 260    | 95    | 30    | 17    | 24    |
| 22    | 20    | 17    | 14   | 19    | 18    | 14   | 152   | 252    | 90    | 31    | 17    | 24    |
| 23    | 20    | 17    | 14   | 20    | 19    | 15   | 212   | 240    | 85    | 32    | 17    | 23    |
| 24    | 20    | 30    | 14   | 25    | 17    | 15   | 312   | 232    | 82    | 31    | 17    | 22    |
| 25    | 19    | 29    | 14   | 40    | 17    | 14   | 452   | 236    | 77    | 31    | 17    | 21    |
| 26    | 19    | 23    | 15   | 25    | 17    | 15   | 380   | 252    | 77    | 30    | 16    | 22    |
| 27    | 19    | 18    | 15   | 16    | 17    | 16   | 280   | 284    | 75    | 29    | 15    | 21    |
| 28    | 19    | 24    | 15   | 11    | 17    | 15   | 240   | 308    | 65    | 30    | 21    | 21    |
| 29    | 19    | 17    | 15   | 12    | ----- | 15   | 232   | 300    | 63    | 30    | 24    | 20    |
| 30    | 19    | 18    | 16   | 17    | ----- | 17   | 244   | 288    | 61    | 28    | 31    | 20    |
| 31    | 18    | ----- | 16   | 24    | ----- | 19   | ----- | 300    | ----- | 28    | 30    | ----- |
| TOTAL | 621   | 545   | 479  | 543   | 592   | 501  | 3,861 | 13,457 | 4,496 | 1,190 | 628   | 653   |
| MEAN  | 20.0  | 18.2  | 15.5 | 17.5  | 21.1  | 16.2 | 129   | 434    | 150   | 38.4  | 20.3  | 21.8  |
| MAX   | 23    | 30    | 18   | 40    | 28    | 25   | 452   | 826    | 292   | 57    | 31    | 28    |
| MIN   | 18    | 15    | 13   | 10    | 17    | 12   | 17    | 232    | 61    | 28    | 15    | 19    |
| CFSM  | .21   | .19   | .16  | .18   | .22   | .17  | 1.33  | 4.48   | 1.55  | .40   | .21   | .23   |
| IN.   | .24   | .21   | .18  | .21   | .23   | .19  | 1.48  | 5.17   | 1.73  | .46   | .24   | .25   |
| AC-FT | 1,230 | 1,080 | 950  | 1,080 | 1,170 | 994  | 7,660 | 26,690 | 8,920 | 2,360 | 1,250 | 1,300 |

WTR YR 1971 TOTAL 27,566 MEAN 75.5 MAX 826 MIN 10 CFSM .78 IN 10.58 AC-FT 54,680

## PEAK DISCHARGE (BASE, 320 CFS)

| DATE | TIME | G.HT. | DISCHARGE | DATE | TIME | G.HT. | DISCHARGE |
|------|------|-------|-----------|------|------|-------|-----------|
| 4-25 | 1330 | 6.18  | 472       | 5-31 | 0700 | 5.72  | 324       |
| 5-5  | 1230 | 6.99  | 874       |      |      |       |           |

NOTE.--Stage-discharge relation affected by ice Dec. 3 to Jan. 26 (no gage height record Dec. 23, 25, 27, Jan. 1, 3, 7-20). No gage height record Oct. 1 to Nov. 16.



## PEND OREILLE RIVER BASIN

12335500 Nevada Creek above reservoir, near Finn, Mont.

LOCATION.--Lat 46°46'25", long 112°45'25", near south line of sec.20, T.12 N., R.9 W., Powell County, on right bank 0.3 mile downstream from Gallagher Creek, 2 miles upstream from Buffalo Creek, and 3 miles west of Finn.

DRAINAGE AREA.--116 sq mi.

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

GAGE.--Water-stage recorder. Altitude of gage is 4,660 ft (from river-profile map). Prior to Apr. 30, 1942, nonrecording gage at site 0.9 mile downstream at different datum. Apr. 30, 1942, to July 26, 1953, water-stage recorder at site 1 mile downstream at different datum.

AVERAGE DISCHARGE.--32 years, 36.8 cfs (26,660 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 986 cfs Mar. 26 (gage height, 4.54 ft); maximum gage height, 4.71 ft Jan. 30 (backwater from ice); minimum discharge, 5.6 cfs Aug. 26-28 (gage height, 1.02 ft).

Period of record: Maximum discharge, 1,800 cfs June 2, 1953 (gage height, 6.00 ft, site and datum then in use), from rating curve extended above 400 cfs on basis of inflow-outflow study of Nevada Creek Reservoir; maximum gage height, 7.40 ft May 29, 1953, site and datum then in use (backwater from diversion dam); minimum discharge, probably less than 2 cfs at times in 1944 and 1957.

REMARKS.--Records good except those for winter period, which are poor. Diversions for irrigation of about 2,900 acres above station.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT            | NOV       | DEC     | JAN     | FEB          | MAR   | APR   | MAY    | JUN   | JUL   | AUG   | SEP   |
|-------------|----------------|-----------|---------|---------|--------------|-------|-------|--------|-------|-------|-------|-------|
| 1           | 15             | 16        | 15      | 11      | 100          | 15    | 137   | 70     | 165   | 40    | 12    | 11    |
| 2           | 15             | 17        | 14      | 10      | 60           | 15    | 137   | 94     | 157   | 37    | 11    | 9.9   |
| 3           | 15             | 20        | 14      | 9.5     | 40           | 15    | 137   | 122    | 143   | 36    | 12    | 9.2   |
| 4           | 14             | 22        | 15      | 9.0     | 30           | 14    | 134   | 171    | 147   | 29    | 16    | 8.6   |
| 5           | 16             | 14        | 16      | 9.5     | 20           | 14    | 133   | 229    | 139   | 26    | 15    | 8.3   |
| 6           | 20             | 16        | 17      | 10      | 20           | 13    | 117   | 225    | 130   | 22    | 15    | 8.2   |
| 7           | 17             | 14        | 17      | 10      | 20           | 13    | 59    | 201    | 125   | 18    | 22    | 8.9   |
| 8           | 18             | 15        | 17      | 11      | 25           | 14    | 46    | 195    | 116   | 18    | 19    | 7.3   |
| 9           | 20             | 15        | 17      | 11      | 25           | 15    | 45    | 206    | 112   | 21    | 16    | 7.2   |
| 10          | 23             | 16        | 16      | 12      | 30           | 15    | 48    | 209    | 112   | 18    | 15    | 7.1   |
| 11          | 19             | 16        | 16      | 13      | 35           | 15    | 42    | 209    | 110   | 14    | 15    | 7.2   |
| 12          | 22             | 15        | 16      | 13      | 35           | 16    | 38    | 221    | 103   | 14    | 15    | 7.1   |
| 13          | 20             | 15        | 15      | 12      | 30           | 16    | 34    | 251    | 96    | 14    | 14    | 7.0   |
| 14          | 19             | 16        | 16      | 12      | 25           | 16    | 37    | 257    | 94    | 14    | 9.2   | 7.1   |
| 15          | 17             | 19        | 17      | 13      | 22           | 15    | 50    | 222    | 93    | 13    | 9.8   | 7.4   |
| 16          | 17             | 17        | 16      | 15      | 21           | 14    | 50    | 199    | 83    | 13    | 10    | 6.5   |
| 17          | 17             | 14        | 15      | 20      | 20           | 13    | 48    | 178    | 72    | 12    | 9.7   | 6.8   |
| 18          | 17             | 14        | 14      | 30      | 20           | 13    | 43    | 162    | 67    | 12    | 10    | 7.0   |
| 19          | 17             | 14        | 14      | 40      | 19           | 13    | 38    | 139    | 63    | 11    | 10    | 7.3   |
| 20          | 17             | 14        | 15      | 50      | 19           | 14    | 41    | 137    | 56    | 12    | 9.9   | 7.5   |
| 21          | 17             | 12        | 14      | 45      | 19           | 15    | 45    | 113    | 52    | 14    | 9.8   | 9.2   |
| 22          | 17             | 11        | 13      | 40      | 19           | 17    | 50    | 103    | 45    | 13    | 9.5   | 11    |
| 23          | 17             | 12        | 12      | 35      | 18           | 20    | 58    | 94     | 39    | 12    | 8.9   | 10    |
| 24          | 17             | 15        | 13      | 30      | 18           | 25    | 79    | 88     | 35    | 11    | 7.5   | 10    |
| 25          | 16             | 17        | 13      | 30      | 17           | 150   | 117   | 82     | 37    | 11    | 6.8   | 10    |
| 26          | 16             | 16        | 13      | 30      | 17           | 351   | 107   | 88     | 41    | 11    | 6.4   | 11    |
| 27          | 16             | 16        | 14      | 35      | 16           | 176   | 93    | 117    | 45    | 11    | 6.1   | 13    |
| 28          | 18             | 15        | 14      | 50      | 16           | 144   | 83    | 159    | 56    | 15    | 6.2   | 13    |
| 29          | 20             | 15        | 14      | 70      | -----        | 144   | 72    | 185    | 57    | 16    | 6.4   | 12    |
| 30          | 19             | 15        | 13      | 150     | -----        | 140   | 65    | 184    | 47    | 14    | 11    | 12    |
| 31          | 17             | -----     | 12      | 300     | -----        | 137   | ----- | 182    | ----- | 12    | 12    | ----- |
| TOTAL       | 545            | 463       | 457     | 1,136.0 | 756          | 1,607 | 2,183 | 5,092  | 2,637 | 534   | 356.2 | 267.8 |
| MEAN        | 17.6           | 15.4      | 14.7    | 36.6    | 27.0         | 51.8  | 72.8  | 164    | 87.9  | 17.2  | 11.5  | 8.93  |
| MAX         | 23             | 22        | 17      | 300     | 100          | 351   | 137   | 257    | 165   | 40    | 22    | 13    |
| MIN         | 14             | 11        | 12      | 9.0     | 16           | 13    | 34    | 70     | 35    | 11    | 6.1   | 6.5   |
| AC-FT       | 1,080          | 918       | 906     | 2,250   | 1,500        | 3,190 | 4,330 | 10,100 | 5,230 | 1,060 | 707   | 531   |
| CAL YR 1970 | TOTAL 15,150.8 | MEAN 41.5 | MAX 314 | MIN 4.5 | AC-FT 30,050 |       |       |        |       |       |       |       |
| WTR YR 1971 | TOTAL 16,034.0 | MEAN 43.9 | MAX 351 | MIN 6.1 | AC-FT 31,800 |       |       |        |       |       |       |       |

PEAK DISCHARGE (BASE, 290 CFS, REVISED)

| DATE | TIME | G.H.T. | DISCHARGE | DATE | TIME | G.H.T. | DISCHARGE |
|------|------|--------|-----------|------|------|--------|-----------|
| 1-30 | --   | --     | a700      | 3-26 | 1645 | 4.54   | 986       |

a About.

NOTE.--Stage-discharge relation affected by ice Nov. 21 to Mar. 25 (no gage height record Feb. 19 to Mar. 18).

12340000 Blackfoot River near Bonner, Mont.

LOCATION.--Lat 46°53'59", long 113°45'20", in SE¼SE¼NW¼ sec.9, T.13 N., R.17 W., Missoula County, Lolo National Forest, on right bank 5.6 miles northeast of Bonner, 5.0 miles downstream from Union Creek, and 7.3 miles upstream from mouth.

DRAINAGE AREA.--2,290 sq mi.

PERIOD OF RECORD.--July to November 1898, March 1899 to September 1901, May 1903 to January 1905, March to October 1905, October 1939 to current year. Monthly discharge only for some periods, published in WSP 1316. Published as "at Bonner" 1898-99 and as Big Blackfoot River near Bonner 1903-5.

GAGE.--Water-stage recorder. Datum of gage is 3,344.76 ft above mean sea level. July 7, 1898, to June 30, 1901, and May 15, 1903, to Oct. 31, 1905, nonrecording gage at site 7 miles downstream at different datum. Oct. 4, 1939, to Sept. 30, 1955, nonrecording gage at site 1.3 miles downstream at datum 21.82 ft lower.

AVERAGE DISCHARGE.--35 years (1899-1901, 1903-4, 1939-71), 1,637 cfs (9.71 inches per year, 1,186,000 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 12,100 cfs May 14 (gage height, 8.78 ft); minimum daily, 350 cfs Jan. 6.

Period of record: Maximum discharge, 19,200 cfs June 10, 1964 (gage height, 10.89 ft); minimum daily, 200 cfs Jan. 4, 5, 1950.

REMARKS.--Records excellent except those for winter period, which are poor. Diversions for irrigation of about 20,000 acres above station.

REVISIONS.--WSP 1216: Drainage area.

## DISCHARGE, IN CURIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT           | NOV        | DEC        | JAN     | FEB      | MAR      | APR             | MAY     | JUN     | JUL     | AUG    | SEP    |
|-------------|---------------|------------|------------|---------|----------|----------|-----------------|---------|---------|---------|--------|--------|
| 1           | 652           | 619        | 668        | 560     | 3,250    | 1,000    | 1,110           | 4,300   | 9,650   | 3,500   | 1,240  | 852    |
| 2           | 649           | 616        | 650        | 520     | 2,790    | 936      | 1,080           | 4,630   | 8,710   | 3,340   | 1,230  | 855    |
| 3           | 647           | 610        | 620        | 480     | 2,700    | 1,000    | 1,060           | 5,560   | 8,160   | 3,280   | 1,200  | 848    |
| 4           | 647           | 608        | 600        | 450     | 2,500    | 952      | 1,070           | 7,060   | 7,980   | 3,170   | 1,190  | 822    |
| 5           | 649           | 610        | 580        | 400     | 2,200    | 912      | 1,110           | 8,990   | 7,760   | 3,060   | 1,160  | 799    |
| 6           | 676           | 622        | 600        | 350     | 1,920    | 880      | 1,200           | 10,100  | 7,350   | 2,970   | 1,140  | 778    |
| 7           | 678           | 625        | 620        | 400     | 1,800    | 912      | 1,370           | 10,000  | 7,040   | 2,880   | 1,120  | 771    |
| 8           | 676           | 622        | 640        | 500     | 1,620    | 912      | 1,470           | 10,100  | 7,420   | 2,710   | 1,110  | 764    |
| 9           | 686           | 624        | 620        | 600     | 1,470    | 888      | 1,560           | 10,300  | 8,170   | 2,590   | 1,070  | 752    |
| 10          | 694           | 635        | 600        | 650     | 1,540    | 888      | 1,670           | 10,100  | 8,080   | 2,620   | 1,030  | 739    |
| 11          | 683           | 630        | 580        | 600     | 1,590    | 896      | 1,710           | 10,100  | 7,540   | 2,560   | 1,010  | 733    |
| 12          | 690           | 630        | 560        | 550     | 1,640    | 896      | 1,720           | 10,600  | 6,980   | 2,470   | 980    | 727    |
| 13          | 694           | 636        | 540        | 500     | 1,720    | 920      | 1,710           | 11,500  | 6,740   | 2,350   | 953    | 721    |
| 14          | 688           | 633        | 520        | 520     | 1,790    | 912      | 1,750           | 11,900  | 6,990   | 2,240   | 930    | 703    |
| 15          | 674           | 626        | 560        | 560     | 1,760    | 888      | 1,880           | 10,900  | 6,700   | 2,150   | 906    | 703    |
| 16          | 659           | 622        | 600        | 600     | 1,640    | 866      | 2,050           | 9,930   | 6,080   | 2,080   | 888    | 703    |
| 17          | 648           | 626        | 560        | 630     | 1,520    | 845      | 2,160           | 9,040   | 5,620   | 2,020   | 877    | 703    |
| 18          | 640           | 630        | 540        | 660     | 1,450    | 817      | 2,180           | 8,050   | 5,320   | 1,960   | 861    | 709    |
| 19          | 641           | 627        | 520        | 680     | 1,390    | 817      | 2,140           | 7,170   | 5,200   | 1,880   | 849    | 709    |
| 20          | 643           | 625        | 510        | 700     | 1,310    | 817      | 2,210           | 6,660   | 5,200   | 1,840   | 838    | 709    |
| 21          | 658           | 613        | 510        | 720     | 1,220    | 817      | 2,480           | 6,050   | 5,350   | 1,760   | 832    | 697    |
| 22          | 643           | 530        | 480        | 680     | 1,190    | 810      | 2,720           | 5,480   | 5,570   | 1,750   | 818    | 691    |
| 23          | 645           | 490        | 460        | 640     | 1,200    | 817      | 3,080           | 5,130   | 5,850   | 1,700   | 800    | 685    |
| 24          | 659           | 600        | 440        | 640     | 1,180    | 838      | 3,590           | 4,970   | 5,930   | 1,650   | 792    | 680    |
| 25          | 653           | 825        | 460        | 650     | 1,160    | 880      | 4,320           | 5,200   | 5,570   | 1,570   | 787    | 674    |
| 26          | 647           | 729        | 480        | 660     | 1,090    | 936      | 5,190           | 5,990   | 5,210   | 1,510   | 777    | 668    |
| 27          | 636           | 703        | 500        | 670     | 1,020    | 1,010    | 5,210           | 7,630   | 4,750   | 1,450   | 765    | 668    |
| 28          | 630           | 663        | 520        | 670     | 1,050    | 1,020    | 5,030           | 9,500   | 4,320   | 1,410   | 748    | 674    |
| 29          | 629           | 675        | 540        | 670     | -----    | 976      | 4,660           | 10,700  | 4,150   | 1,390   | 735    | 674    |
| 30          | 674           | 680        | 560        | 950     | -----    | 1,020    | 4,350           | 11,100  | 3,860   | 1,350   | 787    | 658    |
| 31          | 621           | -----      | 580        | 2,900   | -----    | 1,130    | -----           | 10,900  | -----   | 1,290   | 846    | -----  |
| TOTAL       | 20,359        | 18,789     | 17,218     | 20,760  | 46,710   | 28,208   | 72,840          | 259,640 | 193,250 | 68,500  | 29,269 | 21,869 |
| MEAN        | 657           | 633        | 555        | 670     | 1,668    | 910      | 2,428           | 8,375   | 6,442   | 2,210   | 944    | 729    |
| MAX         | 694           | 825        | 668        | 2,900   | 3,250    | 1,130    | 5,210           | 11,900  | 9,650   | 3,500   | 1,240  | 855    |
| MIN         | 621           | 490        | 440        | 350     | 1,020    | 810      | 1,060           | 4,300   | 3,860   | 1,290   | 735    | 658    |
| CFSM        | .29           | .28        | .24        | .29     | .73      | .40      | 1.06            | 3.66    | 2.81    | .97     | .41    | .32    |
| IN.         | .33           | .31        | .28        | .34     | .76      | .46      | 1.18            | 4.22    | 3.14    | 1.11    | .48    | .36    |
| AC-FT       | 40,380        | 37,660     | 34,150     | 41,180  | 92,650   | 55,950   | 144,500         | 515,000 | 383,300 | 135,900 | 58,060 | 43,380 |
| CAL YR 1970 | TOTAL 597,024 | MEAN 1,636 | MAX 10,500 | MIN 250 | CFSM .71 | IN 9.70  | AC-FT 1,184,000 |         |         |         |        |        |
| WTR YR 1971 | TOTAL 797,612 | MEAN 2,185 | MAX 11,900 | MIN 350 | CFSM .95 | IN 12.96 | AC-FT 1,582,000 |         |         |         |        |        |

NOTE.--Stage-discharge relation affected by ice Dec. 3 to Jan. 31.

## PEND OREILLE RIVER BASIN

12340500 Clark Fork above Missoula, Mont.

LOCATION.--Lat 46°52'38", long 113°55'53", in NW1/4 sec. 19, T.13 N., R.18 W., Missoula County, on right bank 0.2 mile downstream from county road bridge, 2.8 miles east of Missoula, 2.8 miles downstream from Milltown Dam, 3.0 miles downstream from Blackfoot River, and at mile 361.6.

DRAINAGE AREA.--5,999 sq mi.

PERIOD OF RECORD.--March 1929 to current year. Monthly discharge only for some periods, published in WSP 1316.

GAGE.--Water-stage recorder. Datum of gage is 3,198.30 ft above mean sea level (levels by Corps of Engineers). Prior to May 27, 1929, nonrecording gage.

AVERAGE DISCHARGE.--42 years, 2,950 cfs (2,137,000 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 19,400 cfs May 14 (gage height, 10.14 ft); minimum daily, 700 cfs Jan. 6.

Period of record: Maximum discharge, 31,700 cfs June 10, 1964 (gage height, 13.35 ft); minimum, 115 cfs Oct. 25, 1943 (gage height, 0.64 ft, powerplant shutdown); minimum daily, 340 cfs Sept. 27, 1937.

Flood in June 1908 reached a discharge of 48,000 cfs (furnished by The Montana Power Co.).

REMARKS.--Records excellent except those for winter period, which are fair. Diurnal fluctuation caused by powerplant at Bonner. Diversions for irrigation of about 120,000 acres above station. Records of chemical analyses for the current year are published in Part 2 of this report.

REVISIONS (WATER YEARS).--WSP 1042: 1936. WSP 1152: 1942. WSP 1246: 1929-30, 1935, drainage area. WSP 1316: 1932-33.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT             | NOV     | DEC        | JAN     | FEB        | MAR     | APR     | MAY     | JUN             | JUL     | AUG    | SEP    |
|-------------|-----------------|---------|------------|---------|------------|---------|---------|---------|-----------------|---------|--------|--------|
| 1           | 1,790           | 1,740   | 1,730      | 1,200   | 7,330      | 2,010   | 2,280   | 6,480   | 15,700          | 5,930   | 1,980  | 1,580  |
| 2           | 1,780           | 1,710   | 1,650      | 1,100   | 5,630      | 1,810   | 2,160   | 6,940   | 14,500          | 5,670   | 1,980  | 1,650  |
| 3           | 1,770           | 1,660   | 1,550      | 1,000   | 5,040      | 1,950   | 2,100   | 8,330   | 13,400          | 5,400   | 2,030  | 1,620  |
| 4           | 1,760           | 1,570   | 1,590      | 900     | 4,350      | 1,960   | 2,060   | 10,300  | 13,000          | 5,280   | 1,970  | 1,610  |
| 5           | 1,720           | 1,630   | 1,470      | 800     | 3,900      | 1,850   | 2,180   | 12,800  | 12,900          | 5,020   | 2,010  | 1,580  |
| 6           | 1,780           | 1,730   | 1,480      | 700     | 3,350      | 1,790   | 2,310   | 14,700  | 12,300          | 4,980   | 1,950  | 1,550  |
| 7           | 1,860           | 1,670   | 1,730      | 800     | 3,350      | 1,790   | 2,550   | 14,600  | 11,700          | 4,260   | 1,920  | 1,550  |
| 8           | 1,840           | 1,610   | 1,720      | 1,000   | 3,080      | 1,850   | 2,090   | 14,500  | 12,000          | 4,350   | 1,890  | 1,570  |
| 9           | 1,870           | 1,680   | 1,650      | 1,250   | 2,790      | 1,840   | 2,190   | 15,100  | 13,200          | 4,220   | 1,790  | 1,570  |
| 10          | 1,940           | 1,710   | 1,630      | 1,500   | 2,840      | 1,810   | 2,440   | 15,100  | 13,200          | 4,200   | 1,660  | 1,540  |
| 11          | 2,010           | 1,630   | 1,590      | 1,350   | 3,300      | 1,830   | 2,550   | 15,300  | 12,500          | 4,110   | 1,680  | 1,520  |
| 12          | 2,440           | 1,680   | 1,520      | 1,200   | 3,480      | 1,840   | 3,050   | 15,900  | 11,800          | 3,840   | 1,620  | 1,520  |
| 13          | 1,850           | 1,680   | 1,250      | 1,100   | 3,460      | 1,890   | 2,860   | 17,400  | 11,800          | 3,710   | 1,520  | 1,520  |
| 14          | 1,990           | 1,670   | 1,100      | 1,100   | 3,500      | 1,910   | 2,740   | 18,400  | 11,500          | 3,520   | 1,530  | 1,490  |
| 15          | 1,630           | 1,710   | 1,200      | 1,200   | 3,460      | 1,840   | 2,810   | 16,900  | 11,100          | 3,430   | 1,520  | 1,460  |
| 16          | 1,830           | 1,720   | 1,400      | 1,400   | 3,280      | 1,790   | 2,960   | 15,600  | 10,200          | 3,410   | 1,420  | 1,440  |
| 17          | 1,860           | 1,740   | 1,500      | 1,600   | 2,980      | 1,740   | 3,100   | 14,400  | 9,550           | 3,110   | 1,400  | 1,450  |
| 18          | 1,830           | 1,670   | 1,400      | 1,800   | 2,840      | 1,710   | 3,220   | 13,000  | 8,980           | 3,100   | 1,400  | 1,500  |
| 19          | 1,810           | 1,630   | 1,300      | 2,000   | 2,730      | 1,680   | 3,320   | 11,600  | 8,640           | 2,980   | 1,390  | 1,530  |
| 20          | 1,790           | 1,670   | 1,200      | 2,100   | 2,600      | 1,660   | 3,390   | 10,900  | 8,520           | 2,890   | 1,390  | 1,540  |
| 21          | 1,800           | 1,580   | 1,100      | 2,200   | 2,370      | 1,670   | 3,610   | 9,950   | 8,620           | 2,810   | 1,400  | 1,540  |
| 22          | 1,770           | 1,380   | 1,050      | 2,000   | 2,280      | 2,140   | 3,990   | 9,050   | 8,760           | 2,790   | 1,330  | 1,540  |
| 23          | 1,750           | 1,370   | 1,000      | 1,800   | 2,320      | 1,710   | 4,430   | 8,350   | 9,150           | 2,730   | 1,370  | 1,540  |
| 24          | 1,760           | 1,570   | 950        | 1,800   | 2,340      | 1,750   | 4,880   | 8,110   | 9,200           | 2,630   | 1,330  | 1,530  |
| 25          | 1,720           | 2,170   | 1,000      | 1,850   | 2,320      | 1,800   | 5,880   | 8,300   | 8,740           | 2,520   | 1,310  | 1,530  |
| 26          | 1,700           | 2,000   | 1,050      | 1,900   | 2,190      | 1,880   | 7,120   | 9,150   | 8,180           | 2,440   | 1,300  | 1,500  |
| 27          | 1,720           | 1,850   | 1,100      | 1,950   | 2,010      | 2,010   | 7,170   | 11,000  | 7,700           | 2,370   | 1,280  | 1,520  |
| 28          | 1,750           | 1,740   | 1,150      | 1,890   | 2,020      | 2,140   | 7,010   | 13,600  | 7,260           | 2,340   | 1,260  | 1,640  |
| 29          | 1,850           | 1,740   | 1,200      | 1,870   | -----      | 2,060   | 6,880   | 15,800  | 7,080           | 2,300   | 1,240  | 1,720  |
| 30          | 1,770           | 1,740   | 1,250      | 2,240   | -----      | 2,090   | 6,500   | 16,800  | 6,660           | 2,420   | 1,300  | 1,690  |
| 31          | 1,770           | -----   | 1,300      | 6,330   | -----      | 2,300   | -----   | 17,000  | -----           | 2,270   | 1,520  | -----  |
| TOTAL       | 56,510          | 50,650  | 41,810     | 50,930  | 91,140     | 58,100  | 109,830 | 395,360 | 317,840         | 111,030 | 48,690 | 46,540 |
| MEAN        | 1,823           | 1,688   | 1,349      | 1,643   | 3,255      | 1,874   | 3,661   | 12,750  | 10,590          | 3,582   | 1,571  | 1,551  |
| MAX         | 2,440           | 2,170   | 1,730      | 6,330   | 7,330      | 2,300   | 7,170   | 18,400  | 15,700          | 5,930   | 2,030  | 1,720  |
| MIN         | 1,630           | 1,370   | 950        | 700     | 2,010      | 1,660   | 2,060   | 6,480   | 6,660           | 2,270   | 1,240  | 1,440  |
| AC-FT       | 112,100         | 100,500 | 82,930     | 101,000 | 180,800    | 115,200 | 217,800 | 784,200 | 630,400         | 220,200 | 96,580 | 92,310 |
| CAL YR 1970 | TOTAL 1,175,288 |         | MEAN 3,220 |         | MAX 17,000 |         | MIN 600 |         | AC-FT 2,331,000 |         |        |        |
| WTR YR 1971 | TOTAL 1,378,430 |         | MEAN 3,777 |         | MAX 18,400 |         | MIN 700 |         | AC-FT 2,734,000 |         |        |        |

NOTE.--Stage-discharge relation affected by ice Dec. 13 to Jan. 26.

## PEND OREILLE RIVER BASIN

209

12342500 West Fork Bitterroot River near Conner, Mont.

LOCATION.--Lat 45°43'30", long 114°16'50", in SE 1/4 NW 1/4 sec. 26, T.1 S., R.22 W., Ravalli County, on right bank 0.6 mile downstream from Painted Rocks Lake (formerly West Fork Bitterroot River Reservoir), 6.4 miles upstream from Nez Perce Creek, 16.1 miles southwest of Conner, and at mile 19.2.

DRAINAGE AREA.--317 sq mi.

PERIOD OF RECORD.--April 1941 to current year.

GAGE.--Water-stage recorder. Datum of gage is 4,581.4 ft above mean sea level (Forest Service bench mark).

AVERAGE DISCHARGE.--30 years, 290 cfs (210,100 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 2,780 cfs May 13 (gage height, 5.16 ft); minimum daily, 108 cfs Sept. 15-30.

Period of record: Maximum discharge, 4,060 cfs May 9, 1947 (gage height, 6.18 ft); minimum, 0.2 cfs Nov. 25, 1952; minimum daily, 0.6 cfs May 3-7, 1954.

REMARKS.--Records excellent. Flow regulated by Painted Rocks Lake (see p. 233). Diversions for irrigation of about 200 acres above station.

REVISIONS.--WSP 1246: Drainage area.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT   | NOV     | DEC   | JAN   | FEB   | MAR   | APR    | MAY     | JUN    | JUL     | AUG   | SEP   |
|-------------|-------|---------|-------|-------|-------|-------|--------|---------|--------|---------|-------|-------|
| 1           | 114   | 114     | 112   | 109   | 110   | 114   | 267    | 294     | 2,310  | 574     | 153   | 125   |
| 2           | 114   | 114     | 112   | 109   | 112   | 114   | 266    | 496     | 2,090  | 535     | 150   | 125   |
| 3           | 114   | 114     | 112   | 109   | 112   | 114   | 266    | 1,260   | 1,880  | 513     | 169   | 125   |
| 4           | 114   | 114     | 112   | 109   | 112   | 114   | 266    | 1,730   | 1,780  | 476     | 169   | 125   |
| 5           | 114   | 114     | 112   | 109   | 112   | 114   | 266    | 2,460   | 1,730  | 449     | 160   | 125   |
| 6           | 114   | 114     | 112   | 109   | 112   | 114   | 266    | 2,430   | 1,690  | 423     | 153   | 125   |
| 7           | 114   | 114     | 112   | 109   | 112   | 114   | 266    | 2,090   | 1,690  | 402     | 148   | 125   |
| 8           | 114   | 114     | 112   | 109   | 112   | 114   | 266    | 2,050   | 1,810  | 380     | 148   | 123   |
| 9           | 114   | 114     | 112   | 109   | 112   | 114   | 269    | 2,040   | 2,020  | 362     | 148   | 123   |
| 10          | 114   | 114     | 112   | 109   | 112   | 114   | 269    | 2,100   | 1,980  | 334     | 148   | 123   |
| 11          | 114   | 113     | 112   | 109   | 112   | 114   | 269    | 2,180   | 1,870  | 324     | 148   | 123   |
| 12          | 114   | 114     | 112   | 109   | 112   | 114   | 269    | 2,390   | 1,740  | 314     | 148   | 123   |
| 13          | 114   | 114     | 112   | 109   | 112   | 114   | 269    | 2,680   | 1,700  | 302     | 148   | 123   |
| 14          | 114   | 112     | 112   | 109   | 114   | 114   | 269    | 2,680   | 1,690  | 287     | 148   | 118   |
| 15          | 113   | 112     | 112   | 109   | 114   | 114   | 271    | 2,340   | 1,610  | 275     | 148   | 108   |
| 16          | 112   | 112     | 112   | 109   | 114   | 114   | 273    | 2,160   | 1,490  | 264     | 143   | 108   |
| 17          | 112   | 112     | 112   | 109   | 114   | 114   | 273    | 1,940   | 1,390  | 254     | 133   | 108   |
| 18          | 112   | 112     | 112   | 109   | 114   | 114   | 273    | 1,670   | 1,290  | 242     | 133   | 108   |
| 19          | 114   | 112     | 112   | 109   | 114   | 114   | 274    | 1,440   | 1,210  | 236     | 133   | 108   |
| 20          | 114   | 112     | 112   | 109   | 114   | 114   | 276    | 1,260   | 1,140  | 235     | 133   | 108   |
| 21          | 114   | 112     | 112   | 109   | 114   | 114   | 276    | 1,090   | 1,040  | 231     | 133   | 108   |
| 22          | 114   | 112     | 112   | 109   | 114   | 114   | 277    | 972     | 1,080  | 217     | 133   | 108   |
| 23          | 114   | 112     | 110   | 109   | 114   | 143   | 280    | 887     | 1,080  | 211     | 133   | 108   |
| 24          | 114   | 112     | 111   | 109   | 114   | 170   | 281    | 882     | 1,020  | 202     | 133   | 108   |
| 25          | 114   | 112     | 109   | 109   | 114   | 170   | 285    | 949     | 945    | 190     | 133   | 108   |
| 26          | 114   | 112     | 109   | 109   | 114   | 199   | 288    | 1,170   | 940    | 181     | 133   | 108   |
| 27          | 114   | 112     | 109   | 109   | 114   | 224   | 290    | 1,630   | 884    | 175     | 133   | 108   |
| 28          | 112   | 112     | 109   | 109   | 114   | 224   | 290    | 2,200   | 777    | 169     | 133   | 108   |
| 29          | 114   | 112     | 109   | 109   | ----- | 224   | 290    | 2,670   | 707    | 166     | 133   | 108   |
| 30          | 114   | 112     | 109   | 109   | ----- | 224   | 293    | 2,710   | 631    | 166     | 130   | 108   |
| 31          | 114   | -----   | 109   | 109   | ----- | 245   | -----  | 2,530   | -----  | 160     | 125   | ----- |
| TOTAL       | 3,525 | 3,385   | 3,448 | 3,379 | 3,164 | 4,331 | 8,233  | 55,380  | 43,214 | 9,249   | 4,413 | 3,459 |
| MEAN        | 114   | 113     | 111   | 109   | 113   | 140   | 274    | 1,786   | 1,440  | 298     | 142   | 115   |
| MAX         | 114   | 114     | 112   | 109   | 114   | 245   | 293    | 2,710   | 2,310  | 574     | 169   | 125   |
| MIN         | 112   | 112     | 109   | 109   | 110   | 114   | 266    | 294     | 631    | 160     | 125   | 108   |
| AC-FT       | 6,990 | 6,710   | 6,840 | 6,700 | 6,280 | 8,590 | 16,330 | 109,800 | 85,710 | 18,350  | 8,750 | 6,860 |
| CAL YR 1970 | TOTAL | 112,442 | MEAN  | 308   | MAX   | 2,490 | MIN    | 92      | AC-FT  | 223,000 |       |       |
| WTR YR 1971 | TOTAL | 145,180 | MEAN  | 398   | MAX   | 2,710 | MIN    | 108     | AC-FT  | 288,000 |       |       |

12343400 East Fork Bitterroot River near Conner, Mont.

LOCATION.--Lat 45°53'00", long 114°03'53", in NE 1/4 sec. 34, T.2 N., R.20 W., Ravalli County, on right bank 10 ft downstream from private bridge, 4.3 miles southeast of Conner, and 5.0 miles upstream from confluence with West Fork.

DRAINAGE AREA.--381 sq mi.

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

GAGE.--Water-stage recorder. Datum of gage is 4,191.81 ft above mean sea level.

AVERAGE DISCHARGE.--15 years, 287 cfs (10.23 inches per year, 207,900 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 2,650 cfs May 29 (gage height, 6.37 ft); minimum daily, 35 cfs Jan. 5.

Period of record: Maximum discharge, 3,270 cfs June 8, 1964, and June 12, 1965; minimum observed, 23 cfs Nov. 29, 1960, result of discharge measurement.

REMARKS.--Records good except those for winter period, which are poor. Diversions for irrigation of about 2,200 acres above station.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT   | NOV     | DEC   | JAN   | FEB   | MAR   | APR    | MAY    | JUN    | JUL    | AUG   | SEP   |       |         |
|-------------|-------|---------|-------|-------|-------|-------|--------|--------|--------|--------|-------|-------|-------|---------|
| 1           | 114   | 106     | 109   | 65    | 230   | 95    | 147    | 537    | 2,100  | 632    | 169   | 135   |       |         |
| 2           | 113   | 101     | 103   | 50    | 183   | 87    | 151    | 682    | 1,850  | 605    | 161   | 138   |       |         |
| 3           | 112   | 92      | 100   | 45    | 159   | 112   | 152    | 914    | 1,670  | 577    | 180   | 140   |       |         |
| 4           | 108   | 100     | 103   | 40    | 135   | 109   | 150    | 1,170  | 1,630  | 535    | 177   | 137   |       |         |
| 5           | 109   | 113     | 85    | 35    | 130   | 102   | 163    | 1,460  | 1,570  | 510    | 177   | 132   |       |         |
| 6           | 123   | 113     | 119   | 50    | 84    | 93    | 194    | 1,380  | 1,550  | 490    | 172   | 127   |       |         |
| 7           | 119   | 110     | 111   | 70    | 123   | 109   | 224    | 1,420  | 1,550  | 465    | 169   | 129   |       |         |
| 8           | 117   | 108     | 113   | 85    | 120   | 106   | 205    | 1,490  | 1,680  | 445    | 158   | 128   |       |         |
| 9           | 120   | 107     | 105   | 95    | 118   | 104   | 207    | 1,520  | 1,860  | 435    | 150   | 126   |       |         |
| 10          | 128   | 112     | 97    | 85    | 149   | 106   | 221    | 1,590  | 1,740  | 415    | 143   | 126   |       |         |
| 11          | 122   | 102     | 92    | 75    | 172   | 107   | 204    | 1,660  | 1,660  | 396    | 140   | 122   |       |         |
| 12          | 145   | 108     | 75    | 65    | 150   | 111   | 198    | 1,900  | 1,520  | 378    | 138   | 119   |       |         |
| 13          | 148   | 104     | 50    | 55    | 142   | 110   | 190    | 2,250  | 1,580  | 360    | 136   | 115   |       |         |
| 14          | 126   | 90      | 80    | 65    | 140   | 105   | 203    | 2,160  | 1,590  | 344    | 130   | 112   |       |         |
| 15          | 116   | 92      | 105   | 75    | 141   | 104   | 259    | 1,880  | 1,450  | 328    | 130   | 112   |       |         |
| 16          | 116   | 107     | 100   | 85    | 131   | 96    | 255    | 1,870  | 1,320  | 308    | 130   | 114   |       |         |
| 17          | 116   | 103     | 95    | 95    | 122   | 100   | 255    | 1,630  | 1,260  | 296    | 130   | 116   |       |         |
| 18          | 114   | 100     | 80    | 105   | 126   | 92    | 258    | 1,420  | 1,180  | 273    | 136   | 117   |       |         |
| 19          | 112   | 98      | 75    | 120   | 120   | 91    | 241    | 1,270  | 1,140  | 248    | 128   | 116   |       |         |
| 20          | 111   | 99      | 75    | 140   | 95    | 105   | 276    | 1,170  | 1,120  | 234    | 118   | 115   |       |         |
| 21          | 115   | 86      | 80    | 130   | 87    | 113   | 350    | 1,030  | 1,090  | 238    | 114   | 114   |       |         |
| 22          | 116   | 50      | 70    | 120   | 110   | 107   | 352    | 934    | 1,170  | 231    | 111   | 113   |       |         |
| 23          | 115   | 92      | 65    | 110   | 127   | 111   | 440    | 876    | 1,140  | 220    | 113   | 112   |       |         |
| 24          | 122   | 158     | 70    | 100   | 121   | 122   | 492    | 907    | 1,060  | 214    | 115   | 108   |       |         |
| 25          | 111   | 180     | 75    | 95    | 113   | 123   | 480    | 953    | 984    | 201    | 115   | 109   |       |         |
| 26          | 113   | 137     | 70    | 95    | 101   | 128   | 459    | 1,150  | 988    | 195    | 113   | 119   |       |         |
| 27          | 108   | 120     | 70    | 95    | 94    | 143   | 433    | 1,510  | 948    | 186    | 110   | 127   |       |         |
| 28          | 97    | 117     | 70    | 95    | 105   | 126   | 414    | 1,910  | 849    | 180    | 108   | 128   |       |         |
| 29          | 106   | 108     | 75    | 100   | ----- | 129   | 428    | 2,510  | 777    | 177    | 107   | 122   |       |         |
| 30          | 103   | 116     | 75    | 200   | ----- | 164   | 476    | 2,480  | 683    | 175    | 133   | 123   |       |         |
| 31          | 103   | -----   | 75    | 331   | ----- | 171   | -----  | 2,310  | -----  | 172    | 145   | ----- |       |         |
| TOTAL       | 3,598 | 3,229   | 2,667 | 2,971 | 3,628 | 3,481 | 8,477  | 45,943 | 40,709 | 10,463 | 4,256 | 3,651 |       |         |
| MEAN        | 116   | 108     | 86.0  | 95.8  | 130   | 112   | 283    | 1,482  | 1,357  | 338    | 137   | 122   |       |         |
| MAX         | 148   | 180     | 119   | 331   | 230   | 171   | 492    | 2,510  | 2,100  | 632    | 180   | 140   |       |         |
| MIN         | 97    | 50      | 50    | 35    | 84    | 87    | 147    | 537    | 683    | 172    | 107   | 108   |       |         |
| CFSM        | .30   | .28     | .23   | .25   | .34   | .29   | .74    | 3.89   | 3.56   | .89    | .36   | .32   |       |         |
| IN.         | .35   | .32     | .26   | .29   | .35   | .34   | .83    | 4.49   | 3.97   | 1.02   | .42   | .36   |       |         |
| AC-FT       | 7,140 | 6,400   | 5,290 | 5,890 | 7,200 | 6,900 | 16,810 | 91,130 | 80,750 | 20,750 | 8,440 | 7,240 |       |         |
| CAL YR 1970 | TOTAL | 109,032 | MEAN  | 299   | MAX   | 2,360 | MIN    | 45     | CFSM   | .78    | IN    | 10.65 | AC-FT | 216,300 |
| WTR YR 1971 | TOTAL | 133,073 | MEAN  | 365   | MAX   | 2,510 | MIN    | 35     | CFSM   | .96    | IN    | 12.99 | AC-FT | 264,000 |

PEAK DISCHARGE (BASE, 700 CFS)

| DATE | TIME | G.HT. | DISCHARGE | DATE | TIME | G.HT. | DISCHARGE |
|------|------|-------|-----------|------|------|-------|-----------|
| 5-13 | 2230 | 6.16  | 2,320     | 6-9  | 0430 | 5.91  | 1,990     |
| 5-29 | 0530 | 6.37  | 2,650     |      |      |       |           |

NOTE.--Stage-discharge relation affected by ice Dec. 13 to Jan. 30.



## 211

LOCATION.--Lat 45°58'20", long 114°08'26", in SW 1/4 sec.36, T.3 N., R.21 W., Ravalli County, on left bank 45 ft downstream from bridge on U.S. Highway 93, 0.3 mile downstream from Chaffin Creek, 4.1 miles south-east of Darby, and at mile 77.2.

REVISIONS.--WSP 1246: Drainage area.

| DAY   | OCT    | NOV    | DEC   | JAN    | FEB    | MAR    | APR    | MAY     | JUN     | JUL    | AUG    | SEP   |
|-------|--------|--------|-------|--------|--------|--------|--------|---------|---------|--------|--------|-------|
| 1     | 333    | 321    | 349   | 271    | 1,620  | 349    | 710    | 1,940   | 6,640   | 2,020  | 527    | 318   |
| 2     | 321    | 314    | 329   | 230    | 1,345  | 345    | 703    | 2,460   | 5,760   | 2,030  | 504    | 321   |
| 3     | 318    | 295    | 318   | 220    | 1,000  | 406    | 703    | 3,840   | 5,100   | 1,910  | 551    | 325   |
| 4     | 314    | 303    | 318   | 210    | 804    | 379    | 703    | 5,050   | 4,950   | 1,820  | 563    | 318   |
| 5     | 310    | 333    | 281   | 290    | 661    | 361    | 745    | 7,030   | 4,810   | 1,750  | 551    | 307   |
| 6     | 337    | 337    | 349   | 250    | 510    | 337    | 852    | 6,750   | 4,740   | 1,730  | 539    | 299   |
| 7     | 333    | 333    | 349   | 314    | 545    | 357    | 976    | 5,940   | 4,850   | 1,570  | 499    | 307   |
| 8     | 321    | 325    | 353   | 318    | 510    | 357    | 958    | 5,900   | 5,330   | 1,500  | 471    | 299   |
| 9     | 329    | 325    | 337   | 329    | 493    | 349    | 967    | 5,860   | 6,060   | 1,510  | 445    | 292   |
| 10    | 349    | 333    | 314   | 321    | 640    | 353    | 994    | 6,200   | 5,470   | 1,540  | 420    | 288   |
| 11    | 333    | 314    | 303   | 285    | 759    | 353    | 949    | 6,350   | 5,180   | 1,490  | 406    | 285   |
| 12    | 406    | 325    | 274   | 280    | 682    | 361    | 916    | 6,990   | 4,920   | 1,360  | 388    | 281   |
| 13    | 445    | 318    | 245   | 250    | 668    | 357    | 876    | 8,120   | 4,990   | 1,280  | 379    | 278   |
| 14    | 348    | 290    | 268   | 270    | 668    | 341    | 908    | 7,930   | 5,030   | 1,270  | 370    | 274   |
| 15    | 361    | 292    | 333   | 288    | 668    | 337    | 1,080  | 6,620   | 4,580   | 1,230  | 365    | 264   |
| 16    | 357    | 318    | 329   | 288    | 627    | 325    | 1,120  | 6,220   | 4,260   | 1,190  | 361    | 271   |
| 17    | 353    | 310    | 299   | 341    | 582    | 321    | 1,100  | 5,450   | 4,040   | 1,230  | 349    | 274   |
| 18    | 353    | 307    | 278   | 337    | 563    | 307    | 1,080  | 4,610   | 3,780   | 1,160  | 349    | 274   |
| 19    | 345    | 303    | 271   | 341    | 539    | 307    | 1,000  | 3,990   | 3,680   | 1,060  | 337    | 278   |
| 20    | 337    | 307    | 268   | 430    | 471    | 325    | 1,080  | 3,570   | 3,730   | 1,060  | 325    | 281   |
| 21    | 337    | 285    | 292   | 383    | 406    | 337    | 1,250  | 3,150   | 3,680   | 1,000  | 318    | 281   |
| 22    | 341    | 279    | 281   | 353    | 460    | 337    | 1,290  | 2,840   | 3,990   | 932    | 310    | 278   |
| 23    | 345    | 254    | 254   | 341    | 493    | 357    | 1,640  | 2,650   | 4,060   | 860    | 310    | 274   |
| 24    | 361    | 430    | 295   | 333    | 466    | 430    | 1,880  | 2,720   | 3,810   | 804    | 310    | 268   |
| 25    | 341    | 369    | 292   | 321    | 440    | 440    | 1,850  | 3,060   | 3,480   | 759    | 303    | 268   |
| 26    | 333    | 455    | 278   | 329    | 397    | 471    | 1,790  | 3,700   | 3,370   | 696    | 299    | 278   |
| 27    | 321    | 397    | 281   | 333    | 370    | 557    | 1,680  | 5,010   | 3,010   | 654    | 295    | 295   |
| 28    | 310    | 383    | 285   | 318    | 397    | 533    | 1,610  | 6,500   | 2,660   | 627    | 292    | 299   |
| 29    | 318    | 357    | 292   | 314    | -----  | 533    | 1,610  | 8,120   | 2,380   | 601    | 292    | 295   |
| 30    | 314    | 365    | 281   | 440    | -----  | 614    | 1,740  | 7,930   | 2,120   | 575    | 325    | 292   |
| 31    | 314    | -----  | 292   | 1,310  | -----  | 703    | -----  | 7,470   | -----   | 551    | 329    | ----- |
| TOTAL | 10,578 | 10,037 | 9,288 | 10,548 | 17,779 | 12,239 | 34,760 | 163,970 | 130,460 | 37,769 | 12,082 | 8,662 |
| MEAN  | 341    | 335    | 300   | 340    | 635    | 395    | 1,159  | 5,289   | 4,349   | 1,218  | 390    | 289   |
| MAX   | 445    | 569    | 353   | 1,310  | 1,620  | 703    | 1,880  | 8,120   | 6,640   | 2,030  | 563    | 325   |
| MIN   | 310    | 229    | 245   | 200    | 370    | 307    | 703    | 1,940   | 2,120   | 551    | 292    | 264   |
| AC-FT | 20,980 | 19,9   |       |        |        |        |        |         |         |        |        |       |

## PEND OREILLE RIVER BASIN

12346500 Skalkaho Creek near Hamilton, Mont.

LOCATION.--Lat 46°09'43", long 113°57'08", in SW1/4 sec.27, T.5 N., R.19 W., Ravalli County, Bitterroot National Forest, on right bank 2 miles downstream from Daly Creek, 11.4 miles southwest of Hamilton, and at mile 12.0.

DRAINAGE AREA.--87.8 sq mi.

PERIOD OF RECORD.--December 1948 to September 1953, August 1957 to current year. April 1920 to September 1924 at site 3 miles downstream; records not equivalent owing to inflow.

GAGE.--Water-stage recorder. Datum of gage is 4,393.16 ft above mean sea level (Bureau of Public Roads bench mark).

AVERAGE DISCHARGE.--18 years (1949-53, 1957-71), 92.9 cfs (14.37 inches per year, 67,310 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 652 cfs May 29 (gage height, 4.14 ft); minimum daily, 17 cfs Jan. 5.

Period of record: Maximum discharge, 844 cfs June 12, 1965 (gage height, 4.36 ft); maximum gage height recorded, 5.18 ft Feb. 29, 1960 (backwater from ice); minimum discharge recorded, 10 cfs Apr. 2, 1953 (gage height, 1.26 ft, backwater from ice).

Flood of May 20, 1954, reached a stage of 4.65 ft, present site and datum, from floodmarks (discharge, 935 cfs).

REMARKS.--Records good except those for winter period, which are poor. During irrigation season flow is supplemented by releases from Kent and Dam Creek Lakes (combined capacity, 200 acre-ft).

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY   | OCT   | NOV   | DEC   | JAN   | FEB   | MAR   | APR   | MAY    | JUN    | JUL   | AUG   | SEP   |
|-------|-------|-------|-------|-------|-------|-------|-------|--------|--------|-------|-------|-------|
| 1     | 45    | 40    | 36    | 25    | 39    | 26    | 28    | 84     | 490    | 243   | 84    | 56    |
| 2     | 44    | 39    | 35    | 23    | 37    | 25    | 28    | 113    | 430    | 235   | 82    | 56    |
| 3     | 44    | 38    | 34    | 21    | 34    | 25    | 28    | 155    | 422    | 219   | 82    | 54    |
| 4     | 43    | 38    | 34    | 19    | 33    | 26    | 28    | 193    | 426    | 203   | 81    | 53    |
| 5     | 44    | 41    | 30    | 17    | 32    | 27    | 30    | 275    | 430    | 196   | 79    | 52    |
| 6     | 47    | 41    | 41    | 19    | 31    | 28    | 33    | 251    | 430    | 191   | 78    | 51    |
| 7     | 45    | 40    | 38    | 21    | 30    | 29    | 36    | 251    | 435    | 179   | 75    | 52    |
| 8     | 45    | 39    | 35    | 23    | 29    | 29    | 33    | 275    | 505    | 172   | 74    | 49    |
| 9     | 46    | 39    | 35    | 25    | 30    | 28    | 34    | 300    | 530    | 170   | 70    | 48    |
| 10    | 48    | 39    | 32    | 24    | 31    | 27    | 35    | 326    | 466    | 166   | 69    | 47    |
| 11    | 45    | 38    | 31    | 23    | 32    | 27    | 35    | 346    | 430    | 157   | 68    | 46    |
| 12    | 51    | 39    | 28    | 21    | 33    | 27    | 34    | 394    | 418    | 149   | 67    | 45    |
| 13    | 48    | 39    | 27    | 19    | 34    | 27    | 34    | 444    | 453    | 143   | 65    | 45    |
| 14    | 45    | 36    | 29    | 21    | 33    | 27    | 38    | 422    | 448    | 137   | 64    | 45    |
| 15    | 43    | 36    | 31    | 23    | 33    | 27    | 44    | 398    | 435    | 133   | 63    | 45    |
| 16    | 43    | 37    | 29    | 25    | 31    | 26    | 41    | 390    | 430    | 128   | 62    | 45    |
| 17    | 43    | 37    | 28    | 27    | 31    | 25    | 41    | 368    | 414    | 126   | 62    | 45    |
| 18    | 43    | 37    | 27    | 28    | 30    | 24    | 41    | 329    | 408    | 121   | 62    | 45    |
| 19    | 44    | 36    | 26    | 29    | 30    | 25    | 41    | 306    | 418    | 117   | 60    | 45    |
| 20    | 44    | 36    | 25    | 27    | 29    | 26    | 45    | 281    | 410    | 114   | 59    | 45    |
| 21    | 44    | 30    | 23    | 25    | 28    | 27    | 52    | 257    | 422    | 111   | 58    | 44    |
| 22    | 45    | 25    | 21    | 24    | 29    | 27    | 55    | 237    | 430    | 108   | 57    | 43    |
| 23    | 43    | 30    | 20    | 23    | 30    | 27    | 66    | 232    | 430    | 103   | 58    | 43    |
| 24    | 44    | 35    | 22    | 24    | 31    | 27    | 68    | 246    | 426    | 100   | 57    | 43    |
| 25    | 43    | 40    | 24    | 24    | 29    | 27    | 68    | 275    | 406    | 97    | 55    | 42    |
| 26    | 42    | 41    | 23    | 24    | 28    | 28    | 66    | 339    | 379    | 96    | 54    | 44    |
| 27    | 41    | 39    | 22    | 25    | 27    | 28    | 64    | 410    | 343    | 93    | 53    | 48    |
| 28    | 41    | 39    | 23    | 26    | 27    | 27    | 63    | 510    | 326    | 92    | 52    | 45    |
| 29    | 40    | 37    | 24    | 28    | ----- | 28    | 64    | 581    | 290    | 90    | 52    | 44    |
| 30    | 40    | 38    | 25    | 33    | ----- | 31    | 70    | 540    | 257    | 88    | 66    | 44    |
| 31    | 40    | ----- | 26    | 41    | ----- | 30    | ----- | 525    | -----  | 85    | 59    | ----- |
| TOTAL | 1,363 | 1,119 | 884   | 757   | 871   | 838   | 1,343 | 10,053 | 12,535 | 4,362 | 2,027 | 1,409 |
| MEAN  | 44.0  | 37.3  | 28.5  | 24.4  | 31.1  | 27.0  | 44.8  | 324    | 418    | 141   | 65.4  | 47.0  |
| MAX   | 51    | 41    | 41    | 41    | 39    | 31    | 70    | 581    | 530    | 243   | 84    | 56    |
| MIN   | 40    | 25    | 20    | 17    | 27    | 24    | 28    | 84     | 257    | 85    | 52    | 42    |
| CFSM  | .50   | .42   | .32   | .28   | .35   | .31   | .51   | 3.69   | 4.76   | 1.61  | .74   | .54   |
| IN.   | .58   | .47   | .37   | .32   | .37   | .36   | .57   | 4.26   | 5.31   | 1.85  | .86   | .60   |
| AC-FT | 2,700 | 2,220 | 1,750 | 1,580 | 1,730 | 1,660 | 2,660 | 19,940 | 24,860 | 8,650 | 4,020 | 2,790 |

CAL YR 1970 TOTAL 33,905 MEAN 92.9 MAX 640 MIN 17 CFSM 1.06 IN 14.37 AC-FT 67,250  
WTR YR 1971 TOTAL 37,561 MEAN 103 MAX 581 MIN 17 CFSM 1.17 IN 15.91 AC-FT 74,500

## PEAK DISCHARGE (BASE, 400 CFS)

| DATE | TIME | G.HT. | DISCHARGE | DATE | TIME | G.HT. | DISCHARGE |
|------|------|-------|-----------|------|------|-------|-----------|
| 5-13 | 1800 | 3.80  | 475       | 6-8  | 2330 | 3.99  | 570       |
| 5-29 | 0030 | 4.14  | 652       |      |      |       |           |

NOTE.--Stage-discharge relation affected by ice Dec. 11 to Jan. 29.

## 213

LOCATION.--Lat 46°52'09", long 114°07'33", in NW1/4SE1/4 sec.21, T.13 N., R.20 W., Missoula County, on right bank 1.0 mile downstream from Bitterroot River, 4.5 miles west of Missoula, and at mile 349.5.

PERIOD OF RECORD.--October 1929 to current year.

AVERAGE DISCHARGE.--42 years, 5,387 cfs (3,903,000 acre-ft per year).

Period of record: Maximum discharge, 52,800 cfs May 23, 1948 (gage height, 12.08 ft); minimum, 388 cfs Jan. 18, 1933; minimum gage height, 0.30 ft about Jan. 16, 1954, Mar. 24, 1964.

REVISIONS (WATER YEARS).--WSP 1042: 1931. WSP 1246: Drainage area. WSP 1316: 1932(M), 1935(M), 1946(M).

| DAY | OCT   | NOV   | DEC   | JAN   | FEB    | MAR   | APR    | MAY    | JUN    | JUL    | AUG   | SEP   |
|-----|-------|-------|-------|-------|--------|-------|--------|--------|--------|--------|-------|-------|
| 1   | 2,930 | 2,820 | 3,080 | 2,420 | 12,300 | 3,530 | 3,890  | 10,600 | 32,900 | 11,600 | 3,280 | 2,330 |
| 2   | 2,860 | 2,800 | 2,990 | 2,110 | 11,400 | 3,190 | 3,810  | 11,700 | 30,500 | 11,300 | 3,140 | 2,490 |
| 3   | 2,830 | 2,760 | 2,840 | 1,730 | 9,580  | 3,380 | 3,750  | 14,700 | 27,900 | 10,900 | 3,150 | 2,560 |
| 4   | 2,790 | 2,640 | 2,800 | 1,590 | 8,060  | 3,450 | 3,690  | 19,500 | 26,700 | 10,400 | 3,170 | 2,560 |
| 5   | 2,720 | 2,680 | 2,610 | 1,430 | 7,030  | 3,280 | 3,790  | 25,400 | 26,400 | 10,100 | 3,210 | 2,560 |
| 6   | 2,740 | 2,800 | 2,620 | 1,340 | 5,900  | 3,150 | 4,040  | 30,300 | 25,400 | 9,830  | 3,120 | 2,510 |
| 7   | 2,840 | 2,780 | 2,950 | 1,440 | 5,480  | 3,150 | 4,540  | 29,700 | 24,300 | 9,080  | 3,100 | 2,480 |
| 8   | 2,880 | 2,690 | 3,010 | 1,890 | 5,130  | 3,230 | 4,540  | 28,200 | 25,200 | 8,500  | 3,030 | 2,510 |
| 9   | 2,880 | 2,730 | 2,940 | 2,460 | 4,700  | 3,190 | 4,770  | 28,800 | 27,700 | 8,150  | 2,900 | 2,530 |
| 10  | 2,970 | 2,770 | 2,870 | 2,890 | 4,970  | 3,140 | 5,280  | 29,300 | 28,400 | 8,400  | 2,690 | 2,490 |
| 11  | 3,020 | 2,710 | 2,790 | 2,790 | 5,870  | 3,170 | 5,280  | 30,300 | 26,300 | 8,400  | 2,620 | 2,420 |
| 12  | 3,390 | 2,700 | 2,680 | 2,330 | 6,080  | 3,170 | 5,260  | 31,200 | 24,900 | 7,910  | 2,510 | 2,390 |
| 13  | 2,930 | 2,730 | 2,250 | 2,020 | 5,870  | 3,230 | 5,110  | 33,600 | 24,020 | 7,420  | 2,390 | 2,370 |
| 14  | 3,240 | 2,700 | 1,960 | 1,980 | 5,950  | 3,240 | 5,130  | 35,900 | 25,100 | 7,030  | 2,310 | 2,300 |
| 15  | 2,950 | 2,700 | 2,180 | 2,210 | 5,920  | 3,140 | 5,410  | 33,400 | 24,300 | 6,800  | 2,300 | 2,250 |
| 16  | 2,980 | 2,700 | 2,650 | 2,580 | 5,710  | 3,060 | 5,920  | 30,200 | 21,700 | 6,630  | 2,200 | 2,240 |
| 17  | 3,060 | 2,740 | 2,740 | 3,620 | 5,310  | 2,970 | 6,080  | 28,400 | 20,300 | 6,550  | 2,110 | 2,250 |
| 18  | 3,020 | 2,690 | 2,580 | 4,120 | 5,060  | 2,920 | 6,140  | 24,800 | 19,200 | 6,350  | 2,070 | 2,300 |
| 19  | 2,990 | 2,620 | 2,300 | 3,620 | 4,870  | 2,870 | 6,080  | 21,600 | 18,700 | 6,110  | 2,060 | 2,340 |
| 20  | 2,960 | 2,660 | 2,100 | 4,160 | 4,660  | 2,840 | 6,080  | 19,700 | 19,200 | 5,790  | 2,030 | 2,370 |
| 21  | 2,950 | 2,590 | 2,080 | 4,250 | 4,230  | 2,850 | 6,860  | 17,700 | 19,600 | 5,660  | 2,010 | 2,400 |
| 22  | 2,950 | 2,320 | 2,160 | 3,560 | 4,060  | 3,280 | 7,420  | 15,900 | 20,100 | 5,510  | 1,990 | 2,420 |
| 23  | 2,920 | 2,010 | 1,990 | 3,340 | 4,170  | 2,940 | 8,310  | 14,500 | 21,400 | 5,230  | 1,950 | 2,420 |
| 24  | 2,940 | 2,490 | 1,900 | 3,380 | 4,170  | 2,990 | 9,650  | 14,100 | 21,700 | 4,920  | 1,960 | 2,420 |
| 25  | 2,940 | 3,760 | 2,100 | 3,400 | 4,100  | 3,120 | 11,000 | 14,900 | 20,200 | 4,610  | 1,950 | 2,400 |
| 26  | 2,860 | 3,850 | 2,270 | 3,300 | 3,890  | 3,240 | 12,200 | 17,000 | 19,400 | 4,390  | 1,950 | 2,390 |
| 27  | 2,870 | 3,510 | 2,160 | 3,380 | 3,570  | 3,470 | 11,900 | 21,300 | 17,700 | 4,080  | 1,950 | 2,420 |
| 28  | 2,850 | 3,270 | 2,090 | 3,360 | 3,550  | 3,550 | 11,300 | 27,100 | 15,800 | 3,890  | 1,900 | 2,560 |
| 29  | 2,930 | 3,170 | 2,340 | 3,280 | -----  | 3,450 | 10,800 | 32,000 | 14,600 | 3,710  | 1,830 | 2,650 |
| 30  | 2,840 | 3,130 | 2,430 | 3,510 | -----  | 3,530 | 10,400 | 35,000 | 13,100 | 3,710  | 1,900 | 2,670 |
| 31  | 2,840 | ----- |       |       |        |       |        |        |        |        |       |       |

12354000 St Regis River near St. Regis, Mont.

LOCATION.--Lat 47°17'49", long 115°07'18", near center of NW¼NE¼ sec.26, T.18 N., R.28 W., Mineral County, on left bank 70 ft downstream from road bridge, 500 ft upstream from Little Joe Creek, 1.2 miles west of St. Regis, and 1.7 miles upstream from mouth.

DRAINAGE AREA.--303 sq mi.

PERIOD OF RECORD.--September 1910 to September 1917 (no winter records), September 1958 to current year. Monthly discharge only for some periods, published in WSP 1316, 1736.

GAGE.--Water-stage recorder. Datum of gage is 2,645.00 ft above mean sea level. September 1910 to September 1917, nonrecording gage at site 2 miles upstream at different datum.

AVERAGE DISCHARGE.--13 years, 566 cfs (25.37 inches per year, 410,100 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 5,620 cfs May 13 (gage height, 6.67 ft); minimum daily, 90 cfs Jan. 4.

Period of record: Maximum discharge observed, 7,740 cfs May 28, 1917 (gage height, 8.65 ft, site and datum then in use); minimum, 41 cfs Dec. 30, 1968 (gage height, 1.97 ft), result of freezeup, but may have been less during period of ice effect Dec. 9-14, 1961.

Flood of about Dec. 20, 1933, reached a stage of about 14.5 ft, from information by local residents (discharge unknown). Flood of May 19, 1954, reached a discharge of about 11,000 cfs (gage height, 9.4 ft), from rating curve extended above 5,100 cfs.

REMARKS.--Records good. Minor diversions for irrigation of hay meadows above station.

REVISIONS (WATER YEARS).--WSP 1246: 1912, drainage area. WSP 1316: 1911.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY   | OCT   | NOV   | DEC   | JAN    | FEB    | MAR    | APR    | MAY     | JUN     | JUL    | AUG    | SEP   |
|-------|-------|-------|-------|--------|--------|--------|--------|---------|---------|--------|--------|-------|
| 1     | 108   | 105   | 183   | 120    | 1,660  | 452    | 458    | 1,720   | 2,550   | 1,020  | 275    | 182   |
| 2     | 105   | 105   | 173   | 110    | 1,400  | 410    | 476    | 2,150   | 2,510   | 990    | 265    | 230   |
| 3     | 105   | 100   | 166   | 100    | 1,170  | 446    | 488    | 3,140   | 2,300   | 943    | 265    | 195   |
| 4     | 105   | 98    | 152   | 90     | 1,010  | 422    | 528    | 4,230   | 2,150   | 889    | 260    | 174   |
| 5     | 103   | 105   | 140   | 100    | 854    | 398    | 584    | 4,840   | 2,060   | 844    | 245    | 162   |
| 6     | 120   | 108   | 155   | 110    | 736    | 380    | 688    | 4,060   | 2,030   | 862    | 250    | 154   |
| 7     | 120   | 113   | 206   | 120    | 664    | 386    | 863    | 3,590   | 2,020   | 799    | 245    | 154   |
| 8     | 115   | 108   | 266   | 130    | 612    | 375    | 908    | 3,840   | 2,250   | 734    | 230    | 150   |
| 9     | 115   | 118   | 230   | 150    | 563    | 364    | 962    | 4,310   | 2,190   | 702    | 220    | 147   |
| 10    | 120   | 146   | 210   | 170    | 577    | 364    | 1,090  | 4,400   | 2,070   | 782    | 210    | 143   |
| 11    | 115   | 128   | 206   | 150    | 619    | 386    | 1,040  | 4,570   | 1,860   | 718    | 205    | 143   |
| 12    | 120   | 125   | 190   | 135    | 570    | 380    | 944    | 4,990   | 1,770   | 662    | 195    | 140   |
| 13    | 120   | 125   | 143   | 120    | 626    | 380    | 890    | 5,510   | 1,940   | 622    | 190    | 136   |
| 14    | 113   | 120   | 152   | 130    | 752    | 358    | 917    | 4,750   | 2,180   | 590    | 186    | 133   |
| 15    | 110   | 118   | 176   | 140    | 872    | 347    | 1,040  | 3,540   | 1,890   | 566    | 182    | 133   |
| 16    | 110   | 123   | 176   | 150    | 908    | 336    | 1,050  | 3,490   | 1,710   | 543    | 178    | 133   |
| 17    | 108   | 176   | 173   | 210    | 872    | 320    | 1,040  | 2,920   | 1,590   | 529    | 174    | 129   |
| 18    | 108   | 162   | 159   | 262    | 818    | 310    | 971    | 2,440   | 1,530   | 508    | 170    | 129   |
| 19    | 105   | 146   | 155   | 310    | 768    | 315    | 953    | 2,160   | 1,490   | 480    | 166    | 129   |
| 20    | 105   | 143   | 149   | 792    | 696    | 325    | 1,050  | 1,940   | 1,480   | 459    | 162    | 126   |
| 21    | 110   | 134   | 146   | 626    | 656    | 331    | 1,240  | 1,740   | 1,460   | 438    | 158    | 129   |
| 22    | 110   | 110   | 131   | 488    | 626    | 331    | 1,310  | 1,710   | 1,560   | 417    | 158    | 126   |
| 23    | 113   | 103   | 123   | 434    | 598    | 325    | 1,540  | 1,810   | 1,600   | 398    | 186    | 126   |
| 24    | 123   | 257   | 131   | 410    | 584    | 358    | 1,740  | 2,140   | 1,400   | 380    | 170    | 122   |
| 25    | 134   | 482   | 134   | 375    | 563    | 380    | 1,740  | 2,780   | 1,390   | 362    | 162    | 119   |
| 26    | 123   | 300   | 131   | 375    | 521    | 428    | 1,880  | 3,430   | 1,290   | 344    | 158    | 129   |
| 27    | 115   | 239   | 128   | 369    | 494    | 458    | 1,810  | 4,450   | 1,140   | 332    | 154    | 129   |
| 28    | 110   | 210   | 131   | 342    | 476    | 434    | 1,660  | 4,190   | 1,190   | 314    | 147    | 136   |
| 29    | 110   | 190   | 134   | 331    | -----  | 428    | 1,560  | 3,890   | 1,270   | 308    | 143    | 133   |
| 30    | 108   | 187   | 134   | 507    | -----  | 464    | 1,540  | 3,590   | 1,100   | 296    | 154    | 129   |
| 31    | 105   | ----- | 137   | 1,460  | -----  | 476    | -----  | 3,010   | -----   | 285    | 162    | ----- |
| TOTAL | 3,491 | 4,684 | 5,020 | 9,316  | 21,265 | 11,867 | 32,960 | 105,330 | 52,970  | 18,116 | 6,025  | 4,300 |
| MEAN  | 113   | 156   | 162   | 301    | 759    | 383    | 1,099  | 3,398   | 1,766   | 584    | 194    | 143   |
| MAX   | 134   | 482   | 266   | 1,460  | 1,660  | 476    | 1,880  | 5,510   | 2,550   | 1,020  | 275    | 230   |
| MIN   | 103   | 98    | 123   | 90     | 476    | 310    | 458    | 1,710   | 1,100   | 285    | 143    | 119   |
| CFSM  | .37   | .51   | .53   | .99    | 2.51   | 1.26   | 3.63   | 11.2    | 5.83    | 1.93   | .64    | .47   |
| IN.   | .43   | .58   | .62   | 1.14   | 2.61   | 1.46   | 4.05   | 12.93   | 6.50    | 2.22   | .74    | .53   |
| AC-FT | 6,920 | 9,290 | 9,960 | 18,480 | 42,180 | 23,540 | 65,380 | 208,900 | 105,100 | 35,930 | 11,950 | 8,530 |

CAL YR 1970 TOTAL 188,189 MEAN 516 MAX 3,830 MIN 50 CFSM 1.70 IN 23.10 AC-FT 373,300  
WTR YR 1971 TOTAL 275,344 MEAN 754 MAX 5,510 MIN 90 CFSM 2.49 IN 33.80 AC-FT 546,100

## PEAK DISCHARGE (BASE, 3,000 CFS)

| DATE | TIME | G.HT. | DISCHARGE | DATE | TIME | G.HT. | DISCHARGE |
|------|------|-------|-----------|------|------|-------|-----------|
| 5-5  | 0930 | 6.37  | 5,080     | 5-27 | 0545 | 6.16  | 4,700     |
| 5-13 | 1230 | 6.67  | 5,620     |      |      |       |           |

PEND OREILLE RIVER BASIN

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12354500 Clark Fork at St. Regis, Mont.

LOCATION.--Lat 47°18'07", long 115°05'11", near center of SW $\frac{1}{4}$  sec.19, T.18 N., R.27 W., Mineral County, on left bank at St. Regis, 0.4 mile downstream from St. Regis River, and at mile 270.3.

DRAINAGE AREA.--10,709 sq mi.

PERIOD OF RECORD.--October 1910 to current year. Monthly discharge only for some periods, published in WSP 1316.

GAGE.--Water-stage recorder. Datum of gage is 2,600.37 ft above mean sea level (levels by Corps of Engineers). Prior to Nov. 29, 1933, nonrecording gage at same site and datum.

AVERAGE DISCHARGE.--61 years, 7,501 cfs (5,434,000 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 49,200 cfs May 14 (gage height, 16.92 ft); minimum daily, 1,800 cfs Jan. 7.

Period of record: Maximum discharge, 68,900 cfs May 24, 1948 (gage height, 19.96 ft, from graph based on gage readings); minimum, 1,000 cfs Dec. 17, 1940 (gage height, 3.36 ft), but may have been less during periods of ice effect in several years.

REMARKS.--Records excellent. Diversions for irrigation of about 244,000 acres above station.

REVISIONS (WATER YEARS).--WSP 1246: Drainage area. WSP 1316: 1916-17, 1920, 1929-31(M), 1933(M).

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT             | NOV     | DEC        | JAN     | FEB        | MAR     | APR       | MAY      | JUN             | JUL     | AUG     | SEP     |
|-------------|-----------------|---------|------------|---------|------------|---------|-----------|----------|-----------------|---------|---------|---------|
| 1           | 3,740           | 3,530   | 4,060      | 3,200   | 14,400     | 5,130   | 5,360     | 16,000   | 44,700          | 16,700  | 4,980   | 3,210   |
| 2           | 3,690           | 3,500   | 3,980      | 3,330   | 16,000     | 4,900   | 5,440     | 17,300   | 42,300          | 15,700  | 4,660   | 3,470   |
| 3           | 3,640           | 3,470   | 3,880      | 2,810   | 13,800     | 4,740   | 5,380     | 21,100   | 39,000          | 15,300  | 4,560   | 3,590   |
| 4           | 3,590           | 3,420   | 3,700      | 2,380   | 11,900     | 4,860   | 5,400     | 27,600   | 36,200          | 14,600  | 4,500   | 3,600   |
| 5           | 3,530           | 3,320   | 3,600      | 2,000   | 10,300     | 4,780   | 5,440     | 34,600   | 35,300          | 14,000  | 4,520   | 3,590   |
| 6           | 3,530           | 3,370   | 3,470      | 1,900   | 9,140      | 4,580   | 5,770     | 39,800   | 34,400          | 13,700  | 4,520   | 3,550   |
| 7           | 3,530           | 3,480   | 3,590      | 1,800   | 7,950      | 4,500   | 6,470     | 41,300   | 33,100          | 13,200  | 4,430   | 3,500   |
| 8           | 3,600           | 3,450   | 3,970      | 2,000   | 7,550      | 4,470   | 7,200     | 40,300   | 33,200          | 11,800  | 4,350   | 3,480   |
| 9           | 3,650           | 3,400   | 3,970      | 2,740   | 7,050      | 4,490   | 7,100     | 40,800   | 34,600          | 11,300  | 4,220   | 3,480   |
| 10          | 3,700           | 3,480   | 3,860      | 3,500   | 6,760      | 4,450   | 7,930     | 42,000   | 36,200          | 11,300  | 4,070   | 3,470   |
| 11          | 3,740           | 3,480   | 3,770      | 4,790   | 7,300      | 4,470   | 8,190     | 43,000   | 34,700          | 11,400  | 3,880   | 3,440   |
| 12          | 3,810           | 3,420   | 3,670      | 3,570   | 7,930      | 4,470   | 8,030     | 45,000   | 32,500          | 11,000  | 3,770   | 3,360   |
| 13          | 4,150           | 3,420   | 3,420      | 2,990   | 8,030      | 4,500   | 7,820     | 47,800   | 31,800          | 10,300  | 3,650   | 3,320   |
| 14          | 3,790           | 3,420   | 2,970      | 2,700   | 8,210      | 4,490   | 7,750     | 48,900   | 32,300          | 9,780   | 3,550   | 3,290   |
| 15          | 3,970           | 3,390   | 2,970      | 2,600   | 8,500      | 4,450   | 8,080     | 46,900   | 32,100          | 9,360   | 3,450   | 3,230   |
| 16          | 3,690           | 3,390   | 3,120      | 3,120   | 8,550      | 4,330   | 8,580     | 43,000   | 29,500          | 9,090   | 3,400   | 3,200   |
| 17          | 3,760           | 3,450   | 3,470      | 3,600   | 8,240      | 4,220   | 9,040     | 39,000   | 27,200          | 8,980   | 3,280   | 3,170   |
| 18          | 3,770           | 3,480   | 3,520      | 4,840   | 7,720      | 4,110   | 9,010     | 35,300   | 25,700          | 8,600   | 3,200   | 3,170   |
| 19          | 3,740           | 3,420   | 3,370      | 5,000   | 7,400      | 4,060   | 8,930     | 31,400   | 24,600          | 8,420   | 3,140   | 3,210   |
| 20          | 3,720           | 3,370   | 3,090      | 5,710   | 7,070      | 4,020   | 9,040     | 28,000   | 24,500          | 8,110   | 3,090   | 3,260   |
| 21          | 3,690           | 3,390   | 2,900      | 5,980   | 6,680      | 4,000   | 9,720     | 25,000   | 25,200          | 7,850   | 3,060   | 3,280   |
| 22          | 3,670           | 3,240   | 2,880      | 5,530   | 6,230      | 4,000   | 10,800    | 22,900   | 25,900          | 7,620   | 3,120   | 3,290   |
| 23          | 3,670           | 2,970   | 2,810      | 4,900   | 6,050      | 4,390   | 12,100    | 21,400   | 27,000          | 7,350   | 3,140   | 3,310   |
| 24          | 3,670           | 3,060   | 2,770      | 4,640   | 6,070      | 4,150   | 14,300    | 21,600   | 27,500          | 6,920   | 3,090   | 3,290   |
| 25          | 3,690           | 4,300   | 2,740      | 4,600   | 6,020      | 4,200   | 15,900    | 21,700   | 26,900          | 6,560   | 3,090   | 3,280   |
| 26          | 3,650           | 5,100   | 2,820      | 4,540   | 5,820      | 4,430   | 17,400    | 24,600   | 25,100          | 6,230   | 3,050   | 3,280   |
| 27          | 3,590           | 4,840   | 2,960      | 4,500   | 5,510      | 4,660   | 17,800    | 30,500   | 23,600          | 5,960   | 3,020   | 3,280   |
| 28          | 3,590           | 4,490   | 2,880      | 4,520   | 5,210      | 4,860   | 17,100    | 36,300   | 21,600          | 5,620   | 2,960   | 3,310   |
| 29          | 3,550           | 4,220   | 2,990      | 4,470   | -----      | 4,880   | 16,300    | 41,600   | 20,100          | 5,400   | 2,900   | 3,420   |
| 30          | 3,610           | 4,110   | 3,110      | 4,660   | -----      | 4,910   | 15,900    | 46,200   | 18,400          | 5,190   | 2,870   | 3,500   |
| 31          | 3,550           | -----   | 3,210      | 7,620   | -----      | 5,150   | -----     | 47,000   | -----           | 5,170   | 2,960   | -----   |
| TOTAL       | 114,260         | 108,280 | 103,520    | 119,240 | 231,390    | 139,670 | 293,280   | 1,067.3M | 905,200         | 302,510 | 112,480 | 100,830 |
| MEAN        | 3,686           | 3,609   | 3,339      | 3,846   | 8,264      | 4,505   | 9,776     | 34,430   | 30,170          | 9,758   | 3,628   | 3,361   |
| MAX         | 4,150           | 5,100   | 4,060      | 7,620   | 16,000     | 5,150   | 17,800    | 48,900   | 44,700          | 16,700  | 4,980   | 3,600   |
| MIN         | 3,530           | 2,970   | 2,740      | 1,800   | 5,210      | 4,000   | 5,360     | 16,000   | 18,400          | 5,170   | 2,870   | 3,170   |
| AC-FT       | 226,600         | 214,800 | 205,300    | 236,500 | 459,000    | 277,000 | 581,700   | 2,117M   | 1,795M          | 600,000 | 223,100 | 200,000 |
| CAL YR 1970 | TOTAL 2,844,520 |         | MEAN 7,793 |         | MAX 46,300 |         | MIN 1,100 |          | AC-FT 5,642,000 |         |         |         |
| WTR YR 1971 | TOTAL 3,597,960 |         | MEAN 9,857 |         | MAX 48,900 |         | MIN 1,800 |          | AC-FT 7,137,000 |         |         |         |



## PEND OREILLE RIVER BASIN

12355000 North Fork Flathead River at Flathead, British Columbia  
(Formerly published as Flathead River at Flathead, British Columbia)

(International gaging station)

LOCATION.--Lat 49°00'06", long 114°28'30", on left bank 200 ft north of international boundary and Flathead, British Columbia, 1.6 miles upstream from Sage Creek, 6.5 miles northwest of Trail Creek, Mont., and at mile 216.6.

DRAINAGE AREA.--450 sq mi, approximately.

PERIOD OF RECORD.--March 1929 to current year (no winter records prior to 1952). Prior to October 1934, published as "near Trail Creek, Mont."

GAGE.--Water-stage recorder. Datum of gage is 3,966.74 ft above mean sea level. Prior to Sept. 1, 1949, non-recording gage, and Sept. 1, 1949, to Oct. 4, 1964, water-stage recorder, at site 1,200 ft upstream at datum 9.22 ft higher.

AVERAGE DISCHARGE.--20 years (1951-71), 974 cfs (29.40 inches per year, 705,700 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, about 8,300 cfs May 28; minimum daily, 100 cfs Jan. 4.

Period of record: Maximum discharge, 16,300 cfs June 8, 1964 (gage height, 8.00 ft, in gage well, 8.6 ft from outside floodmarks, site and datum then in use), from rating curve extended above 8,000 cfs on basis of slope-area measurement of peak flow; minimum observed, 65 cfs Apr. 9, 1929, but may have been less during periods of no winter record.

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

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

REVISIONS (WATER YEARS).--WSP 1092: 1933 (maximum gage height only).

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | CCT           | NOV        | DEC       | JAN     | FEB       | MAR      | APR           | MAY     | JUN     | JUL    | AUG    | SEP    |
|-------------|---------------|------------|-----------|---------|-----------|----------|---------------|---------|---------|--------|--------|--------|
| 1           | 226           | 184        | 206       | 190     | 510       | 215      | 167           | 1,770   | 5,110   | 1,800  | 678    | 363    |
| 2           | 222           | 185        | 193       | 152     | 600       | 218      | 164           | 2,320   | 5,070   | 1,760  | 670    | 361    |
| 3           | 219           | 185        | 189       | 126     | 630       | 222      | 161           | 3,290   | 4,400   | 1,690  | 678    | 358    |
| 4           | 215           | 181        | 193       | 100     | 580       | 223      | 164           | 4,570   | 4,630   | 1,590  | 665    | 350    |
| 5           | 215           | 178        | 202       | 108     | 520       | 221      | 170           | 5,630   | 5,310   | 1,520  | 644    | 333    |
| 6           | 219           | 181        | 212       | 120     | 425       | 208      | 183           | 5,740   | 5,540   | 1,450  | 631    | 317    |
| 7           | 216           | 182        | 228       | 134     | 392       | 205      | 214           | 5,110   | 5,140   | 1,370  | 610    | 316    |
| 8           | 214           | 182        | 252       | 150     | 363       | 207      | 229           | 5,140   | 5,590   | 1,280  | 585    | 297    |
| 9           | 213           | 188        | 240       | 150     | 340       | 207      | 246           | 5,410   | 5,370   | 1,240  | 558    | 285    |
| 10          | 215           | 192        | 220       | 141     | 330       | 202      | 295           | 4,990   | 4,260   | 1,780  | 535    | 289    |
| 11          | 214           | 188        | 198       | 133     | 353       | 200      | 300           | 5,290   | 3,920   | 1,970  | 517    | 279    |
| 12          | 222           | 186        | 186       | 127     | 350       | 202      | 287           | 5,680   | 3,930   | 1,730  | 491    | 282    |
| 13          | 221           | 182        | 173       | 119     | 340       | 187      | 285           | 5,730   | 4,110   | 1,560  | 470    | 278    |
| 14          | 218           | 175        | 179       | 122     | 330       | 182      | 316           | 5,650   | 4,040   | 1,460  | 444    | 269    |
| 15          | 213           | 179        | 194       | 126     | 330       | 180      | 402           | 4,550   | 3,330   | 1,390  | 431    | 263    |
| 16          | 211           | 178        | 199       | 131     | 329       | 176      | 428           | 3,580   | 2,870   | 1,330  | 419    | 260    |
| 17          | 207           | 184        | 200       | 137     | 282       | 179      | 421           | 3,050   | 2,710   | 1,290  | 404    | 259    |
| 18          | 206           | 181        | 192       | 143     | 269       | 166      | 405           | 2,650   | 2,670   | 1,230  | 390    | 257    |
| 19          | 205           | 177        | 186       | 152     | 260       | 175      | 445           | 2,480   | 2,690   | 1,160  | 381    | 254    |
| 20          | 207           | 176        | 177       | 164     | 237       | 177      | 549           | 2,570   | 2,870   | 1,110  | 374    | 280    |
| 21          | 212           | 168        | 173       | 169     | 246       | 171      | 744           | 2,500   | 2,930   | 1,080  | 368    | 268    |
| 22          | 210           | 154        | 154       | 166     | 263       | 168      | 889           | 2,590   | 3,150   | 1,120  | 360    | 259    |
| 23          | 210           | 153        | 127       | 162     | 247       | 177      | 1,130         | 3,000   | 3,470   | 1,090  | 372    | 254    |
| 24          | 211           | 160        | 138       | 163     | 253       | 173      | 1,490         | 3,770   | 3,140   | 1,020  | 366    | 251    |
| 25          | 208           | 172        | 150       | 167     | 232       | 168      | 2,590         | 5,120   | 2,970   | 939    | 346    | 250    |
| 26          | 200           | 190        | 162       | 170     | 224       | 166      | 2,510         | 5,580   | 2,810   | 874    | 334    | 249    |
| 27          | 196           | 183        | 173       | 172     | 208       | 164      | 2,040         | 7,370   | 2,400   | 821    | 319    | 252    |
| 28          | 193           | 188        | 183       | 181     | 215       | 161      | 1,660         | 8,070   | 2,120   | 810    | 307    | 259    |
| 29          | 189           | 194        | 196       | 211     | -----     | 163      | 1,530         | 7,300   | 1,990   | 785    | 306    | 265    |
| 30          | 188           | 206        | 204       | 265     | -----     | 172      | 1,570         | 6,500   | 1,840   | 739    | 329    | 269    |
| 31          | 186           | -----      | 214       | 420     | -----     | 174      | -----         | 5,580   | -----   | 697    | 353    | -----  |
| TOTAL       | 6,501         | 5,416      | 5,893     | 4,971   | 9,658     | 5,809    | 21,984        | 142,580 | 110,380 | 39,685 | 14,335 | 8,526  |
| MEAN        | 210           | 181        | 190       | 160     | 345       | 187      | 733           | 4,599   | 3,679   | 1,280  | 462    | 284    |
| MAX         | 226           | 206        | 252       | 420     | 630       | 223      | 2,590         | 8,070   | 5,590   | 1,970  | 678    | 363    |
| MIN         | 186           | 153        | 127       | 100     | 208       | 161      | 161           | 1,770   | 1,840   | 697    | 306    | 249    |
| CFSM        | -47           | -40        | -42       | -36     | -77       | -42      | 1.63          | 10.2    | 8.18    | 2.84   | 1.03   | .63    |
| IN.         | .54           | .45        | .49       | .41     | .80       | .48      | 1.82          | 11.79   | 9.12    | 3.28   | 1.19   | .70    |
| AC-FT       | 12,890        | 10,740     | 11,690    | 9,860   | 19,160    | 11,520   | 43,610        | 282,800 | 218,900 | 78,720 | 28,430 | 16,910 |
| CAL YR 1970 | TOTAL 256,773 | MEAN 703   | MAX 5,860 | MIN 105 | CFSM 1.56 | IN 21.23 | AC-FT 509,300 |         |         |        |        |        |
| WTR YR 1971 | TOTAL 375,738 | MEAN 1,029 | MAX 8,070 | MIN 100 | CFSM 2.29 | IN 31.06 | AC-FT 745,300 |         |         |        |        |        |

NOTE.--Stage-discharge relation affected by ice Nov. 21 to Feb. 15.

12355500 North Fork Flathead River near Columbia Falls, Mont.  
(Formerly published as Flathead River near Columbia Falls, Mont.)

LOCATION.--Lat 48°29'44", long 114°07'36", in NE 1/4 SW 1/4 sec. 35, T. 32 N., R. 20 W., Flathead County, on right bank 1.5 miles downstream from Canyon Creek, 3.8 miles upstream from Middle Fork, 8.8 miles northeast of Columbia Falls, and at mile 162.1.

DRAINAGE AREA.--1,548 sq mi.

PERIOD OF RECORD.--September 1910 to September 1917 (no winter records in water years 1913, 1916, 1917), April 1929 to February 1935 (incomplete), June 1935 to current year. Monthly discharge only for some periods, published in WSP 1316. Published as Flathead River near Columbia Falls 1915-17, 1929-70.

GAGE.--Water-stage recorder. Datum of gage is 3,145.59 ft above mean sea level. September 1910 to September 1917 and April to August 1929, nonrecording gages, and May 1, 1930, to Sept. 30, 1962, water-stage recorder all at site 2.7 miles downstream at different datums.

AVERAGE DISCHARGE.--40 years (1910-12, 1913-15, 1935-71), 2,973 cfs (26.08 inches per year, 2,154,000 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 22,200 cfs May 28 (gage height, 10.09 ft); minimum daily, 300 cfs Jan. 4.

Period of record: Maximum discharge, 69,100 cfs June 9, 1964 (gage height, 18.60 ft, from floodmarks), from rating curve extended above 37,000 cfs on basis of slope-area measurement of peak flow; minimum, 198 cfs Jan. 8, 1953 (gage height, 0.86 ft, site and datum then in use).

REMARKS.--Records excellent except those for winter period, which are poor. A few small diversions from tributaries for irrigation of hay meadows above station.

REVISIONS (WATER YEARS).--WSP 1216: Drainage area. WSP 1246: 1911, 1912(M), 1915-17(M), 1929(M), 1938-39(M), 1946(M).

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT    | NOV       | DEC    | JAN    | FEB    | MAR    | APR     | MAY     | JUN     | JUL     | AUG     | SEP    |       |           |
|-------------|--------|-----------|--------|--------|--------|--------|---------|---------|---------|---------|---------|--------|-------|-----------|
| 1           | 910    | 685       | 540    | 550    | 2,440  | 942    | 749     | 6,490   | 15,500  | 7,300   | 3,060   | 1,550  |       |           |
| 2           | 894    | 578       | 530    | 450    | 2,780  | 934    | 748     | 7,650   | 14,300  | 7,300   | 3,020   | 1,560  |       |           |
| 3           | 878    | 666       | 520    | 400    | 2,670  | 974    | 743     | 9,770   | 13,500  | 7,150   | 3,140   | 1,550  |       |           |
| 4           | 854    | 646       | 510    | 300    | 2,400  | 966    | 749     | 12,900  | 13,100  | 6,830   | 3,250   | 1,520  |       |           |
| 5           | 846    | 652       | 500    | 350    | 1,950  | 942    | 778     | 15,700  | 14,700  | 6,460   | 3,140   | 1,470  |       |           |
| 6           | 862    | 672       | 700    | 400    | 1,660  | 878    | 870     | 17,400  | 16,900  | 6,170   | 3,040   | 1,400  |       |           |
| 7           | 838    | 678       | 900    | 450    | 1,650  | 902    | 1,070   | 15,800  | 16,000  | 5,790   | 2,960   | 1,360  |       |           |
| 8           | 822    | 672       | 850    | 500    | 1,500  | 902    | 1,240   | 14,900  | 16,500  | 5,290   | 2,810   | 1,310  |       |           |
| 9           | 815    | 706       | 750    | 500    | 1,400  | 878    | 1,450   | 15,400  | 18,100  | 5,020   | 2,690   | 1,270  |       |           |
| 10          | 822    | 727       | 650    | 450    | 1,550  | 970    | 1,770   | 15,100  | 15,400  | 6,600   | 2,580   | 1,230  |       |           |
| 11          | 800    | 713       | 500    | 400    | 1,550  | 894    | 1,860   | 15,000  | 13,500  | 7,000   | 2,460   | 1,190  |       |           |
| 12          | 815    | 706       | 550    | 350    | 1,430  | 870    | 1,730   | 16,600  | 12,800  | 6,700   | 2,360   | 1,170  |       |           |
| 13          | 830    | 685       | 500    | 320    | 1,440  | 846    | 1,670   | 18,500  | 12,800  | 6,300   | 2,240   | 1,130  |       |           |
| 14          | 815    | 678       | 550    | 350    | 1,470  | 822    | 1,790   | 20,200  | 13,100  | 6,050   | 2,130   | 1,110  |       |           |
| 15          | 800    | 672       | 600    | 400    | 1,550  | 800    | 2,160   | 16,600  | 11,900  | 5,790   | 2,030   | 1,080  |       |           |
| 16          | 785    | 672       | 640    | 500    | 1,520  | 785    | 2,450   | 13,500  | 10,200  | 5,630   | 1,950   | 1,070  |       |           |
| 17          | 762    | 685       | 620    | 600    | 1,410  | 741    | 2,400   | 11,600  | 9,240   | 5,650   | 1,860   | 1,040  |       |           |
| 18          | 755    | 706       | 600    | 700    | 1,380  | 706    | 2,310   | 10,100  | 8,730   | 5,610   | 1,770   | 1,030  |       |           |
| 19          | 748    | 692       | 580    | 720    | 1,330  | 727    | 2,490   | 9,150   | 8,640   | 5,420   | 1,690   | 1,020  |       |           |
| 20          | 741    | 685       | 560    | 740    | 1,220  | 741    | 2,930   | 8,970   | 9,030   | 5,200   | 1,630   | 1,040  |       |           |
| 21          | 755    | 646       | 500    | 720    | 1,150  | 748    | 3,650   | 8,910   | 9,210   | 5,040   | 1,570   | 1,030  |       |           |
| 22          | 762    | 450       | 400    | 700    | 1,170  | 659    | 4,310   | 8,730   | 9,930   | 5,040   | 1,520   | 999    |       |           |
| 23          | 762    | 400       | 450    | 710    | 1,160  | 645    | 5,290   | 9,880   | 11,600  | 5,070   | 1,540   | 982    |       |           |
| 24          | 785    | 450       | 500    | 720    | 1,150  | 762    | 6,170   | 9,870   | 11,800  | 4,810   | 1,550   | 958    |       |           |
| 25          | 778    | 500       | 540    | 730    | 1,140  | 748    | 8,520   | 12,200  | 11,000  | 4,510   | 1,510   | 942    |       |           |
| 26          | 755    | 480       | 580    | 740    | 1,090  | 755    | 9,510   | 15,100  | 10,800  | 4,130   | 1,450   | 942    |       |           |
| 27          | 748    | 460       | 620    | 750    | 558    | 748    | 8,180   | 18,100  | 9,660   | 3,820   | 1,400   | 942    |       |           |
| 28          | 720    | 440       | 660    | 800    | 974    | 727    | 7,000   | 21,100  | 8,490   | 3,690   | 1,370   | 942    |       |           |
| 29          | 713    | 460       | 680    | 1,000  | -----  | 720    | 6,410   | 20,800  | 8,050   | 3,600   | 1,340   | 950    |       |           |
| 30          | 699    | 500       | 700    | 1,710  | -----  | 741    | 6,320   | 18,300  | 7,630   | 3,380   | 1,380   | 958    |       |           |
| 31          | 685    | -----     | 700    | 2,060  | -----  | 770    | -----   | 17,100  | -----   | 3,180   | 1,520   | -----  |       |           |
| TOTAL       | 24,554 | 18,462    | 18,580 | 20,070 | 43,182 | 25,183 | 97,360  | 430,370 | 362,110 | 169,530 | 65,960  | 34,745 |       |           |
| MEAN        | 792    | 615       | 599    | 647    | 1,542  | 812    | 3,245   | 13,880  | 12,070  | 5,469   | 2,128   | 1,158  |       |           |
| MAX         | 910    | 727       | 900    | 2,060  | 2,780  | 974    | 9,510   | 21,100  | 18,100  | 7,300   | 3,250   | 1,560  |       |           |
| MIN         | 685    | 400       | 400    | 300    | 558    | 659    | 748     | 6,490   | 7,630   | 3,180   | 1,340   | 942    |       |           |
| CFSM        | .51    | .40       | .39    | .42    | 1.00   | .52    | 2.10    | 8.97    | 7.80    | 3.53    | 1.37    | .75    |       |           |
| IN.         | .59    | .44       | .45    | .48    | 1.04   | .61    | 2.34    | 10.34   | 8.70    | 4.07    | 1.59    | .83    |       |           |
| AC-FT       | 48,700 | 36,620    | 36,850 | 39,810 | 85,650 | 49,950 | 193,100 | 853,600 | 718,200 | 336,300 | 130,800 | 68,920 |       |           |
| CAL YR 1970 | TOTAL  | 918,618   | MEAN   | 2,517  | MAX    | 17,900 | MIN     | 260     | CFSM    | 1.63    | IN      | 22.08  | AC-FT | 1,822,000 |
| WTR YR 1971 | TOTAL  | 1,310,106 | MEAN   | 3,589  | MAX    | 21,100 | MIN     | 300     | CFSM    | 2.32    | IN      | 31.48  | AC-FT | 2,599,000 |

NOTE.--Stage-discharge relation affected by ice Nov. 22 to Jan. 29 (no gage-height record Jan. 4-6, 10-14).

## PEND OREILLE RIVER BASIN

12358500 Middle Fork Flathead River near West Glacier, Mont.

LOCATION.--Lat 48°29'43", long 114°00'33", in S<sup>1</sup>/<sub>2</sub>SW<sup>1</sup>/<sub>4</sub>NE<sup>1</sup>/<sub>4</sub> sec.34, T.32 N., R.19 W., Flathead County, on left bank 0.8 mile downstream from McDonald Creek, 1.3 miles west of West Glacier (formerly Belton), and 3.8 miles upstream from mouth.

DRAINAGE AREA.--1,128 sq mi.

PERIOD OF RECORD.--October 1939 to current year. Prior to October 1947, published as "near Belton."

GAGE.--Water-stage recorder. Altitude of gage is 3,130 ft (from river-profile map). Prior to Nov. 22, 1950, nonrecording gage at present site and datum.

AVERAGE DISCHARGE.--32 years, 2,941 cfs (35.41 inches per year, 2,131,000 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 23,900 cfs May 28 (gage height, 9.49 ft); minimum, 361 cfs Jan. 11 (gage height, 1.11 ft), result of freezeup.

Period of record: Maximum discharge, about 140,000 cfs June 9, 1964 (gage height, 36.46 ft, from flood-marks), from rating curve extended above 35,000 cfs on basis of flood volume-hydrographic comparison; minimum, less than 173 cfs Nov. 27, 1952 (stage below intake pipe).

REMARKS.--Records excellent.

REVISIONS.--WSP 1216: Drainage area.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT             | NOV        | DEC        | JAN     | FEB       | MAR      | APR             | MAY     | JUN     | JUL     | AUG     | SEP    |
|-------------|-----------------|------------|------------|---------|-----------|----------|-----------------|---------|---------|---------|---------|--------|
| 1           | 765             | 573        | 808        | 610     | 6,880     | 1,250    | 782             | 5,960   | 14,600  | 7,300   | 3,350   | 1,350  |
| 2           | 748             | 573        | 773        | 550     | 6,220     | 1,210    | 765             | 7,390   | 13,600  | 7,730   | 3,320   | 1,300  |
| 3           | 739             | 565        | 756        | 461     | 5,150     | 1,210    | 765             | 10,300  | 13,200  | 7,820   | 3,350   | 1,240  |
| 4           | 722             | 558        | 731        | 454     | 4,330     | 1,170    | 765             | 14,100  | 13,300  | 7,300   | 3,240   | 1,150  |
| 5           | 722             | 554        | 697        | 441     | 3,630     | 1,110    | 790             | 16,100  | 16,000  | 6,970   | 3,130   | 1,080  |
| 6           | 739             | 558        | 722        | 454     | 3,130     | 1,070    | 862             | 15,000  | 18,200  | 6,940   | 3,070   | 1,040  |
| 7           | 705             | 565        | 826        | 529     | 2,830     | 1,050    | 1,100           | 13,600  | 16,600  | 6,450   | 2,990   | 1,000  |
| 8           | 689             | 558        | 950        | 536     | 2,590     | 1,040    | 1,420           | 13,700  | 16,900  | 5,770   | 2,870   | 970    |
| 9           | 673             | 603        | 940        | 536     | 2,320     | 1,000    | 1,620           | 15,400  | 17,000  | 5,610   | 2,750   | 940    |
| 10          | 665             | 649        | 880        | 409     | 2,280     | 991      | 1,950           | 15,400  | 15,300  | 6,450   | 2,610   | 910    |
| 11          | 657             | 625        | 853        | 373     | 2,250     | 991      | 2,040           | 16,000  | 13,700  | 6,710   | 2,460   | 900    |
| 12          | 722             | 618        | 844        | 403     | 2,100     | 991      | 1,930           | 17,700  | 13,100  | 6,050   | 2,340   | 890    |
| 13          | 756             | 610        | 748        | 461     | 2,090     | 970      | 1,870           | 20,300  | 13,400  | 5,610   | 2,210   | 853    |
| 14          | 739             | 595        | 705        | 508     | 2,350     | 950      | 1,950           | 18,900  | 14,000  | 5,550   | 2,100   | 826    |
| 15          | 714             | 588        | 782        | 550     | 2,590     | 920      | 2,440           | 14,700  | 12,500  | 5,660   | 2,000   | 799    |
| 16          | 697             | 558        | 782        | 649     | 2,650     | 900      | 2,790           | 12,500  | 10,600  | 5,770   | 1,870   | 782    |
| 17          | 681             | 633        | 765        | 689     | 2,480     | 862      | 2,730           | 11,200  | 9,500   | 6,080   | 1,760   | 765    |
| 18          | 665             | 657        | 705        | 673     | 2,340     | 835      | 2,590           | 9,830   | 9,210   | 5,910   | 1,660   | 748    |
| 19          | 665             | 649        | 673        | 731     | 2,190     | 826      | 2,610           | 8,860   | 9,270   | 5,800   | 1,570   | 731    |
| 20          | 657             | 657        | 657        | 1,080   | 2,000     | 817      | 2,970           | 8,410   | 10,100  | 5,580   | 1,510   | 722    |
| 21          | 665             | 633        | 657        | 1,140   | 1,840     | 808      | 3,650           | 7,790   | 10,800  | 5,500   | 1,450   | 714    |
| 22          | 665             | 515        | 588        | 1,110   | 1,770     | 765      | 4,290           | 7,300   | 12,200  | 5,470   | 1,440   | 697    |
| 23          | 657             | 467        | 610        | 1,130   | 1,710     | 756      | 5,250           | 7,360   | 13,400  | 5,310   | 1,500   | 681    |
| 24          | 673             | 633        | 595        | 1,140   | 1,660     | 808      | 6,360           | 8,440   | 12,600  | 5,100   | 1,450   | 665    |
| 25          | 673             | 1,060      | 618        | 1,100   | 1,600     | 799      | 10,500          | 11,500  | 11,800  | 4,580   | 1,330   | 657    |
| 26          | 657             | 1,000      | 641        | 1,070   | 1,510     | 799      | 10,100          | 14,700  | 12,400  | 4,210   | 1,260   | 649    |
| 27          | 633             | 920        | 625        | 1,070   | 1,380     | 799      | 8,070           | 18,800  | 10,300  | 3,950   | 1,220   | 665    |
| 28          | 618             | 835        | 625        | 1,070   | 1,340     | 773      | 6,820           | 22,600  | 8,760   | 3,900   | 1,200   | 681    |
| 29          | 595             | 844        | 625        | 1,060   | -----     | 765      | 6,100           | 21,100  | 8,380   | 3,770   | 1,190   | 665    |
| 30          | 580             | 853        | 625        | 1,500   | -----     | 773      | 5,740           | 18,700  | 7,420   | 3,500   | 1,250   | 649    |
| 31          | 573             | -----      | 633        | 4,810   | -----     | 799      | -----           | 17,000  | -----   | 3,350   | 1,370   | -----  |
| TOTAL       | 21,109          | 19,706     | 22,439     | 27,297  | 75,210    | 28,807   | 101,619         | 420,640 | 378,140 | 175,700 | 64,820  | 25,719 |
| MEAN        | 681             | 657        | 724        | 881     | 2,686     | 929      | 3,387           | 13,570  | 12,600  | 5,668   | 2,091   | 857    |
| MAX         | 765             | 1,060      | 950        | 4,810   | 6,880     | 1,250    | 10,500          | 22,600  | 18,200  | 7,820   | 3,350   | 1,350  |
| MIN         | 573             | 467        | 588        | 373     | 1,340     | 756      | 765             | 5,960   | 7,420   | 3,350   | 1,190   | 649    |
| CFSM        | .60             | .58        | .64        | .78     | 2.38      | .82      | 3.00            | 12.0    | 11.2    | 5.02    | 1.85    | .76    |
| IN.         | .70             | .65        | .74        | .90     | 2.48      | .95      | 3.35            | 13.87   | 12.47   | 5.79    | 2.14    | .85    |
| AC-FT       | 41,870          | 39,090     | 44,510     | 54,140  | 149,200   | 57,140   | 201,600         | 834,300 | 750,000 | 348,500 | 128,600 | 51,010 |
| CAL YR 1970 | TOTAL 1,053,406 | MEAN 2,886 | MAX 22,400 | MIN 257 | CFSM 2.56 | IN 34.74 | AC-FT 2,089,000 |         |         |         |         |        |
| WTR YR 1971 | TOTAL 1,361,206 | MEAN 3,729 | MAX 22,600 | MIN 373 | CFSM 3.31 | IN 44.89 | AC-FT 2,700,000 |         |         |         |         |        |

## PEND OREILLE RIVER BASIN

219

12359800 South Fork Flathead River above Twin Creek, near Hungry Horse, Mont.

LOCATION.--Lat 47°58'45", long 113°33'36", in NE1/4NE1/4 sec.36, T.26 N., R.16 W., Flathead County, Flathead National Forest, on left bank 0.1 mile downstream from Tin Creek, 0.4 mile upstream from Twin Creek, 36.3 miles southeast of Hungry Horse, and at mile 46.7.

DRAINAGE AREA.--1,160 sq mi.

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

GAGE.--Water-stage recorder. Altitude of gage is 3,575 ft (from river-profile map).

AVERAGE DISCHARGE.--7 years, 2,436 cfs (28.53 inches per year, 1,765,000 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 22,500 cfs May 29 (gage height, 13.75 ft); minimum daily, 230 cfs Jan. 5.

Period of record: Maximum discharge, 23,800 cfs June 6, 1970 (gage height, 14.02 ft); minimum daily, 180 cfs Jan. 7, 1970.

Flood of June 8, 1964, reached a stage of 20.87 ft, from high-water profile (discharge, 50,900 cfs, by slope-area measurement of peak flow).

REMARKS.--Records excellent. Records of water temperatures for the current year are published in Part 2 of this report.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT    | NOV       | DEC    | JAN    | FEB     | MAR    | APR     | MAY     | JUN     | JUL     | AUG       | SEP    |           |
|-------------|--------|-----------|--------|--------|---------|--------|---------|---------|---------|---------|-----------|--------|-----------|
| 1           | 411    | 376       | 590    | 424    | 7,860   | 952    | 618     | 4,610   | 12,000  | 5,020   | 1,700     | 687    |           |
| 2           | 391    | 369       | 555    | 374    | 6,770   | 899    | 616     | 6,220   | 11,400  | 5,480   | 1,660     | 687    |           |
| 3           | 385    | 358       | 530    | 300    | 5,150   | 952    | 620     | 8,710   | 11,200  | 5,670   | 1,630     | 669    |           |
| 4           | 378    | 350       | 505    | 270    | 3,960   | 977    | 611     | 12,200  | 11,200  | 5,470   | 1,600     | 635    |           |
| 5           | 386    | 355       | 428    | 230    | 3,170   | 836    | 635     | 14,800  | 12,900  | 5,280   | 1,570     | 601    |           |
| 6           | 418    | 369       | 515    | 250    | 2,620   | 836    | 744     | 13,400  | 11,500  | 5,370   | 1,510     | 576    |           |
| 7           | 400    | 369       | 525    | 300    | 2,260   | 836    | 1,060   | 11,800  | 11,600  | 4,760   | 1,460     | 553    |           |
| 8           | 390    | 362       | 540    | 350    | 1,990   | 829    | 1,170   | 12,300  | 13,600  | 4,180   | 1,390     | 532    |           |
| 9           | 384    | 370       | 491    | 400    | 1,750   | 801    | 1,280   | 13,200  | 15,400  | 4,310   | 1,310     | 517    |           |
| 10          | 396    | 388       | 463    | 350    | 1,550   | 786    | 1,450   | 13,700  | 14,200  | 5,200   | 1,240     | 508    |           |
| 11          | 394    | 374       | 468    | 300    | 1,320   | 785    | 1,440   | 14,700  | 12,300  | 5,200   | 1,180     | 500    |           |
| 12          | 522    | 376       | 460    | 320    | 1,670   | 766    | 1,370   | 16,200  | 13,900  | 4,480   | 1,110     | 493    |           |
| 13          | 720    | 374       | 309    | 350    | 1,720   | 757    | 1,340   | 18,700  | 11,600  | 4,080   | 1,050     | 476    |           |
| 14          | 531    | 367       | 320    | 400    | 1,950   | 738    | 1,490   | 17,100  | 12,700  | 3,970   | 1,000     | 462    |           |
| 15          | 696    | 354       | 480    | 450    | 1,900   | 718    | 1,930   | 12,800  | 10,600  | 3,950   | 954       | 451    |           |
| 16          | 473    | 358       | 482    | 500    | 1,850   | 700    | 2,070   | 11,100  | 9,010   | 3,960   | 908       | 451    |           |
| 17          | 459    | 398       | 468    | 530    | 1,720   | 647    | 2,020   | 9,930   | 8,430   | 4,190   | 866       | 447    |           |
| 18          | 453    | 398       | 394    | 496    | 1,650   | 622    | 1,910   | 8,700   | 8,620   | 4,120   | 828       | 441    |           |
| 19          | 454    | 394       | 402    | 496    | 1,560   | 632    | 1,860   | 7,630   | 8,700   | 3,870   | 791       | 434    |           |
| 20          | 458    | 390       | 398    | 630    | 1,390   | 649    | 2,170   | 7,070   | 9,120   | 3,610   | 758       | 431    |           |
| 21          | 462    | 380       | 393    | 744    | 1,270   | 650    | 2,520   | 6,320   | 10,600  | 3,430   | 732       | 423    |           |
| 22          | 462    | 290       | 382    | 732    | 1,260   | 592    | 2,930   | 5,790   | 12,200  | 3,280   | 709       | 420    |           |
| 23          | 457    | 270       | 366    | 720    | 1,310   | 639    | 3,770   | 5,990   | 13,600  | 3,200   | 714       | 412    |           |
| 24          | 462    | 540       | 386    | 717    | 1,260   | 641    | 4,800   | 7,070   | 13,300  | 2,980   | 702       | 404    |           |
| 25          | 453    | 220       | 478    | 688    | 1,210   | 622    | 7,110   | 9,410   | 11,400  | 2,710   | 678       | 397    |           |
| 26          | 433    | 822       | 450    | 607    | 1,120   | 639    | 6,670   | 12,400  | 10,900  | 2,450   | 652       | 393    |           |
| 27          | 421    | 714       | 437    | 665    | 1,020   | 641    | 5,570   | 17,000  | 9,120   | 2,250   | 624       | 395    |           |
| 28          | 413    | 636       | 460    | 640    | 1,030   | 614    | 4,780   | 20,900  | 7,480   | 2,160   | 601       | 399    |           |
| 29          | 390    | 600       | 464    | 625    | -----   | 604    | 4,280   | 21,300  | 6,490   | 2,020   | 591       | 397    |           |
| 30          | 383    | 630       | 460    | 1,230  | -----   | 624    | 4,160   | 19,100  | 5,500   | 1,850   | 615       | 393    |           |
| 31          | 379    | -----     | 468    | 5,830  | -----   | 635    | -----   | 15,900  | -----   | 1,760   | 683       | -----  |           |
| TOTAL       | 13,448 | 13,315    | 14,079 | 21,968 | 63,990  | 22,562 | 72,994  | 376,050 | 326,670 | 120,260 | 31,816    | 14,584 |           |
| MEAN        | 434    | 444       | 454    | 676    | 2,285   | 728    | 2,433   | 12,130  | 10,890  | 3,879   | 1,026     | 486    |           |
| MAX         | 570    | 920       | 590    | 5,830  | 7,860   | 952    | 7,110   | 21,300  | 15,400  | 5,670   | 1,700     | 687    |           |
| MIN         | 378    | 270       | 309    | 230    | 1,020   | 592    | 611     | 4,610   | 5,500   | 1,760   | 591       | 393    |           |
| CFSM        | .37    | .38       | .39    | .58    | 1.97    | .63    | 2.10    | 10.5    | 9.39    | 3.34    | .88       | .42    |           |
| IN.         | .63    | .63       | .65    | .67    | 2.05    | .72    | 2.34    | 12.06   | 10.48   | 3.86    | 1.02      | .47    |           |
| AC-FT       | 26,670 | 26,410    | 27,930 | 41,590 | 126,900 | 44,750 | 144,800 | 745,900 | 647,900 | 238,500 | 63,110    | 28,930 |           |
| CAL YR 1970 | TOTAL  | 813,569   | MEAN   | 2,229  | MAX     | 22,900 | MIN     | 180     | CFSM    | 1.92    | IN        | 26.09  |           |
| WTR YR 1971 | TOTAL  | 1,590,736 | MEAN   | 2,988  | MAX     | 21,300 | MIN     | 230     | CFSM    | 2.58    | IN        | 34.98  |           |
|             |        |           |        |        |         |        |         |         |         | AC-FT   | 1,614,000 | AC-FT  | 2,163,000 |

12361000 Sullivan Creek near Hungry Horse, Mont.

LOCATION.--Lat 48°01'45", long 113°42'12", in NW1/4 sec.12, T.26 N., R.17 W., Flathead County, Flathead National Forest, on left bank 0.3 mile downstream from Quintonkon Creek, 1.7 miles upstream from Hungry Horse Reservoir flow line, and 29.5 miles southeast of Hungry Horse.

DRAINAGE AREA.--71.3 sq mi.

PERIOD OF RECORD.--September 1948 to September 1956, August 1959 to current year.

GAGE.--Water-stage recorder. Altitude of gage is 3,630 ft (from topographic map).

AVERAGE DISCHARGE.--20 years, 223 cfs (42.48 inches per year, 161,600 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 2,040 cfs May 13 (gage height, 5.05 ft); minimum daily, 25 cfs Jan. 5.

Period of record: Maximum discharge, 5,020 cfs June 8, 1964 (gage height, 7.21 ft in gage well, 8.3 ft from outside floodmarks), from rating curve extended above 1,800 cfs on basis of slope-area measurement of peak flow; minimum daily, 10 cfs Nov. 26, 1952.

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

REVISIONS.--WSP 1216: Drainage area.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY   | OCT   | NOV   | DEC   | JAN   | FEB    | MAR   | APR    | MAY    | JUN    | JUL    | AUG   | SEP   |
|-------|-------|-------|-------|-------|--------|-------|--------|--------|--------|--------|-------|-------|
| 1     | 32    | 54    | 106   | 45    | 1,010  | 90    | 73     | 520    | 1,080  | 365    | 80    | 52    |
| 2     | 31    | 53    | 98    | 40    | 724    | 90    | 73     | 710    | 1,230  | 375    | 79    | 57    |
| 3     | 31    | 48    | 91    | 35    | 478    | 95    | 73     | 968    | 1,100  | 360    | 82    | 61    |
| 4     | 29    | 50    | 87    | 30    | 356    | 96    | 76     | 1,360  | 1,050  | 342    | 76    | 48    |
| 5     | 38    | 51    | 85    | 25    | 275    | 102   | 84     | 1,740  | 1,720  | 324    | 71    | 44    |
| 6     | 44    | 58    | 90    | 30    | 230    | 94    | 112    | 1,620  | 1,630  | 320    | 70    | 42    |
| 7     | 35    | 56    | 128   | 35    | 202    | 89    | 159    | 1,410  | 1,360  | 275    | 69    | 40    |
| 8     | 34    | 54    | 158   | 40    | 180    | 89    | 161    | 1,390  | 1,390  | 250    | 66    | 39    |
| 9     | 36    | 71    | 136   | 45    | 189    | 86    | 170    | 1,420  | 1,240  | 258    | 63    | 38    |
| 10    | 40    | 77    | 123   | 40    | 180    | 86    | 189    | 1,410  | 1,100  | 284    | 62    | 37    |
| 11    | 42    | 71    | 116   | 35    | 189    | 84    | 173    | 1,530  | 984    | 254    | 59    | 37    |
| 12    | 103   | 74    | 104   | 30    | 180    | 84    | 159    | 1,640  | 952    | 227    | 58    | 36    |
| 13    | 76    | 73    | 95    | 35    | 223    | 82    | 156    | 1,900  | 944    | 209    | 57    | 35    |
| 14    | 65    | 67    | 100   | 40    | 279    | 79    | 180    | 1,570  | 968    | 195    | 56    | 34    |
| 15    | 59    | 64    | 110   | 50    | 284    | 79    | 230    | 1,100  | 773    | 186    | 53    | 33    |
| 16    | 55    | 67    | 120   | 60    | 254    | 77    | 227    | 992    | 668    | 176    | 52    | 34    |
| 17    | 53    | 90    | 80    | 80    | 220    | 70    | 209    | 829    | 628    | 167    | 51    | 34    |
| 18    | 51    | 86    | 75    | 100   | 195    | 64    | 192    | 703    | 634    | 159    | 50    | 33    |
| 19    | 59    | 80    | 70    | 150   | 176    | 66    | 202    | 628    | 661    | 148    | 49    | 32    |
| 20    | 62    | 75    | 65    | 200   | 159    | 68    | 250    | 604    | 682    | 140    | 48    | 35    |
| 21    | 72    | 72    | 60    | 170   | 148    | 70    | 320    | 526    | 738    | 132    | 46    | 33    |
| 22    | 70    | 70    | 50    | 153   | 142    | 68    | 380    | 508    | 815    | 126    | 46    | 32    |
| 23    | 69    | 65    | 40    | 140   | 132    | 66    | 526    | 586    | 794    | 119    | 52    | 31    |
| 24    | 81    | 150   | 42    | 128   | 130    | 68    | 661    | 815    | 654    | 112    | 47    | 30    |
| 25    | 74    | 269   | 44    | 116   | 126    | 70    | 766    | 1,140  | 682    | 108    | 45    | 30    |
| 26    | 67    | 192   | 46    | 114   | 119    | 73    | 654    | 1,450  | 598    | 102    | 44    | 30    |
| 27    | 63    | 158   | 48    | 104   | 110    | 71    | 544    | 1,740  | 472    | 98     | 42    | 35    |
| 28    | 59    | 144   | 50    | 98    | 100    | 70    | 460    | 1,800  | 420    | 98     | 41    | 45    |
| 29    | 56    | 128   | 52    | 98    | -----  | 71    | 420    | 1,570  | 410    | 92     | 40    | 37    |
| 30    | 56    | 116   | 52    | 592   | -----  | 74    | 435    | 1,390  | 375    | 87     | 45    | 34    |
| 31    | 55    | ----- | 50    | 1,040 | -----  | 76    | -----  | 1,220  | -----  | 84     | 47    | ----- |
| TOTAL | 1,697 | 2,683 | 2,571 | 3,898 | 6,990  | 2,447 | 8,314  | 36,789 | 26,752 | 6,172  | 1,746 | 1,138 |
| MEAN  | 54.7  | 89.4  | 82.9  | 126   | 250    | 78.9  | 277    | 1,187  | 892    | 199    | 56.3  | 37.9  |
| MAX   | 103   | 269   | 158   | 1,040 | 1,010  | 102   | 766    | 1,900  | 1,720  | 375    | 82    | 61    |
| MIN   | 29    | 48    | 40    | 25    | 100    | 64    | 73     | 508    | 375    | 84     | 40    | 30    |
| CFSM  | .77   | 1.25  | 1.16  | 1.77  | 3.51   | 1.11  | 3.89   | 16.6   | 12.5   | 2.79   | .79   | .53   |
| IN.   | .89   | 1.40  | 1.34  | 2.03  | 3.65   | 1.28  | 4.34   | 19.19  | 13.96  | 3.22   | .91   | .59   |
| AC-FT | 3,370 | 5,320 | 5,100 | 7,730 | 13,860 | 4,850 | 16,490 | 72,970 | 53,060 | 12,240 | 3,460 | 2,260 |

CAL YR 1970 TOTAL 82,576 MEAN 226 MAX 2,340 MIN 25 CFSM 3.17 IN 43.08 AC-FT 163,800  
WTR YR 1971 TOTAL 101,197 MEAN 277 MAX 1,900 MIN 25 CFSM 3.89 IN 52.80 AC-FT 200,700

PEAK DISCHARGE (BASE, 1,400 CFS, REVISED)

NOTE.--Stage-discharge relation affected by ice Dec. 13 to Jan. 20.

| DATE | TIME | G.HT. | DISCHARGE | DATE | TIME | G.HT. | DISCHARGE |
|------|------|-------|-----------|------|------|-------|-----------|
| 5-5  | 2015 | 4.83  | 1,820     | 5-27 | 2100 | 5.00  | 1,990     |
| 5-13 | 1830 | 5.05  | 2,040     | 6-5  | 1830 | 4.97  | 1,960     |



12361950 Hungry Horse Creek near Hungry Horse, Mont.

LOCATION.--Lat 48°20'51", long 113°54'11", in NW¼NW¼SE¼ sec.21, T.30 N., R.18 W., Flathead County, Flathead National Forest, on right bank 300 ft upstream from road bridge and Hungry Horse Reservoir flow line, and 7.7 miles southeast of Hungry Horse.

DRAINAGE AREA.--23.3 sq mi.

PERIOD OF RECORD.--April 1965 to May 1968 (occasional discharge measurements). May 1969 to current year (no winter records).

GAGE.--Water-stage recorder. Altitude of gage is 3,580 ft (from topographic map). Prior to Oct. 22, 1969, nonrecording gage at same site and datum.

EXTREMES.--Current year: Maximum discharge, 800 cfs June 5 (gage height, 3.44 ft); minimum, 6.3 cfs Oct. 4, 5 (gage height, 1.15 ft).

Period of record: Maximum discharge, 800 cfs June 5, 1971 (gage height, 3.44 ft); minimum, 4.0 cfs Nov. 21, 1969 (gage height, 0.86 ft), caused by temporary regulation upstream.

REMARKS.--Records good.

COOPERATION.--Gage-height record collected in cooperation with Montana Fish and Game Department.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY   | OCT   | NOV   | DEC | JAN | FEB | MAR | APR   | MAY    | JUN    | JUL   | AUG   | SEP   |
|-------|-------|-------|-----|-----|-----|-----|-------|--------|--------|-------|-------|-------|
| 1     | 7.4   | 10    |     |     |     |     |       | 152    | 208    | 96    | 19    | 10    |
| 2     | 7.4   | 12    |     |     |     |     |       | 218    | 202    | 100   | 18    |       |
| 3     | 6.8   | 12    |     |     |     |     |       | 338    | 180    | 94    | 18    |       |
| 4     | 6.8   | 12    |     |     |     |     |       | 494    | 180    | 81    | 17    |       |
| 5     | 7.9   | 12    |     |     |     |     |       | 530    | 531    | 76    | 16    |       |
| 6     | 9.0   | -     |     |     |     |     |       | 433    | 494    | 80    | 16    |       |
| 7     | 7.4   | -     |     |     |     |     |       | 348    | 307    | 71    | 16    |       |
| 8     | 7.4   | -     |     |     |     |     |       | 330    | 298    | 62    | 15    |       |
| 9     | 8.5   | -     |     |     |     |     |       | 330    | 262    | 61    | 14    |       |
| 10    | 9.7   | -     |     |     |     |     |       | 348    | 212    | 81    | 13    |       |
| 11    | 9.0   | -     |     |     |     |     |       | 367    | 180    | 86    | 13    |       |
| 12    | 14    | -     |     |     |     |     |       | 438    | 172    | 80    | 12    |       |
| 13    | 12    | -     |     |     |     |     |       | 550    | 174    | 74    | 12    |       |
| 14    | 11    | -     |     |     |     |     |       | 450    | 180    | 68    | 12    |       |
| 15    | 11    | -     |     |     |     |     |       | 350    | 144    | 64    | 12    |       |
| 16    | 10    | -     |     |     |     |     |       | 250    | 120    | 58    | 11    |       |
| 17    | 10    | -     |     |     |     |     |       | 154    | 104    | 53    | 10    |       |
| 18    | 10    | -     |     |     |     |     |       | 131    | 104    | 50    | 10    |       |
| 19    | 11    | -     |     |     |     |     |       | 120    | 106    | 46    | 10    |       |
| 20    | 11    | -     |     |     |     |     |       | 122    | 117    | 41    | 10    |       |
| 21    | 12    | -     |     |     |     |     |       | 110    | 122    | 38    | 9.7   |       |
| 22    | 12    | -     |     |     |     |     |       | 108    | 134    | 38    | 9.7   |       |
| 23    | 12    | -     |     |     |     |     |       | 117    | 139    | 33    | 10    |       |
| 24    | 14    | -     |     |     |     |     |       | 144    | 106    | 30    | 9.7   |       |
| 25    | 13    | -     |     |     |     |     |       | 205    | 108    | 28    | 9.7   |       |
| 26    | 12    | -     |     |     |     |     |       | 290    | 102    | 27    | 9.0   |       |
| 27    | 11    | -     |     |     |     |     |       | 381    | 85     | 26    | 9.0   |       |
| 28    | 11    | -     |     |     |     |     |       | 407    | 76     | 24    | 9.0   |       |
| 29    | 10    | -     |     |     |     |     |       | 329    | 85     | 22    | 8.5   |       |
| 30    | 10    | -     |     |     |     |     | 131   | 282    | 80     | 22    | 10    |       |
| 31    | 11    | ----- |     |     |     |     | ----- | 243    | -----  | 21    | 10    | ----- |
| TOTAL | 315.3 | -     |     |     |     |     |       | 9,069  | 5,312  | 1,731 | 378.3 |       |
| MEAN  | 10.2  | -     |     |     |     |     |       | 293    | 177    | 55.8  | 12.2  |       |
| MAX   | 14    | -     |     |     |     |     |       | 550    | 531    | 100   | 19    |       |
| MIN   | 6.8   | -     |     |     |     |     |       | 108    | 76     | 21    | 8.5   |       |
| CFSM  | .44   | -     |     |     |     |     |       | 12.6   | 7.60   | 2.39  | .52   |       |
| IN.   | .50   | -     |     |     |     |     |       | 14.48  | 8.48   | 2.76  | .60   |       |
| AC-FT | 625   | -     |     |     |     |     |       | 17,990 | 10,540 | 3,430 | 750   |       |

|             |       |   |      |   |     |   |     |   |      |   |     |   |       |   |
|-------------|-------|---|------|---|-----|---|-----|---|------|---|-----|---|-------|---|
| CAL YR 1970 | TOTAL | - | MEAN | - | MAX | - | MIN | - | CFSM | - | IN. | - | AC-FT | - |
| WTR YR 1971 | TOTAL | - | MEAN | - | MAX | - | MIN | - | CFSM | - | IN. | - | AC-FT | - |

## PEAK DISCHARGE (BASE, 350 CFS)

| DATE | TIME | G.HT. | DISCHARGE | DATE | TIME | G.HT. | DISCHARGE |
|------|------|-------|-----------|------|------|-------|-----------|
| 5-5  | --   | --    | a570      | 5-28 | 0400 | 2.91  | 444       |
| 5-13 | --   | --    | a600      | 6-5  | 1600 | 3.44  | 800       |

a About.

## PEND OREILLE RIVER BASIN

12362000 Hungry Horse Reservoir near Hungry Horse, Mont.

LOCATION.--Lat 48°20'28", long 114°00'48", in NE 1/4 NW 1/4 sec. 27, T. 30 N., R. 19 W., Flathead County, in block 14 of Hungry Horse Dam, on South Fork Flathead River, 3.8 miles southeast of Hungry Horse, and at mile 5.2.

DRAINAGE AREA.--1,654 sq mi.

PERIOD OF RECORD.--September 1951 to current year.

GAGE.--Water-stage recorder equipped with remote indicator in power house. Datum of gage is at mean sea level (levels by Bureau of Reclamation). During construction and prior to May 1, 1953, various types of non-recording gages were used.

EXTREMES.--Current year: Maximum contents observed, 3,453,000 acre-ft Aug. 16 (elevation, 3,561.03 ft); minimum observed, 1,609,000 acre-ft Apr. 21 (elevation, 3,463.08 ft).

Period of record: Maximum contents observed, 3,461,000 acre-ft July 3, 4, 1955, Aug. 6, 1956; maximum elevation observed, 3,561.40 ft July 3, 4, 1955; minimum contents observed since normal low operating level reached in May 1952, 607,700 acre-ft Jan. 13, 1953 (elevation, 3,362.50 ft).

REMARKS.--Reservoir and flow completely controlled by concrete arch-gravity dam; construction began in 1948, completed in 1952. Storage began Sept. 21, 1951. Usable capacity, 3,428,000 acre-ft between elevations 3,196 ft (lowest outlet) and 3,560 ft (controlled spillway elevation). Dead storage, 40,140 acre-ft below elevation 3,196 ft. Minimum operating level, 3,336 ft for on-site power generation (usable contents, 445,900 acre-ft). Water is used for power production, flood control, irrigation and recreation. Controlled spillway is an adjustable ring gate without flashboards. Figures given herein represent usable contents.

COOPERATION.--Daily elevations furnished by Bureau of Reclamation.

Capacity table  
(elevation, in feet and contents, in acre-feet)

|       |           |
|-------|-----------|
| 3,460 | 1,567,000 |
| 3,470 | 1,707,000 |
| 3,480 | 1,859,000 |
| 3,500 | 2,186,000 |
| 3,520 | 2,560,000 |
| 3,540 | 2,974,000 |
| 3,565 | 3,548,000 |

ELEVATION, IN FEET, AT 2359, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY  | OCT      | NOV     | DEC      | JAN      | FEB      | MAR      | APR      | MAY      | JUN      | JUL      | AUG     | SEP      |
|------|----------|---------|----------|----------|----------|----------|----------|----------|----------|----------|---------|----------|
| 1    | 137.22   | 123.64  | 122.31   | 104.24   | 89.07    | 95.33    | 86.48    | 65.11    | 124.53   | 154.18   | 161.00  | 160.18   |
| 2    | 136.42   | 123.48  | 122.40   | 103.75   | 90.39    | 95.16    | 85.28    | 64.77    | 125.98   | 154.24   | 161.00  | 160.24   |
| 3    | 135.63   | 123.51  | 122.35   | 102.77   | 91.08    | 95.02    | 84.56    | 65.04    | 127.31   | 154.50   | 160.97  | 160.29   |
| 4    | 134.84   | 123.53  | 122.18   | 101.74   | 91.80    | 95.15    | 83.82    | 66.06    | 128.68   | 154.80   | 160.95  | 160.32   |
| 5    | 134.06   | 123.55  | 122.28   | 100.74   | 92.37    | 95.21    | 82.60    | 68.50    | 130.45   | 155.10   | 160.94  | 160.36   |
| 6    | 133.51   | 123.60  | 122.40   | 99.66    | 92.84    | 95.33    | 81.38    | 71.50    | 132.05   | 155.54   | 160.94  | 160.38   |
| 7    | 132.94   | 123.62  | 122.14   | 98.59    | 93.24    | 95.47    | 80.40    | 74.03    | 133.47   | 155.92   | 160.94  | 159.94   |
| 8    | 132.35   | 123.66  | 121.36   | 97.52    | 93.11    | 95.54    | 79.44    | 76.55    | 135.22   | 156.26   | 160.91  | 159.24   |
| 9    | 131.60   | 123.70  | 120.49   | 96.47    | 93.18    | 95.60    | 78.21    | 79.26    | 136.92   | 156.68   | 160.89  | 158.55   |
| 10   | 130.95   | 123.72  | 119.65   | 95.40    | 93.54    | 95.77    | 76.87    | 81.90    | 138.44   | 157.21   | 160.89  | 157.89   |
| 11   | 130.75   | 123.57  | 118.85   | 94.34    | 93.85    | 95.78    | 75.40    | 84.63    | 139.68   | 157.85   | 160.84  | 157.94   |
| 12   | 130.15   | 122.97  | 117.99   | 93.22    | 94.16    | 95.87    | 73.93    | 87.62    | 140.86   | 158.31   | 160.80  | 157.64   |
| 13   | 129.45   | 122.41  | 117.05   | 92.13    | 94.50    | 96.00    | 72.43    | 90.96    | 142.12   | 158.73   | 160.85  | 156.93   |
| 14   | 128.69   | 122.46  | 116.16   | 91.00    | 94.87    | 96.09    | 70.95    | 93.86    | 143.48   | 159.16   | 160.92  | 156.64   |
| 15   | 127.91   | 122.48  | 115.31   | 89.96    | 95.29    | 95.67    | 69.60    | 96.04    | 144.55   | 159.58   | 160.99  | 156.57   |
| 16   | 127.62   | 122.55  | 114.44   | 88.81    | 95.65    | 95.30    | 67.87    | 97.96    | 145.42   | 159.68   | 161.03  | 156.15   |
| 17   | 127.66   | 122.61  | 113.53   | 88.68    | 95.98    | 95.05    | 66.49    | 99.20    | 146.20   | 159.96   | 160.98  | 155.85   |
| 18   | 127.69   | 122.70  | 112.63   | 88.74    | 96.01    | 94.34    | 65.06    | 100.55   | 146.99   | 160.15   | 160.97  | 155.85   |
| 19   | 127.48   | 122.77  | 112.36   | 88.93    | 95.99    | 93.72    | 63.84    | 101.77   | 147.86   | 160.32   | 160.96  | 155.85   |
| 20   | 126.87   | 122.80  | 112.26   | 89.12    | 96.22    | 93.77    | 63.10    | 102.91   | 148.72   | 160.52   | 160.94  | 155.47   |
| 21   | 126.48   | 122.65  | 111.43   | 89.29    | 96.44    | 93.81    | 63.08    | 103.91   | 149.76   | 160.64   | 160.89  | 154.95   |
| 22   | 125.90   | 121.97  | 110.46   | 88.71    | 96.46    | 93.53    | 63.72    | 104.83   | 150.94   | 160.75   | 160.46  | 154.44   |
| 23   | 125.16   | 121.25  | 109.52   | 88.84    | 96.45    | 93.00    | 64.78    | 105.80   | 152.09   | 160.83   | 159.94  | 154.07   |
| 24   | 125.26   | 121.43  | 108.93   | 89.00    | 96.08    | 92.48    | 66.14    | 106.95   | 152.96   | 160.90   | 159.78  | 153.75   |
| 25   | 125.30   | 121.61  | 108.98   | 88.85    | 96.02    | 92.00    | 67.83    | 108.52   | 153.56   | 160.93   | 159.82  | 153.75   |
| 26   | 125.31   | 121.77  | 109.03   | 88.79    | 95.58    | 91.43    | 68.84    | 110.36   | 154.00   | 160.87   | 159.86  | 153.77   |
| 27   | 124.78   | 121.84  | 108.62   | 88.91    | 95.51    | 90.69    | 68.26    | 112.64   | 154.25   | 160.90   | 159.90  | 153.42   |
| 28   | 124.23   | 121.97  | 107.65   | 88.71    | 95.66    | 89.95    | 67.59    | 115.35   | 154.38   | 160.98   | 159.93  | 152.92   |
| 29   | 123.95   | 122.10  | 106.70   | 87.62    | -----    | 89.15    | 66.62    | 118.28   | 154.43   | 160.97   | 159.97  | 152.42   |
| 30   | 123.59   | 122.24  | 105.74   | 86.90    | -----    | 88.42    | 65.79    | 120.90   | 154.32   | 161.00   | 160.05  | 151.95   |
| 31   | 123.61   | -----   | 104.75   | 87.68    | -----    | 87.69    | -----    | 122.97   | -----    | 161.00   | 160.13  | -----    |
| MAX  | 137.22   | 123.76  | 122.40   | 104.24   | 96.46    | 96.09    | 86.48    | 122.97   | 154.43   | 161.00   | 161.03  | 160.38   |
| MIN  | 123.59   | 121.25  | 104.75   | 86.90    | 89.07    | 87.69    | 63.08    | 64.77    | 124.53   | 154.18   | 159.78  | 151.95   |
| (+)  | 2,631    | 2,605   | 2,271    | 1,980    | 2,111    | 1,980    | 1,647    | 2,618    | 3,296    | 3,452    | 3,431   | 3,241    |
| (++) | -300,000 | -26,000 | -334,000 | -291,000 | +131,000 | -131,000 | -333,000 | +971,000 | +678,000 | +156,000 | -21,000 | -190,000 |

CAL YR 1970 . . . . . ++ +259,000

WTR YR 1971 . . . . . ++ +310,000

† Contents, in thousands of acre-feet, at end of month.

++ Change in contents, in acre-feet.

NOTE.--Add 3,400 ft to obtain elevation above mean sea level.

12362500 South Fork Flathead River near Columbia Falls, Mont.

LOCATION.--Lat 48°21'24", long 114°02'12", in SW 1/4 SE 1/4 SW 1/4 sec. 16, T.30 N., R.19 W., Flathead County, on right bank 1.7 miles downstream from Hungry Horse Dam, 3.5 miles upstream from mouth, and 6.8 miles east of Columbia Falls.

DRAINAGE AREA.--1,663 sq mi.

PERIOD OF RECORD.--September 1910 to January 1911 (discharge measurements only), February 1911 to September 1913 (no winter records), October 1913 to August 1916 (scattered daily discharge only), water years 1917-22 (annual maximum), April 1923 to November 1924 (no winter records), July to October 1925, May to November 1927, May 1928 to current year. Monthly discharge only for some periods, published in WSP 1316.

GAGE.--Water-stage recorder. Datum of gage is 3,040.0 ft above mean sea level (levels by Bureau of Reclamation). September 1910 to September 1916, nonrecording gage, and Apr. 23, 1923, to Sept. 30, 1928, water-stage recorder at site 3 miles downstream at different datum. Oct. 1, 1928, to Sept. 30, 1952, water-stage recorder at site 1.5 miles downstream at different datum.

AVERAGE DISCHARGE.--43 years, 3,551 cfs (29.00 inches per year, 2,573,000 acre-ft per year), adjusted for change in contents in Hungry Horse Reservoir since Oct. 1, 1951.

EXTREMES.--Current year: Maximum discharge, 20,700 cfs Apr. 29 (gage height, 14.42 ft); minimum daily, 157 cfs May 23.

Period of record: Maximum discharge observed, 46,200 cfs June 19, 1916 (gage height, 16.6 ft, site and datum then in use), from rating curve extended above 20,000 cfs; minimum observed, 7.3 cfs Sept. 24, 1951 (gage height, 0.52 ft, dam closure), site and datum then in use; minimum daily, 7.3 cfs Sept. 24, 1951.

REMARKS.--Records excellent. Flow regulated since Sept. 21, 1951, by Hungry Horse Reservoir (see preceding page).

REVISIONS (WATER YEARS).--WSP 1216: Drainage area. WSP 1316: 1923-24(M), 1926-27(M), 1932(M), 1935-36(M). WSP 1636: 1958 (adjusted runoff).

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY     | OCT     | NOV    | DEC     | JAN     | FEB     | MAR     | APR     | MAY       | JUN     | JUL     | AUG     | SEP     |
|---------|---------|--------|---------|---------|---------|---------|---------|-----------|---------|---------|---------|---------|
| 1       | 9,360   | 372    | 396     | 5,490   | 2,410   | 4,660   | 11,200  | 12,900    | 3,160   | 8,930   | 2,380   | 375     |
| 2       | 9,380   | 2,210  | 391     | 4,960   | 393     | 3,430   | 11,000  | 12,900    | 2,870   | 6,750   | 2,380   | 375     |
| 3       | 9,360   | 387    | 2,260   | 9,390   | 2,660   | 2,790   | 7,310   | 13,000    | 3,110   | 4,960   | 2,390   | 371     |
| 4       | 9,370   | 387    | 2,190   | 9,860   | 403     | 385     | 7,310   | 13,200    | 3,070   | 4,470   | 2,390   | 379     |
| 5       | 9,350   | 384    | 394     | 9,840   | 402     | 1,030   | 11,000  | 6,880     | 3,180   | 3,500   | 2,220   | 379     |
| 6       | 6,500   | 380    | 396     | 10,100  | 402     | 403     | 11,400  | 178       | 3,110   | 2,530   | 2,100   | 368     |
| 7       | 6,680   | 381    | 4,620   | 10,300  | 404     | 401     | 10,100  | 159       | 3,090   | 2,110   | 2,100   | 6,320   |
| 8       | 7,230   | 383    | 9,630   | 10,300  | 4,270   | 842     | 10,300  | 354       | 2,720   | 2,110   | 2,100   | 9,090   |
| 9       | 8,660   | 386    | 9,650   | 10,300  | 2,270   | 1,030   | 12,100  | 176       | 3,160   | 1,170   | 2,100   | 9,020   |
| 10      | 7,690   | 1,300  | 9,650   | 10,300  | 885     | 391     | 14,300  | 173       | 2,900   | 417     | 1,540   | 8,740   |
| 11      | 3,120   | 2,510  | 9,630   | 10,300  | 380     | 1,140   | 14,300  | 176       | 3,720   | 421     | 2,290   | 380     |
| 12      | 7,440   | 7,130  | 9,730   | 10,300  | 385     | 853     | 14,300  | 186       | 3,020   | 421     | 1,640   | 4,030   |
| 13      | 8,480   | 6,420  | 9,760   | 10,100  | 386     | 387     | 14,300  | 569       | 3,030   | 403     | 804     | 9,160   |
| 14      | 8,910   | 406    | 9,810   | 10,500  | 386     | 383     | 14,200  | 361       | 3,030   | 395     | 399     | 3,800   |
| 15      | 9,030   | 387    | 9,790   | 10,500  | 383     | 5,080   | 14,200  | 187       | 3,020   | 414     | 382     | 1,490   |
| 16      | 3,640   | 393    | 9,840   | 10,500  | 381     | 4,420   | 16,900  | 176       | 3,050   | 4,100   | 689     | 5,630   |
| 17      | 398     | 388    | 9,860   | 2,170   | 380     | 3,220   | 14,100  | 3,300     | 2,980   | 2,160   | 1,700   | 3,990   |
| 18      | 374     | 385    | 9,870   | 369     | 2,830   | 7,370   | 14,100  | 452       | 3,040   | 3,090   | 997     | 426     |
| 19      | 3,300   | 378    | 3,550   | 390     | 2,950   | 6,390   | 12,700  | 313       | 3,000   | 3,030   | 1,230   | 385     |
| 20      | 7,220   | 375    | 1,250   | 394     | 487     | 424     | 10,200  | 168       | 2,970   | 2,400   | 1,050   | 5,350   |
| 21      | 5,020   | 2,020  | 9,790   | 385     | 396     | 699     | 5,520   | 163       | 3,000   | 3,140   | 1,700   | 6,880   |
| 22      | 7,070   | 7,480  | 9,860   | 6,920   | 2,040   | 3,550   | 1,820   | 159       | 3,050   | 3,040   | 6,120   | 6,600   |
| 23      | 8,470   | 8,580  | 9,850   | 662     | 2,540   | 5,870   | 430     | 157       | 4,530   | 3,040   | 7,480   | 4,900   |
| 24      | 399     | 407    | 6,240   | 403     | 5,630   | 5,490   | 429     | 168       | 6,830   | 3,040   | 2,740   | 4,370   |
| 25      | 389     | 391    | 385     | 2,790   | 2,570   | 5,300   | 432     | 178       | 8,960   | 3,040   | 384     | 370     |
| 26      | 901     | 391    | 384     | 2,480   | 5,820   | 6,330   | 4,940   | 1,650     | 8,990   | 4,010   | 382     | 371     |
| 27      | 5,960   | 388    | 4,900   | 391     | 2,370   | 7,320   | 14,200  | 3,950     | 8,990   | 2,650   | 385     | 5,230   |
| 28      | 6,430   | 385    | 9,960   | 3,170   | 381     | 7,310   | 13,500  | 3,630     | 8,950   | 2,580   | 384     | 6,370   |
| 29      | 3,620   | 388    | 9,980   | 10,500  | -----   | 8,080   | 14,800  | 239       | 8,980   | 2,480   | 377     | 6,360   |
| 30      | 4,460   | 394    | 10,000  | 10,600  | -----   | 7,310   | 13,100  | 199       | 9,060   | 2,170   | 365     | 6,460   |
| 31      | 429     | -----  | 10,000  | 3,690   | -----   | 7,310   | -----   | 1,510     | -----   | 2,370   | 366     | -----   |
| TOTAL   | 178,640 | 46,166 | 204,016 | 198,354 | 45,194  | 109,598 | 314,491 | 77,811    | 132,570 | 85,341  | 53,564  | 117,969 |
| MEAN    | 5,763   | 1,539  | 6,581   | 6,399   | 1,614   | 3,535   | 10,480  | 2,510     | 4,419   | 2,753   | 1,728   | 3,932   |
| MAX     | 9,380   | 8,580  | 10,000  | 10,600  | 5,820   | 8,080   | 16,900  | 13,200    | 9,060   | 8,930   | 7,480   | 9,160   |
| MIN     | 374     | 372    | 384     | 369     | 380     | 383     | 429     | 157       | 2,720   | 395     | 365     | 368     |
| AC-FT   | 354,300 | 91,570 | 404,700 | 393,400 | 89,640  | 217,400 | 623,800 | 154,300   | 263,000 | 169,300 | 106,200 | 234,000 |
| MEAN †  | 883     | 1,102  | 1,150   | 1,665   | 3,973   | 1,405   | 4,887   | 18,300    | 15,810  | 5,290   | 1,386   | 739     |
| CFSM †  | .53     | .66    | .69     | 1.00    | 2.39    | .84     | 2.94    | 11.0      | 9.51    | 3.18    | .83     | .44     |
| IN. †   | .61     | .74    | .80     | 1.15    | 2.49    | .97     | 3.28    | 12.69     | 10.61   | 3.67    | .96     | .50     |
| AC-FT † | 54,300  | 65,570 | 70,700  | 102,400 | 220,600 | 86,400  | 290,800 | 1,125,000 | 941,000 | 325,300 | 85,200  | 44,000  |

## OBSERVED

|             |       |           |      |       |     |        |     |     |       |           |
|-------------|-------|-----------|------|-------|-----|--------|-----|-----|-------|-----------|
| CAL YR 1970 | TOTAL | 1,167,177 | MEAN | 3,198 | MAX | 11,100 | MIN | 163 | AC-FT | 2,315,000 |
| WTR YR 1971 | TOTAL | 1,563,714 | MEAN | 4,284 | MAX | 16,900 | MIN | 157 | AC-FT | 3,102,000 |

## ADJUSTED

|             |       |           |      |       |      |      |     |       |       |           |
|-------------|-------|-----------|------|-------|------|------|-----|-------|-------|-----------|
| CAL YR 1970 | TOTAL | 1,297,786 | MEAN | 3,556 | CFSM | 2.14 | IN. | 29.02 | AC-FT | 2,574,000 |
| WTR YR 1971 | TOTAL | 1,719,995 | MEAN | 4,712 | CFSM | 2.83 | IN. | 38.46 | AC-FT | 3,214,000 |

† Adjusted for change in contents in Hungry Horse Reservoir.

## PEND OREILLE RIVER BASIN

12363000 Flathead River at Columbia Falls, Mont.

LOCATION.--Lat 48°21'43", long 114°11'02", in NW1/4 sec. 17, T.30 N., R.20 W., Flathead County, on right bank 200 ft downstream from county road bridge at Columbia Falls, 5.7 miles downstream from South Fork, and at mile 143.0.

DRAINAGE AREA.--4,464 sq mi.

PERIOD OF RECORD.--May 1922 to September 1923 (fragmentary), June 1928 to current year. Monthly discharge only for some periods, published in WSP 1316.

GAGE.--Water-stage recorder. Datum of gage is 2,977.67 ft above mean sea level (levels by Corps of Engineers). Prior to Nov. 12, 1928, nonrecording gage on bridge 200 ft upstream at datum 0.19 ft higher.

AVERAGE DISCHARGE.--43 years, 9,712 cfs (29.54 inches per year, 7,036,000 acre-ft per year), adjusted for change in contents in Hungry Horse Reservoir since Oct. 1, 1951.

EXTREMES.--Current year: Maximum discharge, 51,100 cfs May 28 (gage height, 13.38 ft); minimum daily, 1,550 cfs Nov. 4, 5.

Period of record: Maximum discharge, 176,000 cfs June 9, 1964 (gage height, 25.58 ft, from floodmarks), from rating curve extended above 95,000 cfs on basis of slope-area measurement of peak flow; minimum, 798 cfs Dec. 8, 1929 (gage height, -0.08 ft).

Flood in June 1894 reached a stage of 22.7 ft, from floodmarks (discharge, 142,000 cfs, from rating curve extended above 95,000 cfs on basis of slope-area measurement of peak flow in 1964).

REMARKS.--Records excellent. South Fork Flathead River, which contributes about one-third of flow, completely regulated by Hungry Horse Reservoir 10.9 miles upstream since Sept. 21, 1951 (see p. 222).

REVISIONS (WATER YEARS).--WSP 1092: 1923. WSP 1216: Drainage area. WSP 1636: 1958 (adjusted runoff).

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY     | OCT     | NOV     | DEC     | JAN     | FEB     | MAR     | APR     | MAY     | JUN     | JUL     | AUG     | SEP     |
|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 1       | 10,900  | 1,600   | 1,960   | 6,770   | 12,200  | 6,830   | 12,500  | 25,900  | 34,900  | 24,300  | 8,840   | 3,300   |
| 2       | 10,900  | 3,400   | 1,870   | 5,940   | 10,000  | 5,260   | 12,700  | 28,200  | 32,000  | 22,800  | 8,790   | 3,260   |
| 3       | 10,900  | 1,600   | 2,740   | 10,100  | 10,800  | 5,720   | 9,200   | 32,800  | 31,000  | 20,700  | 8,880   | 3,180   |
| 4       | 10,900  | 1,550   | 4,560   | 10,500  | 7,770   | 2,640   | 9,030   | 37,900  | 30,400  | 19,400  | 8,950   | 3,070   |
| 5       | 10,900  | 1,550   | 1,720   | 10,500  | 6,370   | 3,160   | 12,400  | 39,200  | 34,000  | 17,700  | 8,590   | 2,950   |
| 6       | 7,970   | 1,570   | 1,710   | 10,800  | 5,640   | 2,400   | 13,300  | 33,700  | 39,200  | 16,200  | 8,270   | 2,810   |
| 7       | 8,160   | 1,570   | 5,260   | 11,100  | 5,160   | 2,400   | 12,400  | 31,000  | 37,000  | 14,900  | 8,100   | 7,770   |
| 8       | 8,680   | 1,560   | 11,600  | 11,200  | 7,900   | 2,860   | 13,200  | 29,900  | 36,600  | 13,500  | 7,870   | 11,300  |
| 9       | 10,100  | 1,620   | 11,600  | 11,200  | 6,680   | 2,930   | 15,000  | 31,800  | 40,000  | 12,100  | 7,610   | 11,200  |
| 10      | 9,170   | 2,650   | 11,300  | 11,000  | 4,810   | 2,290   | 18,300  | 31,800  | 35,100  | 12,700  | 6,800   | 11,100  |
| 11      | 5,340   | 2,600   | 11,200  | 10,800  | 4,290   | 3,080   | 18,500  | 32,000  | 32,300  | 15,100  | 7,270   | 3,110   |
| 12      | 8,250   | 8,450   | 11,300  | 10,800  | 4,100   | 2,770   | 18,300  | 34,900  | 29,900  | 14,000  | 6,530   | 5,170   |
| 13      | 10,000  | 7,830   | 11,100  | 10,800  | 4,010   | 2,230   | 18,100  | 40,100  | 30,200  | 12,600  | 5,290   | 11,100  |
| 14      | 10,400  | 2,530   | 11,000  | 11,000  | 4,270   | 2,170   | 18,200  | 41,300  | 31,300  | 12,100  | 4,650   | 6,690   |
| 15      | 10,500  | 1,620   | 11,200  | 11,300  | 4,580   | 5,990   | 19,000  | 33,700  | 29,000  | 11,900  | 4,420   | 3,380   |
| 16      | 6,490   | 1,620   | 11,400  | 11,600  | 4,680   | 6,900   | 22,200  | 28,100  | 25,200  | 15,400  | 4,430   | 6,740   |
| 17      | 1,880   | 1,660   | 11,300  | 4,510   | 4,430   | 4,880   | 19,600  | 27,600  | 22,700  | 14,000  | 5,300   | 6,070   |
| 18      | 1,800   | 1,710   | 11,200  | 1,760   | 6,490   | 8,220   | 19,300  | 22,100  | 21,800  | 14,700  | 4,700   | 2,750   |
| 19      | 3,380   | 1,690   | 5,900   | 1,880   | 6,660   | 8,530   | 18,400  | 19,600  | 21,700  | 14,300  | 4,530   | 2,090   |
| 20      | 8,880   | 1,680   | 1,740   | 2,530   | 4,090   | 2,170   | 17,000  | 18,600  | 22,700  | 13,200  | 4,260   | 5,960   |
| 21      | 6,460   | 2,320   | 10,800  | 2,660   | 3,490   | 2,280   | 12,900  | 18,100  | 23,600  | 13,700  | 4,680   | 8,600   |
| 22      | 8,240   | 8,710   | 10,900  | 8,410   | 5,100   | 4,470   | 10,600  | 17,300  | 26,100  | 13,600  | 8,370   | 8,270   |
| 23      | 10,200  | 8,950   | 10,800  | 3,660   | 5,600   | 7,350   | 11,100  | 17,300  | 29,500  | 13,500  | 10,700  | 6,670   |
| 24      | 2,830   | 2,510   | 8,380   | 2,650   | 7,680   | 7,250   | 13,200  | 19,000  | 32,200  | 13,000  | 6,480   | 6,790   |
| 25      | 1,870   | 2,170   | 1,600   | 4,980   | 6,030   | 7,060   | 19,600  | 24,000  | 32,400  | 12,200  | 3,300   | 2,170   |
| 26      | 2,320   | 2,240   | 1,620   | 4,610   | 8,010   | 7,880   | 24,900  | 31,100  | 33,000  | 12,400  | 3,130   | 1,910   |
| 27      | 6,070   | 2,070   | 5,040   | 2,570   | 5,190   | 9,020   | 31,400  | 40,700  | 29,900  | 10,600  | 3,020   | 5,860   |
| 28      | 7,650   | 1,900   | 11,100  | 4,340   | 3,150   | 8,960   | 28,400  | 46,900  | 32,900  | 10,100  | 2,950   | 8,130   |
| 29      | 6,170   | 1,880   | 11,100  | 12,500  | -----   | 9,680   | 27,700  | 43,800  | 26,400  | 9,920   | 2,890   | 7,970   |
| 30      | 4,560   | 1,960   | 11,200  | 13,100  | -----   | 8,990   | 26,200  | 38,700  | 25,100  | 9,150   | 2,970   | 7,980   |
| 31      | 2,760   | -----   | 11,200  | 10,800  | -----   | 9,050   | -----   | 36,700  | -----   | 8,980   | 3,290   | -----   |
| TOTAL   | 224,630 | 84,770  | 245,400 | 246,370 | 169,180 | 165,420 | 522,630 | 953,800 | 908,100 | 438,750 | 185,860 | 177,350 |
| MEAN    | 7,246   | 2,826   | 7,916   | 7,947   | 6,042   | 5,336   | 17,420  | 30,770  | 30,270  | 14,150  | 5,995   | 5,912   |
| MAX     | 10,900  | 8,950   | 11,600  | 13,100  | 12,200  | 9,680   | 31,400  | 46,900  | 40,000  | 24,300  | 10,700  | 11,300  |
| MIN     | 1,800   | 1,550   | 1,600   | 1,760   | 3,150   | 2,170   | 9,030   | 17,300  | 21,700  | 8,980   | 2,890   | 1,910   |
| AC-FT   | 445,600 | 168,100 | 486,800 | 488,700 | 335,600 | 328,100 | 1,037M  | 1,892M  | 1,801M  | 870,300 | 368,700 | 351,800 |
| MEAN †  | 2,368   | 2,388   | 2,485   | 3,215   | 8,401   | 3,205   | 11,830  | 46,560  | 41,660  | 16,690  | 5,655   | 2,719   |
| CFSM †  | .53     | .53     | .56     | .72     | 1.88    | .72     | 2.65    | 10.43   | 9.33    | 3.74    | 1.27    | .61     |
| IN. †   | .61     | .60     | .64     | .83     | 1.96    | .83     | 2.96    | 12.03   | 10.41   | 4.31    | 1.46    | .68     |
| AC-FT † | 145,600 | 142,100 | 152,800 | 197,700 | 466,600 | 197,100 | 704,000 | 2,863M  | 2,479M  | 1,026M  | 347,700 | 161,800 |

## OBSERVED

|             |       |           |      |        |     |        |     |       |       |           |
|-------------|-------|-----------|------|--------|-----|--------|-----|-------|-------|-----------|
| CAL YR 1970 | TOTAL | 3,196,540 | MEAN | 8,758  | MAX | 41,700 | MIN | 1,010 | AC-FT | 6,340,000 |
| WTR YR 1971 | TOTAL | 4,322,260 | MEAN | 11,840 | MAX | 46,900 | MIN | 1,550 | AC-FT | 8,573,000 |

## ADJUSTED

|             |       |           |      |        |      |      |     |       |       |           |
|-------------|-------|-----------|------|--------|------|------|-----|-------|-------|-----------|
| CAL YR 1970 | TOTAL | 3,327,205 | MEAN | 9,116  | CFSM | 2.04 | IN. | 27.72 | AC-FT | 6,599,000 |
| WTR YR 1971 | TOTAL | 4,478,801 | MEAN | 12,270 | CFSM | 2.75 | IN. | 37.31 | AC-FT | 8,883,000 |

† Adjusted for change in contents in Hungry Horse Reservoir.

M Expressed in thousands.



## PEND OREILLE RIVER BASIN

225

12370000 Swan River near Bigfork, Mont.

LOCATION.--Lat 48°01'28", long 113°58'44", near center of S4SW1/4 sec.11, T.26 N., R.19 W., Lake County, on left bank 0.2 mile downstream from Johnson Creek, 0.4 mile downstream from Swan Lake, 5.1 miles southeast of Bigfork, and at mile 14.0.

DRAINAGE AREA.--671 sq mi.

PERIOD OF RECORD.--October 1910 to May 1911 (gage heights only), April 1922 to current year. Monthly discharge only for some periods, published in WSP 1316.

GAGE.--Water-stage recorder. Datum of gage is 3,062.6 ft above mean sea level (from river-profile survey). Oct. 10, 1910, to May 22, 1911, nonrecording gage at site 10 miles upstream at different datum. Apr. 28, 1922, to Oct. 14, 1930, nonrecording gage at site 800 ft upstream at datum 1.9 ft higher.

AVERAGE DISCHARGE.--49 years, 1,155 cfs (23.38 inches per year, 836,800 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 5,440 cfs May 31 (gage height, 5.72 ft); minimum, 413 cfs Jan. 7, 8 (gage height, 2.28 ft), result of freezeup.

Period of record: Maximum discharge, 8,400 cfs May 24, 1948 (gage height, 7.12 ft, from graph based on gage readings); minimum observed, 193 cfs Jan. 26-29, 1930 (gage height, 0.04 ft, site and datum then in use).

REMARKS.--Records excellent. Diversions for irrigation of about 360 acres above station.

REVISIONS (WATER YEARS).--WSP 1216: Drainage area. WSP 1246: 1923-24(M), 1930. WSP 1316: 1923.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT           | NOV        | DEC       | JAN     | FEB       | MAR      | APR             | MAY     | JUN     | JUL     | AUG    | SEP    |
|-------------|---------------|------------|-----------|---------|-----------|----------|-----------------|---------|---------|---------|--------|--------|
| 1           | 529           | 519        | 734       | 507     | 1,710     | 936      | 882             | 2,320   | 5,140   | 3,140   | 1,370  | 705    |
| 2           | 520           | 510        | 718       | 500     | 2,570     | 898      | 890             | 2,240   | 4,910   | 2,820   | 1,320  | 718    |
| 3           | 516           | 503        | 701       | 477     | 3,020     | 866      | 888             | 2,330   | 4,640   | 2,630   | 1,270  | 730    |
| 4           | 513           | 498        | 658       | 454     | 2,920     | 858      | 910             | 2,630   | 4,410   | 2,510   | 1,250  | 728    |
| 5           | 505           | 487        | 656       | 439     | 2,590     | 828      | 946             | 3,260   | 4,370   | 2,420   | 1,210  | 725    |
| 6           | 538           | 494        | 620       | 429     | 2,260     | 787      | 1,010           | 4,250   | 4,470   | 2,400   | 1,180  | 687    |
| 7           | 531           | 492        | 623       | 429     | 1,980     | 773      | 1,140           | 4,830   | 4,490   | 2,380   | 1,170  | 667    |
| 8           | 521           | 496        | 635       | 435     | 1,740     | 761      | 1,360           | 4,880   | 4,380   | 2,300   | 1,150  | 663    |
| 9           | 524           | 503        | 636       | 458     | 1,520     | 753      | 1,530           | 4,770   | 4,430   | 2,210   | 1,110  | 636    |
| 10          | 543           | 510        | 636       | 501     | 1,440     | 746      | 1,640           | 4,700   | 4,520   | 2,160   | 1,080  | 627    |
| 11          | 550           | 525        | 628       | 539     | 1,430     | 745      | 1,750           | 4,700   | 4,500   | 2,220   | 1,050  | 603    |
| 12          | 579           | 522        | 616       | 497     | 1,450     | 752      | 1,730           | 4,750   | 4,330   | 2,240   | 1,020  | 594    |
| 13          | 608           | 525        | 590       | 484     | 1,430     | 749      | 1,680           | 4,940   | 4,100   | 2,180   | 984    | 565    |
| 14          | 626           | 530        | 544       | 472     | 1,460     | 761      | 1,630           | 5,250   | 4,060   | 2,110   | 946    | 556    |
| 15          | 616           | 521        | 534       | 483     | 1,530     | 750      | 1,650           | 5,310   | 4,110   | 2,050   | 914    | 546    |
| 16          | 602           | 518        | 559       | 502     | 1,590     | 735      | 1,730           | 5,010   | 3,980   | 2,010   | 892    | 538    |
| 17          | 590           | 520        | 568       | 521     | 1,590     | 715      | 1,780           | 4,610   | 3,710   | 1,990   | 865    | 528    |
| 18          | 575           | 535        | 575       | 540     | 1,540     | 697      | 1,750           | 4,200   | 3,470   | 2,020   | 847    | 528    |
| 19          | 573           | 553        | 550       | 570     | 1,480     | 679      | 1,710           | 3,770   | 3,340   | 2,030   | 823    | 517    |
| 20          | 575           | 553        | 543       | 631     | 1,400     | 659      | 1,690           | 3,390   | 3,280   | 2,020   | 797    | 516    |
| 21          | 566           | 544        | 530       | 685     | 1,300     | 653      | 1,700           | 3,050   | 3,310   | 2,010   | 767    | 508    |
| 22          | 564           | 529        | 529       | 716     | 1,210     | 649      | 1,780           | 2,770   | 3,470   | 1,990   | 743    | 500    |
| 23          | 571           | 514        | 518       | 729     | 1,160     | 629      | 1,890           | 2,550   | 3,740   | 1,950   | 750    | 500    |
| 24          | 579           | 546        | 505       | 733     | 1,120     | 634      | 2,050           | 2,420   | 4,090   | 1,890   | 745    | 490    |
| 25          | 584           | 636        | 500       | 724     | 1,100     | 638      | 2,290           | 2,440   | 4,290   | 1,830   | 730    | 483    |
| 26          | 582           | 736        | 498       | 741     | 1,050     | 672      | 2,550           | 2,650   | 4,330   | 1,780   | 717    | 486    |
| 27          | 578           | 767        | 499       | 735     | 1,000     | 703      | 2,710           | 3,140   | 4,360   | 1,710   | 697    | 488    |
| 28          | 565           | 768        | 501       | 733     | 968       | 736      | 2,710           | 3,870   | 4,150   | 1,620   | 669    | 487    |
| 29          | 550           | 754        | 506       | 726     | -----     | 758      | 2,590           | 4,690   | 3,880   | 1,560   | 663    | 484    |
| 30          | 540           | 745        | 506       | 765     | -----     | 783      | 2,440           | 5,210   | 3,530   | 1,490   | 655    | 480    |
| 31          | 528           | -----      | 509       | 1,000   | -----     | 842      | -----           | 5,350   | -----   | 1,430   | 685    | -----  |
| TOTAL       | 17,341        | 16,843     | 17,925    | 18,125  | 45,558    | 23,145   | 51,006          | 120,280 | 123,790 | 65,100  | 29,069 | 17,283 |
| MEAN        | 559           | 561        | 578       | 585     | 1,627     | 747      | 1,700           | 3,880   | 4,126   | 2,100   | 938    | 576    |
| MAX         | 626           | 768        | 734       | 1,000   | 3,020     | 936      | 2,710           | 5,350   | 5,140   | 3,140   | 1,370  | 730    |
| MIN         | 505           | 487        | 498       | 429     | 968       | 629      | 882             | 2,240   | 3,280   | 1,430   | 655    | 480    |
| CFSM        | .93           | .84        | .86       | .87     | 2.42      | 1.11     | 2.53            | 5.78    | 6.15    | 3.13    | 1.40   | .86    |
| IN.         | .96           | .93        | .99       | 1.00    | 2.53      | 1.28     | 2.83            | 6.67    | 6.86    | 3.61    | 1.61   | .96    |
| AC-FT       | 34,400        | 33,410     | 35,550    | 35,950  | 90,360    | 45,910   | 101,200         | 238,600 | 245,500 | 129,100 | 57,660 | 34,280 |
| CAL YR 1970 | TOTAL 486,134 | MEAN 1,332 | MAX 7,130 | MIN 330 | CFSM 1.99 | IN 26.95 | AC-FT 964,200   |         |         |         |        |        |
| WTR YR 1971 | TOTAL 545,465 | MEAN 1,494 | MAX 5,350 | MIN 429 | CFSM 2.23 | IN 30.24 | AC-FT 1,082,000 |         |         |         |        |        |



## 12371500 Flathead Lake at Somers, Mont.

LOCATION.--Lat 48°04'22", long 114°13'30", in NE $\frac{1}{4}$ NE $\frac{1}{4}$ SE $\frac{1}{4}$  sec.26, T.27 N., R.21 W., Flathead County, at steam-boat dock at Somers.

DRAINAGE AREA.--7,086 sq mi.

PERIOD OF RECORD.--April to August 1900, daily lake elevations only, at site near Holt, 6 miles east of Somers (datum unknown). August 1908 to November 1909 (fragmentary), January 1910 to current year. Month-end contents only for some periods, published in WSP 1316. Prior to April 1923, published as "at Polson". Oct.1, 1941, to current year, unpublished daily lake elevations at Polson are available in files of Helena District Office.

GAGE.--Water-stage recorder. Datum of gage is at mean sea level (Somers datum). Subtract 1.00 ft to convert Somers datum to datum of 1929, supplementary adjustment of 1947. July 1 to Dec. 12, 1923, nonrecording gage at same site and datum.

EXTREMES.--Current year: Maximum contents, 1,800,000 acre-ft Aug. 5 (elevation, 2,893.07 ft); minimum, 712,200 acre-ft Mar. 22, 23 (elevation, 2,884.18 ft).

Period of record: Maximum contents, 2,208,000 acre-ft June 19, 1933 (elevation, 2,896.26 ft); minimum, 347,000 acre-ft Dec. 5, 1936 (elevation, 2,881.07 ft).

Lake reached an elevation of 2,900 ft during flood in June 1894.

REMARKS.--Natural storage in Flathead Lake increased by construction of Kerr Dam 4 miles downstream from natural lake outlet; storage began Apr. 11, 1938. Usable capacity, 1,791,000 acre-ft at controlled spillway elevation (2,893 ft). Dead storage unknown below 2,878 ft (elevation of natural outlet). Minimum operating level, 2,883 ft for on-site power generation (usable contents, 572,300 acre-ft). Water is used for power production, flood control, recreation, and irrigation. Figures given herein represent usable contents.

Capacity table (elevation, in feet, and contents, in acre-feet)

|       |           |       |           |
|-------|-----------|-------|-----------|
| 2,884 | 690,700   | 2,890 | 1,417,000 |
| 2,886 | 930,300   | 2,892 | 1,665,000 |
| 2,888 | 1,172,000 | 2,894 | 1,917,000 |

## ELEVATION, IN FEET, AT 2400, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY  | OCT      | NOV      | DEC      | JAN      | FEB      | MAR      | APR      | MAY      | JUN      | JUL     | AUG     | SEP     |
|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|---------|---------|---------|
| 1    | 92.27    | 91.15    | 89.98    | 88.98    | 87.86    | 85.94    | 84.39    | 87.39    | 91.00    | 92.92   | 92.97   | 92.68   |
| 2    | 92.35    | 91.09    | 89.98    | 88.94    | 87.94    | 85.88    | 84.48    | 87.55    | 91.00    | 92.94   | 93.04   | 92.60   |
| 3    | 92.37    | 91.01    | 89.93    | 88.97    | 88.03    | 85.77    | 84.52    | 87.76    | 90.97    | 92.93   | 93.05   | 92.58   |
| 4    | 92.43    | 90.94    | 89.88    | 88.97    | 88.04    | 85.62    | 84.54    | 88.08    | 90.98    | 92.92   | 93.04   | 92.55   |
| 5    | 92.45    | 90.89    | 89.83    | 88.96    | 88.04    | 85.50    | 84.56    | 88.42    | 90.94    | 92.93   | 93.03   | 92.52   |
| 6    | 92.40    | 90.81    | 89.78    | 88.95    | 87.97    | 85.36    | 84.65    | 88.61    | 91.01    | 92.98   | 93.03   | 92.50   |
| 7    | 92.38    | 90.76    | 89.74    | 88.95    | 87.90    | 85.25    | 84.84    | 88.81    | 91.06    | 92.96   | 93.04   | 92.52   |
| 8    | 92.33    | 90.71    | 89.72    | 88.95    | 87.82    | 85.12    | 84.90    | 88.96    | 91.12    | 92.95   | 93.02   | 92.62   |
| 9    | 92.32    | 90.63    | 89.72    | 88.95    | 87.78    | 85.03    | 85.00    | 89.10    | 91.24    | 92.94   | 93.02   | 92.68   |
| 10   | 92.35    | 90.55    | 89.74    | 88.95    | 87.73    | 84.96    | 85.12    | 89.26    | 91.25    | 92.93   | 93.01   | 92.76   |
| 11   | 92.34    | 90.53    | 89.73    | 88.94    | 87.61    | 84.80    | 85.24    | 89.40    | 91.20    | 92.97   | 93.03   | 92.74   |
| 12   | 92.30    | 90.58    | 89.67    | 88.92    | 87.50    | 84.68    | 85.36    | 89.58    | 91.12    | 92.99   | 93.03   | 92.70   |
| 13   | 92.30    | 90.62    | 89.67    | 88.89    | 87.40    | 84.60    | 85.48    | 89.96    | 91.11    | 92.95   | 92.99   | 92.71   |
| 14   | 92.32    | 90.60    | 89.65    | 88.86    | 87.27    | 84.52    | 85.60    | 90.30    | 91.04    | 92.94   | 92.96   | 92.73   |
| 15   | 92.31    | 90.57    | 89.64    | 88.89    | 87.15    | 84.44    | 85.73    | 90.62    | 90.96    | 92.91   | 92.92   | 92.60   |
| 16   | 92.28    | 90.54    | 89.65    | 88.86    | 87.03    | 84.40    | 85.83    | 90.88    | 90.96    | 92.85   | 92.90   | 92.58   |
| 17   | 92.20    | 90.48    | 89.63    | 88.78    | 86.94    | 84.38    | 85.95    | 90.89    | 91.06    | 92.77   | 92.94   | 92.57   |
| 18   | 92.10    | 90.44    | 89.63    | 88.71    | 86.85    | 84.35    | 86.07    | 90.76    | 91.17    | 92.76   | 92.93   | 92.55   |
| 19   | 91.95    | 90.37    | 89.54    | 88.67    | 86.75    | 84.36    | 86.15    | 90.62    | 91.28    | 92.85   | 92.91   | 92.44   |
| 20   | 91.97    | 90.33    | 89.33    | 88.60    | 86.67    | 84.30    | 86.23    | 90.38    | 91.38    | 92.92   | 92.92   | 92.39   |
| 21   | 91.88    | 90.18    | 89.28    | 88.48    | 86.55    | 84.25    | 86.21    | 90.20    | 91.50    | 92.98   | 92.90   | 92.37   |
| 22   | 91.85    | 90.15    | 89.29    | 88.38    | 86.45    | 84.18    | 86.21    | 90.02    | 91.67    | 93.01   | 92.93   | 92.37   |
| 23   | 91.84    | 90.23    | 89.27    | 88.29    | 86.40    | 84.19    | 86.15    | 90.02    | 91.86    | 93.00   | 93.01   | 92.32   |
| 24   | 91.80    | 90.28    | 89.23    | 88.20    | 86.35    | 84.20    | 86.13    | 90.11    | 91.97    | 92.92   | 93.00   | 92.34   |
| 25   | 91.67    | 90.20    | 89.05    | 88.10    | 86.30    | 84.20    | 86.21    | 90.10    | 92.15    | 92.91   | 92.92   | 92.30   |
| 26   | 91.54    | 90.15    | 88.90    | 88.00    | 86.19    | 84.24    | 86.35    | 90.13    | 92.31    | 92.95   | 92.89   | 92.25   |
| 27   | 91.40    | 90.08    | 88.75    | 87.86    | 86.11    | 84.24    | 86.65    | 90.27    | 92.38    | 92.92   | 92.82   | 92.21   |
| 28   | 91.35    | 90.08    | 88.78    | 87.80    | 85.97    | 84.27    | 86.90    | 90.45    | 92.53    | 92.92   | 92.76   | 92.24   |
| 29   | 91.32    | 90.03    | 88.85    | 87.79    | -----    | 84.30    | 87.09    | 90.70    | 92.68    | 92.93   | 92.70   | 92.28   |
| 30   | 91.25    | 90.05    | 88.91    | 87.84    | -----    | 84.35    | 87.26    | 90.81    | 92.82    | 92.95   | 92.70   | 92.29   |
| 31   | 91.22    | -----    | 88.98    | 87.82    | -----    | 84.35    | -----    | 90.88    | -----    | 92.95   | 92.70   | -----   |
| MAX  | 92.45    | 91.15    | 89.98    | 88.98    | 88.04    | 85.94    | 87.26    | 90.89    | 92.82    | 93.01   | 93.05   | 92.76   |
| MIN  | 91.22    | 90.03    | 88.75    | 87.79    | 85.97    | 84.18    | 84.39    | 87.39    | 90.94    | 92.76   | 92.70   | 92.21   |
| (+)  | 1,568    | 1,423    | 1,292    | 1,150    | 926.7    | 732.5    | 1,082    | 1,526    | 1,768    | 1,785   | 1,753   | 1,702   |
| (++) | -126,000 | -145,000 | -131,000 | -142,000 | -223,300 | -194,200 | +349,500 | +444,000 | +242,000 | +17,000 | -32,000 | -51,000 |

CAL YR 1970 . . . . . ++ -44,000

WTR YR 1971 . . . . . ++ + 8,000

† Contents, in thousands of acre-feet, at end of month.

++ Change in contents, in acre-feet.

NOTE.--Add 2,800 ft to obtain elevation above mean sea level.

## PEND OREILLE RIVER BASIN

227

## 12372000 Flathead River near Polson, Mont.

LOCATION.--Lat 47°40'49", long 114°14'45", in SW 1/4 SE 1/4 sec. 11, T. 22 N., R. 21 W., Lake County, on left bank 0.5 mile downstream from Kerr Dam, 4.0 miles west of Polson, 5.0 miles downstream from Flathead Lake, and at mile 71.5.

DRAINAGE AREA.--7,096 sq. mi.

PERIOD OF RECORD.--July 1907 to current year.

GAGE.--Water-stage recorder. Datum of gage is 2,692.70 ft above mean sea level (levels by The Montana Power Co.). Prior to Oct. 1, 1941, nonrecording gages or water-stage recorder at several sites near highway bridge at old site of Michell's ferry 6 miles downstream from present site, all at datum 2,629.20 ft above mean sea level (from river-profile survey).

AVERAGE DISCHARGE.--64 years, 14,620 cfs (22.47 inches per year, 8,506,000 acre-ft per year), adjusted for change in contents in Hungry Horse Reservoir and Flathead Lake.

EXTREMES.--Current year: Maximum discharge, 46,800 cfs May 17 (gage height, 15.03 ft); minimum daily, 4,160 cfs Sept. 29.

Period of record: Maximum discharge, 82,800 cfs May 29, 1928 (gage height, 17.2 ft, site and datum then in use); minimum probably less than 5 cfs Apr. 13, 1938; minimum daily, 32 cfs Apr. 12, 1938.

Flood in June 1894 reached a stage of about 21 ft, present datum (discharge, about 110,000 cfs) from lake elevation-discharge study.

REMARKS.--Records excellent. Flow regulated by Flathead Lake (Kerr Dam) since April 1938 (see p. 226) and Hungry Horse Reservoir since September 1951 (see p. 222). Diversions above station for irrigation of about 10,000 acres. Flathead project pumps can divert up to 12,000 acre-ft per month when required for irrigation of lands downstream from station.

REVISIONS (WATER YEARS).--WSP 652: 1926. WSP 752: 1932. WSP 1182: 1948. WSP 1216: Drainage area.

WSP 1246: 1928(M). WSP 1636: 1958 (adjusted runoff).

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT      | NOV       | DEC      | JAN      | FEB     | MAR      | APR     | MAY     | JUN      | JUL        | AUG     | SEP      |
|-------------|----------|-----------|----------|----------|---------|----------|---------|---------|----------|------------|---------|----------|
| 1           | 8,460    | 6,840     | 4,910    | 5,860    | 12,000  | 12,900   | 8,730   | 21,500  | 41,700   | 22,000     | 9,950   | 5,780    |
| 2           | 6,420    | 9,880     | 5,290    | 8,880    | 9,530   | 12,800   | 8,930   | 22,200  | 41,900   | 28,000     | 8,480   | 6,100    |
| 3           | 9,700    | 6,700     | 5,540    | 8,800    | 9,430   | 13,000   | 9,280   | 22,700  | 42,000   | 24,700     | 8,880   | 4,840    |
| 4           | 8,850    | 7,320     | 6,220    | 12,700   | 9,450   | 13,100   | 9,380   | 23,800  | 41,700   | 24,100     | 10,400  | 5,030    |
| 5           | 12,200   | 6,740     | 7,400    | 12,500   | 10,400  | 13,000   | 9,330   | 25,300  | 41,400   | 20,300     | 10,400  | 5,000    |
| 6           | 12,100   | 6,820     | 6,440    | 12,700   | 12,300  | 12,900   | 9,450   | 27,700  | 41,800   | 18,800     | 10,200  | 4,220    |
| 7           | 10,400   | 6,480     | 6,580    | 12,500   | 12,500  | 12,200   | 9,680   | 28,300  | 42,200   | 18,800     | 9,630   | 5,440    |
| 8           | 12,700   | 5,720     | 11,200   | 12,600   | 12,900  | 11,600   | 10,300  | 29,100  | 42,600   | 18,600     | 9,900   | 4,910    |
| 9           | 12,600   | 8,430     | 13,000   | 12,500   | 13,300  | 11,200   | 10,300  | 29,800  | 42,800   | 16,000     | 8,630   | 6,780    |
| 10          | 10,300   | 6,900     | 12,100   | 12,700   | 13,600  | 10,300   | 11,200  | 30,500  | 43,400   | 19,400     | 7,500   | 7,520    |
| 11          | 7,640    | 4,910     | 13,000   | 13,200   | 13,500  | 10,200   | 11,700  | 31,300  | 43,200   | 16,500     | 6,960   | 6,860    |
| 12          | 9,430    | 5,110     | 13,000   | 13,700   | 13,600  | 9,880    | 11,800  | 31,900  | 43,100   | 15,900     | 7,340   | 6,880    |
| 13          | 8,380    | 5,400     | 12,900   | 13,900   | 13,900  | 9,850    | 13,000  | 24,800  | 42,500   | 18,500     | 7,830   | 7,700    |
| 14          | 10,300   | 6,240     | 13,200   | 13,900   | 13,900  | 9,200    | 13,100  | 27,100  | 42,000   | 15,600     | 7,540   | 7,440    |
| 15          | 11,500   | 5,180     | 13,000   | 13,600   | 13,900  | 8,950    | 13,600  | 27,200  | 41,700   | 17,000     | 6,840   | 8,550    |
| 16          | 10,900   | 6,040     | 13,000   | 13,100   | 13,500  | 8,580    | 13,800  | 24,200  | 30,900   | 21,400     | 5,320   | 7,620    |
| 17          | 8,700    | 5,420     | 13,200   | 12,600   | 12,700  | 9,250    | 14,500  | 37,200  | 21,200   | 21,800     | 4,730   | 7,140    |
| 18          | 10,300   | 5,940     | 13,000   | 8,650    | 13,500  | 8,400    | 15,500  | 39,800  | 20,500   | 17,300     | 4,240   | 7,220    |
| 19          | 10,800   | 5,940     | 13,600   | 8,530    | 13,800  | 8,550    | 15,700  | 39,000  | 20,000   | 12,900     | 4,970   | 7,240    |
| 20          | 11,600   | 5,940     | 13,700   | 9,480    | 13,400  | 8,680    | 16,000  | 38,100  | 21,300   | 12,400     | 5,030   | 7,180    |
| 21          | 11,300   | 7,300     | 13,200   | 9,630    | 13,300  | 8,780    | 15,900  | 37,300  | 19,700   | 12,600     | 5,700   | 9,730    |
| 22          | 10,500   | 8,930     | 13,000   | 13,000   | 12,900  | 8,350    | 16,300  | 35,400  | 20,300   | 14,400     | 6,560   | 9,980    |
| 23          | 12,600   | 6,260     | 12,700   | 12,100   | 12,400  | 8,130    | 16,300  | 21,700  | 23,700   | 17,100     | 6,480   | 11,100   |
| 24          | 9,830    | 5,940     | 12,700   | 9,450    | 12,100  | 7,880    | 16,100  | 18,500  | 26,100   | 16,800     | 6,640   | 6,540    |
| 25          | 9,250    | 7,000     | 13,000   | 11,200   | 11,900  | 8,000    | 16,500  | 29,100  | 29,000   | 16,100     | 9,380   | 6,380    |
| 26          | 11,200   | 5,400     | 13,100   | 13,100   | 12,600  | 7,950    | 16,700  | 32,400  | 29,300   | 12,900     | 6,880   | 7,080    |
| 27          | 12,300   | 6,160     | 13,100   | 12,800   | 12,700  | 7,830    | 17,500  | 35,400  | 30,200   | 12,800     | 7,500   | 7,520    |
| 28          | 11,200   | 5,500     | 10,400   | 9,230    | 12,700  | 8,350    | 19,000  | 38,100  | 25,200   | 12,700     | 6,060   | 4,490    |
| 29          | 9,380    | 5,720     | 8,750    | 11,800   | -----   | 8,300    | 20,000  | 39,600  | 23,500   | 12,100     | 7,520   | 4,160    |
| 30          | 8,800    | 5,860     | 7,420    | 13,300   | -----   | 8,750    | 20,800  | 40,700  | 22,900   | 11,300     | 6,500   | 7,850    |
| 31          | 6,360    | -----     | 6,500    | 13,600   | -----   | 8,730    | -----   | 41,200  | -----    | 9,980      | 6,460   | -----    |
| TOTAL       | 311,940  | 191,920   | 334,150  | 359,610  | 351,710 | 305,090  | 410,380 | 950,900 | 997,800  | 528,780    | 230,450 | 204,280  |
| MEAN        | 10,260   | 6,397     | 10,780   | 11,600   | 12,560  | 9,842    | 13,680  | 30,670  | 33,260   | 17,060     | 7,434   | 6,809    |
| MAX         | 12,700   | 9,880     | 13,700   | 13,900   | 13,900  | 13,100   | 20,800  | 41,200  | 43,400   | 28,000     | 10,400  | 11,100   |
| MIN         | 6,360    | 4,910     | 4,910    | 5,860    | 9,430   | 7,830    | 8,730   | 18,500  | 19,700   | 9,980      | 4,240   | 4,160    |
| AC-FT       | 618,700  | 380,700   | 662,800  | 713,300  | 697,600 | 605,100  | 814,000 | 1,886M  | 1,979M   | 1,049M     | 457,100 | 405,200  |
| (+)         | -426,000 | -171,000  | -465,000 | -433,000 | -92,300 | -325,200 | -16,500 | +1,415M | +920,000 | +173,000   | -53,000 | -241,000 |
| MEAN#       | 3,134    | 3,524     | 3,217    | 4,559    | 10,900  | 4,552    | 13,960  | 53,680  | 48,720   | 19,870     | 6,572   | 2,759    |
| CFSM#       | .44      | .50       | .45      | .64      | 1.54    | .64      | 1.97    | 7.56    | 6.87     | 2.80       | .93     | .39      |
| IN.#        | .51      | .55       | .52      | .74      | 1.60    | .74      | 2.19    | 8.72    | 7.66     | 3.23       | 1.07    | .43      |
| AC-FT#      | 192,700  | 209,700   | 197,800  | 280,300  | 605,300 | 279,900  | 830,500 | 3,301M  | 2,899M   | 1,222M     | 404,100 | 164,200  |
| OBSERVED    |          |           |          |          |         |          |         |         |          |            |         |          |
| CAL YR 1970 | TOTAL    | 3,897,190 | MEAN     | 10,680   | MAX     | 41,600   | MIN     | 3,280   | AC-FT    | 7,730,000  | (+)     | +215,000 |
| WTR YR 1971 | TOTAL    | 5,177,010 | MEAN     | 14,180   | MAX     | 43,400   | MIN     | 4,160   | AC-FT    | 10,270,000 | (+)     | +318,000 |
| ADJUSTED    |          |           |          |          |         |          |         |         |          |            |         |          |
| CAL YR 1970 | TOTAL    | 4,005,244 | MEAN     | 10,970   | CFSM    | 1.55     | IN.     | 20.99   | AC-FT    | 7,945,000  |         |          |
| WTR YR 1971 | TOTAL    | 5,337,283 | MEAN     | 14,620   | CFSM    | 2.06     | IN.     | 27.97   | AC-FT    | 10,590,000 |         |          |

† Change in contents, in acre-feet, in Hungry Horse Reservoir and Flathead Lake.

M Expressed in thousands.

# Adjusted for change in contents.

## PEND OREILLE RIVER BASIN

12389000 Clark Fork near Plains, Mont.

LOCATION.--Lat 47°25'47", long 114°51'18", in E&SW $\frac{1}{4}$  sec.1, T.19 N., R.26 W., Sanders County, on right bank 2.4 miles southeast of Plains, 6.0 miles downstream from Flathead River, and at mile 239.0.

DRAINAGE AREA.--19,958 sq mi.

PERIOD OF RECORD.--October 1910 to current year. Monthly discharge only for some periods, published in WSP 1316.

GAGE.--Water-stage recorder. Datum of gage is 2,449.11 ft above mean sea level (levels by Corps of Engineers). Prior to Nov. 28, 1911, nonrecording gage at site 50 ft upstream at same datum.

AVERAGE DISCHARGE.--61 years, 19,880 cfs (14,400,000 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 89,600 cfs May 31 (gage height, 14.78 ft); minimum, 7,480 cfs Aug. 19 (gage height, 3.87 ft).

Period of record: Maximum discharge, 134,000 cfs June 5, 1948 (gage height, 19.17 ft); minimum, 3,200 cfs Feb. 8, 1936, Dec. 10, 1940; minimum gage height, 2.70 ft (from partly estimated gage-height record) Sept. 2, 1958.

REMARKS.--Records excellent. Flow partly regulated by Hungry Horse Reservoir (see p. 222) and by Flathead Lake (see p. 226). Diversions for irrigation of about 335,000 acres above station. Records of water temperatures for the current year are published in Part 2 of this report.

REVISIONS.--WSP 1246: Drainage area.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT             | NOV     | DEC         | JAN     | FEB        | MAR     | APR       | MAY      | JUN              | JUL     | AUG     | SEP     |
|-------------|-----------------|---------|-------------|---------|------------|---------|-----------|----------|------------------|---------|---------|---------|
| 1           | 14,500          | 10,500  | 10,300      | 10,300  | 27,700     | 18,600  | 14,600    | 38,400   | 88,000           | 41,600  | 15,800  | 10,400  |
| 2           | 12,400          | 11,300  | 9,530       | 9,500   | 28,700     | 18,600  | 14,800    | 40,300   | 86,000           | 41,500  | 15,600  | 10,000  |
| 3           | 10,900          | 13,500  | 9,660       | 11,500  | 25,000     | 18,200  | 15,000    | 44,200   | 83,600           | 44,400  | 13,900  | 10,500  |
| 4           | 14,200          | 10,900  | 9,950       | 11,000  | 23,000     | 18,600  | 15,300    | 50,800   | 80,300           | 40,800  | 14,400  | 9,370   |
| 5           | 12,600          | 11,300  | 10,400      | 13,000  | 21,200     | 18,700  | 15,500    | 60,000   | 79,100           | 39,600  | 16,000  | 9,490   |
| 6           | 15,200          | 10,800  | 11,300      | 17,100  | 21,400     | 18,400  | 15,700    | 67,300   | 78,200           | 35,300  | 16,000  | 9,320   |
| 7           | 15,800          | 10,900  | 10,500      | 16,400  | 21,100     | 18,100  | 16,300    | 71,100   | 77,100           | 34,000  | 15,500  | 8,650   |
| 8           | 15,200          | 10,500  | 11,400      | 16,700  | 21,200     | 17,400  | 17,400    | 70,500   | 76,900           | 33,000  | 14,700  | 9,700   |
| 9           | 17,100          | 9,870   | 16,300      | 17,900  | 20,800     | 16,600  | 18,000    | 71,400   | 78,200           | 30,900  | 15,000  | 9,030   |
| 10          | 17,000          | 12,300  | 17,100      | 17,600  | 21,000     | 16,500  | 18,600    | 73,600   | 80,300           | 30,200  | 13,600  | 11,000  |
| 11          | 14,500          | 11,000  | 16,900      | 16,700  | 21,800     | 15,700  | 20,400    | 75,000   | 80,700           | 31,800  | 12,100  | 11,900  |
| 12          | 12,200          | 9,110   | 17,300      | 15,400  | 22,500     | 15,500  | 20,600    | 77,400   | 78,200           | 28,600  | 11,500  | 11,000  |
| 13          | 14,100          | 9,030   | 17,100      | 16,800  | 22,900     | 15,200  | 20,600    | 80,600   | 76,800           | 29,000  | 11,800  | 10,900  |
| 14          | 12,900          | 9,490   | 16,600      | 16,300  | 23,200     | 15,000  | 21,900    | 75,500   | 76,600           | 29,100  | 12,300  | 11,800  |
| 15          | 15,300          | 10,100  | 16,700      | 15,700  | 23,400     | 14,400  | 22,200    | 76,100   | 76,400           | 26,100  | 11,600  | 11,600  |
| 16          | 15,800          | 9,240   | 16,700      | 19,300  | 23,500     | 13,900  | 23,000    | 72,500   | 73,300           | 29,100  | 10,900  | 12,300  |
| 17          | 14,900          | 9,910   | 17,000      | 20,500  | 22,800     | 13,600  | 24,000    | 64,300   | 57,700           | 31,600  | 9,450   | 11,300  |
| 18          | 13,400          | 9,370   | 17,300      | 21,800  | 21,600     | 13,800  | 25,200    | 76,200   | 48,300           | 31,400  | 8,650   | 11,300  |
| 19          | 14,800          | 10,000  | 17,000      | 17,000  | 22,100     | 13,400  | 25,500    | 72,200   | 48,000           | 24,900  | 8,120   | 11,000  |
| 20          | 15,400          | 9,790   | 17,500      | 17,000  | 22,000     | 13,100  | 25,900    | 67,700   | 47,100           | 22,200  | 8,570   | 11,300  |
| 21          | 16,000          | 10,100  | 17,100      | 17,100  | 21,200     | 13,200  | 26,800    | 64,300   | 48,800           | 21,600  | 8,690   | 11,400  |
| 22          | 15,300          | 11,200  | 16,700      | 17,300  | 20,500     | 13,300  | 27,800    | 61,100   | 47,000           | 21,400  | 9,530   | 13,400  |
| 23          | 14,900          | 12,300  | 16,500      | 19,200  | 19,700     | 13,200  | 29,500    | 57,300   | 49,400           | 24,100  | 10,400  | 14,500  |
| 24          | 15,200          | 9,870   | 16,000      | 17,000  | 19,300     | 13,000  | 31,600    | 39,600   | 53,000           | 24,200  | 10,400  | 15,000  |
| 25          | 14,300          | 10,700  | 16,100      | 14,900  | 19,000     | 12,800  | 33,400    | 45,500   | 55,200           | 24,900  | 10,500  | 10,400  |
| 26          | 13,400          | 12,400  | 16,400      | 17,400  | 18,400     | 13,100  | 35,100    | 54,600   | 56,600           | 22,200  | 12,600  | 10,200  |
| 27          | 15,900          | 10,900  | 16,600      | 18,700  | 19,000     | 13,200  | 36,300    | 64,200   | 55,600           | 19,900  | 10,700  | 11,600  |
| 28          | 16,400          | 11,200  | 16,400      | 17,400  | 18,600     | 13,400  | 36,500    | 73,200   | 53,900           | 19,500  | 11,100  | 10,900  |
| 29          | 15,600          | 10,400  | 13,300      | 15,500  | -----      | 14,000  | 37,200    | 81,000   | 46,400           | 19,200  | 9,870   | 8,480   |
| 30          | 13,700          | 10,500  | 12,300      | 17,400  | -----      | 13,900  | 37,700    | 86,600   | 45,300           | 18,200  | 11,400  | 8,570   |
| 31          | 12,700          | -----   | 11,300      | 21,100  | -----      | 14,000  | -----     | 89,000   | -----            | 17,300  | 10,200  | -----   |
| TOTAL       | 451,600         | 318,480 | 455,240     | 510,500 | 612,600    | 470,400 | 722,400   | 2,041.5M | 1,982.0M         | 887,600 | 370,880 | 326,310 |
| MEAN        | 14,570          | 10,620  | 14,690      | 16,470  | 21,880     | 15,170  | 24,080    | 65,850   | 66,070           | 28,630  | 11,960  | 10,880  |
| MAX         | 17,100          | 13,500  | 17,500      | 21,800  | 28,700     | 18,700  | 37,700    | 89,000   | 88,000           | 44,400  | 16,000  | 15,000  |
| MIN         | 10,900          | 9,030   | 9,530       | 9,500   | 18,400     | 12,800  | 14,600    | 38,400   | 45,300           | 17,300  | 8,120   | 8,480   |
| AC-FT       | 895,700         | 631,700 | 903,000     | 1,013M  | 1,215M     | 933,000 | 1,433M    | 4,049M   | 3,931M           | 1,761M  | 735,600 | 647,200 |
| CAL YR 1970 | TOTAL 7,228,280 |         | MEAN 19,800 |         | MAX 88,900 |         | MIN 7,440 |          | AC-FT 14,340,000 |         |         |         |
| WTR YR 1971 | TOTAL 9,149,510 |         | MEAN 25,070 |         | MAX 89,000 |         | MIN 8,120 |          | AC-FT 18,150,000 |         |         |         |

## PEND OREILLE RIVER BASIN

229

12389500 Thompson River near Thompson Falls, Mont.

LOCATION.--Lat 47°35'31", long 115°13'43", in NW¼NE¼SE¼ sec.7, T.21 N., R.28 W., Sanders County, Lolo National Forest, on right bank 1.3 miles upstream from mouth and 5.5 miles east of Thompson Falls.

DRAINAGE AREA.--642 sq mi.

PERIOD OF RECORD.--March to September 1911, October 1911 to September 1916 (occasional gage heights, discharges, and discharge measurements), April 1956 to current year. Records for January and February 1911, published in WSP 916, have been found to be unreliable and should not be used.

GAGE.--Water-stage recorder. Datum of gage is 2,429.97 ft above mean sea level (Bureau of Public Roads bench mark). October 1911 to September 1916, nonrecording gage at site 0.2 mile upstream at different datum.

AVERAGE DISCHARGE.--15 years, 486 cfs (10.28 inches per year, 352,100 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 4,030 cfs May 13 (gage height, 6.80 ft); minimum, 74 cfs Jan. 2 (gage height, 1.90 ft), result of freezeup.

Period of record: Maximum discharge, 6,080 cfs June 9, 1964 (gage height, 8.53 ft); minimum, 68 cfs Dec. 10, 1961, result of freezeup; minimum gage height, 1.01 ft Dec. 17, 1964, result of freezeup.

Flood in May to June 1948 reached a discharge of 6,190 cfs, by slope-area measurement of peak flow at site 0.2 mile downstream.

REMARKS.--Records excellent. Minor diversions above station for irrigation; acreage unknown. Diversion from headwaters of Alder Creek in SW¼ sec.16, T.23 N., R.25 W., to supplement water supply for storage in Upper Dry Fork Reservoir in Little Bitterroot River basin.

REVISIONS (WATER YEARS).--WSP 1246: 1911. See also PERIOD OF RECORD.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY         | OCT    | NOV     | DEC    | JAN    | FEB    | MAR    | APR    | MAY     | JUN     | JUL     | AUG    | SEP    |
|-------------|--------|---------|--------|--------|--------|--------|--------|---------|---------|---------|--------|--------|
| 1           | 184    | 169     | 197    | 152    | 1,760  | 394    | 511    | 1,460   | 2,880   | 1,050   | 435    | 300    |
| 2           | 184    | 169     | 190    | 96     | 1,390  | 365    | 518    | 1,680   | 2,630   | 1,020   | 424    | 309    |
| 3           | 184    | 165     | 188    | 111    | 1,110  | 397    | 520    | 2,200   | 2,510   | 991     | 426    | 296    |
| 4           | 181    | 163     | 184    | 110    | 913    | 378    | 531    | 2,980   | 2,300   | 956     | 420    | 286    |
| 5           | 184    | 170     | 154    | 124    | 769    | 358    | 563    | 3,540   | 2,140   | 920     | 412    | 279    |
| 6           | 202    | 171     | 200    | 151    | 612    | 343    | 637    | 3,530   | 2,030   | 913     | 407    | 274    |
| 7           | 195    | 169     | 215    | 160    | 556    | 361    | 809    | 3,240   | 1,950   | 885     | 401    | 271    |
| 8           | 191    | 168     | 232    | 174    | 516    | 357    | 874    | 3,090   | 2,100   | 834     | 387    | 268    |
| 9           | 175    | 174     | 221    | 174    | 486    | 348    | 890    | 3,230   | 2,240   | 801     | 374    | 265    |
| 10          | 202    | 177     | 211    | 189    | 535    | 348    | 984    | 3,310   | 2,070   | 872     | 364    | 263    |
| 11          | 200    | 174     | 209    | 168    | 531    | 357    | 972    | 3,270   | 1,890   | 845     | 359    | 261    |
| 12          | 208    | 171     | 187    | 146    | 511    | 357    | 903    | 3,490   | 1,740   | 797     | 352    | 257    |
| 13          | 203    | 169     | 124    | 129    | 551    | 366    | 847    | 3,870   | 1,730   | 754     | 346    | 255    |
| 14          | 195    | 166     | 165    | 153    | 654    | 352    | 852    | 3,740   | 1,820   | 720     | 342    | 252    |
| 15          | 190    | 164     | 202    | 166    | 728    | 352    | 927    | 3,010   | 1,690   | 693     | 336    | 252    |
| 16          | 187    | 176     | 199    | 199    | 737    | 348    | 958    | 2,690   | 1,530   | 674     | 330    | 249    |
| 17          | 185    | 184     | 189    | 241    | 691    | 330    | 945    | 2,380   | 1,410   | 658     | 325    | 248    |
| 18          | 184    | 184     | 177    | 265    | 646    | 325    | 901    | 2,100   | 1,350   | 640     | 323    | 247    |
| 19          | 184    | 177     | 178    | 301    | 611    | 334    | 860    | 1,910   | 1,320   | 623     | 317    | 245    |
| 20          | 185    | 177     | 176    | 498    | 558    | 339    | 895    | 1,770   | 1,310   | 606     | 311    | 248    |
| 21          | 184    | 172     | 176    | 416    | 515    | 339    | 1,060  | 1,630   | 1,270   | 592     | 305    | 244    |
| 22          | 195    | 116     | 143    | 351    | 517    | 349    | 1,220  | 1,520   | 1,290   | 577     | 303    | 243    |
| 23          | 185    | 131     | 136    | 346    | 498    | 339    | 1,480  | 1,480   | 1,350   | 560     | 306    | 240    |
| 24          | 197    | 245     | 140    | 329    | 490    | 352    | 1,760  | 1,540   | 1,280   | 539     | 301    | 237    |
| 25          | 196    | 304     | 161    | 316    | 476    | 366    | 1,820  | 1,830   | 1,220   | 523     | 294    | 237    |
| 26          | 188    | 248     | 150    | 309    | 444    | 410    | 1,870  | 2,230   | 1,190   | 509     | 288    | 240    |
| 27          | 185    | 221     | 156    | 302    | 410    | 459    | 1,760  | 2,820   | 1,100   | 494     | 284    | 242    |
| 28          | 175    | 202     | 159    | 293    | 410    | 453    | 1,610  | 3,130   | 1,060   | 484     | 280    | 241    |
| 29          | 174    | 197     | 164    | 287    | -----  | 442    | 1,510  | 3,000   | 1,200   | 473     | 276    | 238    |
| 30          | 172    | 200     | 162    | 675    | -----  | 486    | 1,440  | 2,970   | 1,120   | 461     | 287    | 238    |
| 31          | 171    | -----   | 176    | 1,870  | -----  | 522    | -----  | 3,100   | -----   | 448     | 301    | -----  |
| TOTAL       | 5,830  | 5,473   | 5,521  | 9,201  | 18,625 | 11,616 | 31,427 | 81,740  | 50,720  | 21,912  | 10,616 | 7,725  |
| MEAN        | 188    | 182     | 178    | 297    | 665    | 375    | 1,048  | 2,637   | 1,691   | 707     | 342    | 258    |
| MAX         | 208    | 304     | 232    | 1,870  | 1,760  | 522    | 1,870  | 3,870   | 2,880   | 1,050   | 435    | 309    |
| MIN         | 171    | 116     | 124    | 96     | 410    | 325    | 511    | 1,460   | 1,060   | 448     | 276    | 237    |
| CFSM        | .29    | .28     | .28    | .46    | 1.04   | .58    | 1.63   | 4.11    | 2.63    | 1.10    | .53    | .40    |
| IN.         | .34    | .32     | .32    | .53    | 1.08   | .67    | 1.82   | 4.74    | 2.94    | 1.27    | .62    | .45    |
| AC-FT       | 11,560 | 10,860  | 10,950 | 18,250 | 36,940 | 23,040 | 62,340 | 162,100 | 100,600 | 43,460  | 21,060 | 15,320 |
| CAL YR 1970 | TOTAL  | 92,548  | MEAN   | 254    | MAX    | 1,610  | MIN    | 34      | CFSM    | .40     | IN     | 5.36   |
| WTR YR 1971 | TOTAL  | 260,406 | MEAN   | 713    | MAX    | 3,870  | MIN    | 96      | CFSM    | 1.11    | IN     | 15.09  |
|             |        |         |        |        |        |        |        |         | AC-FT   | 183,600 |        |        |
|             |        |         |        |        |        |        |        |         |         | 516,500 |        |        |



LOCATION.--Lat 47°35'10", long 115°21'15", in lot 12, SE<sup>1</sup>SE<sup>1</sup>SE<sup>1</sup> sec.7, T.21 N., R.29 W., Sanders County, on right bank 500 ft downstream from Dry Creek, 0.5 mile upstream from mouth, and 0.7 mile south of Thompson Falls.

REMARKS.--Records excellent.

| DAY   | OCT   | NOV   | DEC   | JAN    | FEB    | MAR    | APR    | MAY    | JUN    | JUL    | AUG   | SEP   |
|-------|-------|-------|-------|--------|--------|--------|--------|--------|--------|--------|-------|-------|
| 1     | 59    | 50    | 51    | 74     | 1,530  | 234    | 252    | 753    | 1,160  | 469    | 138   | 88    |
| 2     | 59    | 50    | 51    | 71     | 1,160  | 220    | 260    | 931    | 1,160  | 457    | 135   | 90    |
| 3     | 58    | 50    | 52    | 70     | 854    | 218    | 262    | 1,370  | 1,030  | 439    | 134   | 86    |
| 4     | 58    | 50    | 51    | 69     | 693    | 214    | 270    | 1,800  | 962    | 415    | 130   | 83    |
| 5     | 59    | 50    | 51    | 67     | 561    | 203    | 289    | 2,040  | 913    | 393    | 128   | 82    |
| 6     | 63    | 50    | 53    | 67     | 460    | 193    | 336    | 1,760  | 922    | 385    | 126   | 81    |
| 7     | 59    | 50    | 56    | 67     | 398    | 187    | 448    | 1,530  | 953    | 365    | 124   | 80    |
| 8     | 58    | 50    | 56    | 66     | 355    | 184    | 554    | 1,540  | 1,040  | 338    | 120   | 79    |
| 9     | 58    | 51    | 55    | 71     | 327    | 179    | 579    | 1,690  | 1,010  | 320    | 117   | 78    |
| 10    | 58    | 50    | 54    | 79     | 325    | 176    | 653    | 1,700  | 958    | 355    | 115   | 77    |
| 11    | 56    | 49    | 55    | 73     | 325    | 185    | 649    | 1,720  | 868    | 331    | 113   | 77    |
| 12    | 57    | 49    | 55    | 70     | 316    | 184    | 568    | 1,960  | 801    | 309    | 111   | 76    |
| 13    | 56    | 48    | 55    | 68     | 345    | 185    | 505    | 2,310  | 886    | 289    | 109   | 75    |
| 14    | 55    | 48    | 58    | 69     | 424    | 179    | 499    | 1,970  | 976    | 274    | 107   | 73    |
| 15    | 55    | 47    | 59    | 71     | 523    | 174    | 544    | 1,470  | 854    | 262    | 105   | 73    |
| 16    | 55    | 50    | 62    | 75     | 575    | 169    | 565    | 1,330  | 765    | 254    | 102   | 73    |
| 17    | 54    | 49    | 62    | 88     | 544    | 165    | 554    | 1,170  | 729    | 246    | 101   | 72    |
| 18    | 54    | 48    | 64    | 98     | 484    | 160    | 509    | 994    | 709    | 236    | 99    | 72    |
| 19    | 54    | 48    | 68    | 114    | 436    | 159    | 478    | 922    | 705    | 227    | 98    | 71    |
| 20    | 53    | 49    | 74    | 188    | 390    | 160    | 499    | 789    | 717    | 218    | 96    | 71    |
| 21    | 53    | 48    | 77    | 187    | 358    | 162    | 610    | 721    | 677    | 212    | 94    | 71    |
| 22    | 53    | 47    | 76    | 223    | 336    | 163    | 681    | 689    | 709    | 203    | 96    | 70    |
| 23    | 53    | 47    | 76    | 214    | 318    | 162    | 757    | 725    | 757    | 193    | 97    | 70    |
| 24    | 55    | 57    | 75    | 212    | 311    | 168    | 854    | 877    | 689    | 182    | 93    | 69    |
| 25    | 53    | 57    | 76    | 203    | 296    | 172    | 859    | 1,190  | 665    | 174    | 91    | 70    |
| 26    | 52    | 51    | 76    | 198    | 276    | 195    | 944    | 1,530  | 631    | 168    | 89    | 69    |
| 27    | 52    | 50    | 75    | 190    | 260    | 203    | 926    | 1,880  | 558    | 162    | 87    | 69    |
| 28    | 51    | 50    | 76    | 180    | 248    | 209    | 829    | 1,950  | 568    | 156    | 86    | 68    |
| 29    | 51    | 50    | 76    | 176    | -----  | 212    | 765    | 1,710  | 603    | 151    | 85    | 68    |
| 30    | 51    | 50    | 75    | 252    | -----  | 230    | 737    | 1,550  | 505    | 146    | 88    | 68    |
| 31    | 51    | ----- | 78    | 1,520  | -----  | 246    | -----  | 1,320  | -----  | 142    | 87    | ----- |
| TOTAL | 1,713 | 1,493 | 1,978 | 5,170  | 13,428 | 5,850  | 17,235 | 43,891 | 24,480 | 8,471  | 3,301 | 2,249 |
| MEAN  | 55.3  | 49.8  | 63.8  | 167    | 480    | 189    | 575    | 1,416  | 816    | 273    | 106   | 75.0  |
| MAX   | 63    | 57    | 78    | 1,520  | 1,530  | 246    | 944    | 2,310  | 1,160  | 469    | 138   | 90    |
| MIN   | 51    | 47    | 51    | 66     | 248    | 159    | 252    | 689    | 505    | 142    | 85    | 68    |
| CFSM  | .30   | .27   | .35   | .92    | 2.64   | 1.04   | 3.16   | 7.78   | 4.48   | 1.50   | .58   | .41   |
| IN.   | .35   | .31   | .40   | 1.06   | 2.74   | 1.20   | 3.52   | 8.97   | 5.00   | 1.73   | .67   | .46   |
| AC-FT | 3,400 | 2,960 | 3,920 | 10,250 | 26,630 | 11,600 | 34,190 | 87,060 | 48,560 | 16,800 | 6,550 | 4,460 |



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LOCATION.--Lat 47°57'40", long 115°43'58", in SW<sub>4</sub> sec.33, T.26 N., R.32 W., Sanders County, at Noxon Rapids Dam 1 mile upstream from Rock Creek, 3 miles southeast of Noxon, and at mile 169.7.

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

AVERAGE DISCHARGE.--11 years, 21,620 cfs (15,660,000 acre-ft per year).

Period of record: Maximum daily discharge, 124,900 cfs June 12, 1964; minimum daily, 80 cfs Oct. 16, 1960, Aug. 26, 1962, Aug. 18, 25, 31, Sept. 1, 1963.

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

| DAY | OCT    | NOV    | DEC    | JAN    | FEB    | MAR    | APR    | MAY    | JUN    | JUL    | AUG    | SEP    |
|-----|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 1   | 14,500 | 6,150  | 9,970  | 7,620  | 31,700 | 25,700 | 16,200 | 31,400 | 96,300 | 43,400 | 11,800 | 9,900  |
| 2   | 15,200 | 14,100 | 9,990  | 14,200 | 35,000 | 28,400 | 17,000 | 35,600 | 94,000 | 39,600 | 14,300 | 9,560  |
| 3   | 8,860  | 12,500 | 11,400 | 8,830  | 30,100 | 18,600 | 13,600 | 49,900 | 91,100 | 46,500 | 15,700 | 10,100 |
| 4   | 10,100 | 12,500 | 9,940  | 15,800 | 27,300 | 21,500 | 4,710  | 59,300 | 88,000 | 41,900 | 12,700 | 9,960  |
| 5   | 15,700 | 11,900 | 6,210  | 15,300 | 26,100 | 21,300 | 11,500 | 70,600 | 85,400 | 41,700 | 14,100 | 7,340  |
| 6   | 15,600 | 12,900 | 9,080  | 11,500 | 21,800 | 21,400 | 13,700 | 75,500 | 85,700 | 34,700 | 17,400 | 7,850  |
| 7   | 16,000 | 5,850  | 12,300 | 10,900 | 18,400 | 18,800 | 16,700 | 78,800 | 81,200 | 35,800 | 15,900 | 8,520  |
| 8   | 17,100 | 3,700  | 10,900 | 9,130  | 23,900 | 22,600 | 22,700 | 71,200 | 82,600 | 33,100 | 11,400 | 9,740  |
| 9   | 17,000 | 8,720  | 15,900 | 14,200 | 20,200 | 23,600 | 23,000 | 63,800 | 82,300 | 32,400 | 13,200 | 10,200 |
| 10  | 9,790  | 9,650  | 18,400 | 14,200 | 20,700 | 20,200 | 26,800 | 82,800 | 85,000 | 30,800 | 13,200 | 11,500 |
| 11  | 10,000 | 12,100 | 19,100 | 17,600 | 24,200 | 17,500 | 25,400 | 84,700 | 84,800 | 34,300 | 13,500 | 8,690  |
| 12  | 15,800 | 11,100 | 18,600 | 16,500 | 21,700 | 16,900 | 27,800 | 88,600 | 83,700 | 30,900 | 11,800 | 7,560  |
| 13  | 14,100 | 10,200 | 14,600 | 17,500 | 24,200 | 14,600 | 27,200 | 93,900 | 82,500 | 28,300 | 13,300 | 10,500 |
| 14  | 14,300 | 7,110  | 18,100 | 16,400 | 20,000 | 9,680  | 29,400 | 88,600 | 80,600 | 28,300 | 9,040  | 10,900 |
| 15  | 14,300 | 5,520  | 15,100 | 15,900 | 28,600 | 18,100 | 30,800 | 74,200 | 79,600 | 27,300 | 10,000 | 11,600 |
| 16  | 16,600 | 10,500 | 12,700 | 15,900 | 23,000 | 21,800 | 31,500 | 65,500 | 79,000 | 28,200 | 11,700 | 10,300 |
| 17  | 12,500 | 10,100 | 13,200 | 15,800 | 23,800 | 21,400 | 28,100 | 69,000 | 64,000 | 31,400 | 11,400 | 13,800 |
| 18  | 5,280  | 10,900 | 16,200 | 17,600 | 25,000 | 18,600 | 34,800 | 78,600 | 49,700 | 31,200 | 11,300 | 11,500 |
| 19  | 18,100 | 12,400 | 16,400 | 19,900 | 23,100 | 17,100 | 35,200 | 77,300 | 51,000 | 30,700 | 10,200 | 8,030  |
| 20  | 13,700 | 10,800 | 14,000 | 23,100 | 23,900 | 13,800 | 31,900 | 69,600 | 50,700 | 24,000 | 7,760  | 9,900  |
| 21  | 15,000 | 8,320  | 15,100 | 21,800 | 20,000 | 10,100 | 34,400 | 69,300 | 46,700 | 23,700 | 4,600  | 11,100 |
| 22  | 13,700 | 8,140  | 18,400 | 22,900 | 23,700 | 18,300 | 33,000 | 64,400 | 50,200 | 23,800 | 2,690  | 11,400 |
| 23  | 14,900 | 11,100 | 19,400 | 19,600 | 20,900 | 19,900 | 35,100 | 63,500 | 51,500 | 18,800 | 8,480  | 13,700 |
| 24  | 13,100 | 7,020  | 18,100 | 16,400 | 21,400 | 16,100 | 36,100 | 47,800 | 55,400 | 23,600 | 12,700 | 14,500 |
| 25  | 10,500 | 12,200 | 7,190  | 15,900 | 22,800 | 16,700 | 34,400 | 47,200 | 56,900 | 19,300 | 10,100 | 9,470  |
| 26  | 16,900 | 8,120  | 17,000 | 20,700 | 20,900 | 18,500 | 45,200 | 57,000 | 58,800 | 20,600 | 11,900 | 9,920  |
| 27  | 18,000 | 12,100 | 13,200 | 17,100 | 13,200 | 18,600 | 42,700 | 67,700 | 56,500 | 22,500 | 13,200 | 10,900 |
| 28  | 16,000 | 9,930  | 17,300 | 16,800 | 17,600 | 12,400 | 41,600 | 83,800 | 56,800 | 21,100 | 7,220  | 11,500 |
| 29  | 14,800 | 9,370  | 15,000 | 13,500 | -----  |        |        |        |        |        |        |        |

## PEND OREILLE RIVER BASIN

12392000 Clark Fork at Whitehorse Rapids, near Cabinet, Idaho

LOCATION.--Lat 48°05'10", long 116°03'50", in NE1/4 sec. 27, T.55 N., R.3 E., Bonner County, on left bank at Cabinet, 0.4 mile downstream from Cabinet Gorge Dam, 1.7 mile downstream from Blue Creek, 6.5 miles south-east of Clark Fork, and at mile 149.5. Measuring cableway 0.4 mile downstream. Discharge computed at Whitehorse Rapids, 2.7 miles downstream.

DRAINAGE AREA.--22,067 sq mi, based on revised area of 22,006 sq mi for site near Heron.

PERIOD OF RECORD.--September 1928 to current year. Prior to October 1952, published as "near Heron, Mont."

GAGE.--Water-stage recorder. Datum of gage is 2,060.00 ft above mean sea level, levels by Washington Water Power Co. Prior to Oct. 30, 1928, nonrecording gage, and Oct. 30, 1928, to Apr. 8, 1952, water-stage recorder at site near Heron, 4 miles upstream at datum 28.00 ft higher prior to Jan. 2, 1931, and 18.00 ft higher thereafter. Apr. 9 to Sept. 30, 1952, nonrecording gage just upstream from present site at datum approximately 60.0 ft lower, and Oct. 1, 1952, to Sept. 30, 1964, water-stage recorder at datum 60.00 ft lower.

AVERAGE DISCHARGE.--43 years, 22,150 cfs (16,050,000 acre-ft per year); 15-year base period (1952-67), 24,140 cfs.

EXTREMES.--Current year: Maximum discharge, 115,000 cfs May 13 or 14 (gage height, 27.01 ft); minimum, 850 cfs Aug. 20 (gage height, 4.10 ft); minimum daily, 3,210 cfs Aug. 22.

Period of record: Maximum discharge, 153,000 cfs May 29 to June 1, 1948; maximum gage height, 50.97 ft May 31, 1948, site and datum then in use; minimum observed, 270 cfs Aug. 12, 1952 (discharge measurement), at present site during filling of Cabinet Gorge Reservoir; minimum daily since reservoir filled, 762 cfs Sept. 2, 1962.

Maximum discharge known, 195,000 cfs June 1894 (elevation of floodmark at site about 4 miles upstream and 0.1 mile below "near Heron" site, 2,137.1 ft).

REMARKS.--Records good. Flow regulated by Hungry Horse Reservoir and Flathead Lake. Extreme diurnal fluctuation caused by powerplant at Cabinet Gorge Dam. Diversions above station for irrigation of about 354,000 acres. Discharge measurements indicate about 800 cfs ground-water inflow between Cabinet Gorge Dam and Whitehorse Rapids. Records given herein represent flow at Whitehorse Rapids, computed by adding 600 cfs to observed flows at the measuring cableway, and are considered comparable to records at former site near Heron, except for minor surface inflow from additional drainage area. To determine flow at Cabinet Gorge Dam, 800 cfs should be deducted from discharges published herein.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

| DAY   | OCT     | NOV     | DEC     | JAN     | FEB     | MAR     | APR     | MAY      | JUN      | JUL     | AUG     | SEP     |
|-------|---------|---------|---------|---------|---------|---------|---------|----------|----------|---------|---------|---------|
| 1     | 15,800  | 7,350   | 11,800  | 8,320   | 37,000  | 28,100  | 19,200  | 35,000   | 104,000  | 48,000  | 14,000  | 12,200  |
| 2     | 17,800  | 15,100  | 11,900  | 15,700  | 39,800  | 31,600  | 18,600  | 37,700   | 101,000  | 43,200  | 16,800  | 12,700  |
| 3     | 10,300  | 14,400  | 12,800  | 11,000  | 35,500  | 23,400  | 16,800  | 53,100   | 96,400   | 50,200  | 17,100  | 11,500  |
| 4     | 10,600  | 14,700  | 11,300  | 17,100  | 31,700  | 24,600  | 7,410   | 63,600   | 94,500   | 44,900  | 15,600  | 10,300  |
| 5     | 18,400  | 13,700  | 7,580   | 16,600  | 31,100  | 24,900  | 13,400  | 75,100   | 90,100   | 44,400  | 16,600  | 9,080   |
| 6     | 17,300  | 14,200  | 10,300  | 13,700  | 25,300  | 24,600  | 16,400  | 79,400   | 88,800   | 38,300  | 18,500  | 9,420   |
| 7     | 17,300  | 7,470   | 14,300  | 12,400  | 21,300  | 20,900  | 19,900  | 83,400   | 88,000   | 38,400  | 19,000  | 11,000  |
| 8     | 18,800  | 4,610   | 12,600  | 9,550   | 27,800  | 25,600  | 26,500  | 75,800   | 88,500   | 36,200  | 13,400  | 9,620   |
| 9     | 19,600  | 10,600  | 17,600  | 16,600  | 26,100  | 26,200  | 25,600  | 68,700   | 87,500   | 36,000  | 15,300  | 11,200  |
| 10    | 11,500  | 10,700  | 20,700  | 15,800  | 19,700  | 24,000  | 31,100  | 86,100   | 90,500   | 35,300  | 17,400  | 14,000  |
| 11    | 10,800  | 14,100  | 21,800  | 19,800  | 28,400  | 20,400  | 29,400  | 90,300   | 90,300   | 35,100  | 12,800  | 9,850   |
| 12    | 18,000  | 12,500  | 21,400  | 17,800  | 24,800  | 19,300  | 30,800  | 95,000   | 87,900   | 32,700  | 13,200  | 7,750   |
| 13    | 16,500  | 12,600  | 16,500  | 19,700  | 27,200  | 16,900  | 32,600  | 101,000  | 87,300   | 31,000  | 15,200  | 13,100  |
| 14    | 16,400  | 8,200   | 20,300  | 17,600  | 22,800  | 11,600  | 33,300  | 96,300   | 85,400   | 32,300  | 10,400  | 13,900  |
| 15    | 15,500  | 6,840   | 18,000  | 17,600  | 32,800  | 21,000  | 34,100  | 82,300   | 86,600   | 29,800  | 11,700  | 11,400  |
| 16    | 18,500  | 12,500  | 14,700  | 18,000  | 25,200  | 24,300  | 35,600  | 71,100   | 84,000   | 30,300  | 13,300  | 11,700  |
| 17    | 15,100  | 11,600  | 13,400  | 16,600  | 27,300  | 24,900  | 31,000  | 73,800   | 68,100   | 33,400  | 16,100  | 14,400  |
| 18    | 11,100  | 12,800  | 18,200  | 20,200  | 28,800  | 22,400  | 36,800  | 83,600   | 53,600   | 33,600  | 9,540   | 12,900  |
| 19    | 19,100  | 13,600  | 18,100  | 22,600  | 26,500  | 18,300  | 38,000  | 83,900   | 54,600   | 33,500  | 16,000  | 10,100  |
| 20    | 16,800  | 12,500  | 16,000  | 25,100  | 27,200  | 16,100  | 36,400  | 76,200   | 53,800   | 27,500  | 5,670   | 12,200  |
| 21    | 17,000  | 9,400   | 16,100  | 25,800  | 23,400  | 12,100  | 40,000  | 74,500   | 50,400   | 26,700  | 5,540   | 11,600  |
| 22    | 14,600  | 10,700  | 20,500  | 25,700  | 26,600  | 21,600  | 36,500  | 69,400   | 53,100   | 26,400  | 3,210   | 13,400  |
| 23    | 17,400  | 13,400  | 21,000  | 23,000  | 24,300  | 26,700  | 39,800  | 68,200   | 54,700   | 23,900  | 10,100  | 14,300  |
| 24    | 15,200  | 6,900   | 20,200  | 18,800  | 25,100  | 18,900  | 40,500  | 54,200   | 59,300   | 24,100  | 14,600  | 15,700  |
| 25    | 11,900  | 14,800  | 9,580   | 23,000  | 26,300  | 19,700  | 36,400  | 52,100   | 61,200   | 23,100  | 14,600  | 12,300  |
| 26    | 18,600  | 8,500   | 18,400  | 18,200  | 23,900  | 21,300  | 48,800  | 63,300   | 62,900   | 26,000  | 11,300  | 10,800  |
| 27    | 19,400  | 14,500  | 14,300  | 19,900  | 15,000  | 21,300  | 46,400  | 73,400   | 60,000   | 26,500  | 14,100  | 12,900  |
| 28    | 18,200  | 12,100  | 19,600  | 19,000  | 21,200  | 14,900  | 46,600  | 90,000   | 59,700   | 23,800  | 8,650   | 12,900  |
| 29    | 17,700  | 9,670   | 16,800  | 15,700  | -----   | 16,200  | 44,000  | 97,000   | 54,000   | 22,900  | 10,600  | 11,100  |
| 30    | 17,200  | 13,000  | 14,600  | 13,900  | -----   | 16,700  | 36,100  | 102,000  | 49,300   | 21,600  | 11,800  | 12,800  |
| 31    | 10,500  | -----   | 11,900  | 25,600  | -----   | 19,900  | -----   | 104,000  | -----    | 19,000  | 12,100  | -----   |
| TOTAL | 492,900 | 343,040 | 492,260 | 560,370 | 752,100 | 658,400 | 948,010 | 2,359,5M | 2,245.5M | 998,100 | 404,210 | 356,120 |
| MEAN  | 15,900  | 11,430  | 15,880  | 18,080  | 26,860  | 21,240  | 31,600  | 76,110   | 74,850   | 32,200  | 13,040  | 11,870  |
| MAX   | 19,600  | 15,100  | 21,800  | 25,800  | 39,800  | 31,600  | 48,800  | 104,000  | 104,000  | 50,200  | 19,000  | 15,700  |
| MIN   | 10,300  | 4,610   | 7,580   | 8,320   | 15,000  | 11,600  | 7,410   | 35,000   | 49,300   | 19,000  | 3,210   | 7,750   |
| AC-FT | 977,700 | 680,400 | 976,400 | 1,111M  | 1,492M  | 1,306M  | 1,880M  | 4,680M   | 4,454M   | 1,980M  | 801,800 | 706,400 |

CAL YR 1970 TOTAL 8,014,180 MEAN 21,960 MAX 100,000 MIN 3,400 AC-FT 15,900,000  
WTR YR 1971 TOTAL 10,610,510 MEAN 29,070 MAX 104,000 MIN 3,210 AC-FT 21,050,000

M Expressed in thousands.

NOTE.--No gage-height record May 13-24.

## Smaller reservoirs in Pend Oreille River basin in Montana

- 12325000 GEORGETOWN LAKE.--Lat 46°12'55", long 113°16'40", in SW¼ sec.6, T.5 N., R.13 W., Granite County, at dam on Flint Creek, 2 miles west of Southern Cross, 8 miles south of Philipsburg, and at mile 38.8. Drainage area, 50.1 sq mi. Period of record, October 1939 to current year. May to July 1948 daily elevations and contents, published in WSP 1080. Records of daily elevations since October 1940 are in files of Helena district office. Nonrecording gage read daily. Datum of gage is at mean sea level (levels by The Montana Power Co.).
- Extremes for current year: Maximum contents observed, 31,010 acre-ft July 16-18, 23, 24 (elevation 6,429.49 ft); minimum observed, 23,800 acre-ft May 2 (elevation, 6,427.00 ft). Extremes for period of record: Maximum contents observed, 31,580 acre-ft June 30, 1970 (elevation, 6,429.68 ft); minimum observed, 15,990 acre-ft Apr. 28, 29, 1957 (elevation, 6,424.15 ft).
- Reservoir is formed by masonry and concrete dam. Storage began about 1905 to store water for pumpage into Warm Springs Creek for use of reduction works of Anaconda Copper Mining Co. at Anaconda, or for release through Flint Creek for irrigation, power development, and recreation. Usable capacity, 31,040 acre-ft between elevation 6,398.0 ft (bottom of outlet pipes) and 6,429.5 ft (maximum design level). Figures given herein represent usable contents. Records furnished by The Montana Power Co. Revisions, WSP 1316: Drainage area.
- 12332500 EAST FORK ROCK CREEK RESERVOIR.--Lat 46°07'54", long 113°22'48", in NE¼ sec.6, T.4 N., R.14 W., Granite County, at dam on East Fork Rock Creek, 14 miles southwest of Philipsburg, and at mile 9.7. Drainage area, 30.3 sq mi. Period of record, October 1939 to current year (seasonal records only for most years 1946-60, 1964, 1968). Records for October 1955 to April 1956, published in WSP 1446, have been found to be in error and should not be used. May to August 1948 scattered daily contents, published in WSP 1080. Elevations determined by hand levels from reference points at indefinite intervals. Datum of gage is at mean sea level (levels by Montana Water Resources Board).
- Extremes for current year: Maximum contents observed, 16,040 acre-ft July 1 (elevation, 6,055.5 ft); minimum observed, 1,570 acre-ft Sept. 30 (elevation, 6,003.8 ft). Extremes for period of record: Maximum contents observed, in excess of 16,000 acre-ft when reservoir was full and spilling at times in several years; no storage Sept. 1, 1955, Aug. 31 to Sept. 14, 1961, Aug. 28, 1966.
- Reservoir is formed by earthfill dam with concrete spillway completed in 1937; storage began in 1936. Usable capacity, 16,040 acre-ft between elevation 5,990.0 ft (bottom of outlet) and 6,055.5 ft (spillway crest). Dead storage unknown. Figures given herein represent usable contents. Water is used for irrigation and recreation. Records furnished by Montana Water Resources Board. Revisions, WSP 1316: Drainage area.
- 12336500 NEVADA CREEK RESERVOIR.--Lat 46°48'06", long 112°48'42", in NE¼ sec.14, T.12 N., R.10 W., Powell County, at dam on Nevada Creek, 7 miles west of Finn. Drainage area, 145 sq mi. Period of record, October 1939 to current year (incomplete 1948, 1950-58, 1961-62, 1965-66, 1969-70). Nonrecording gage usually read at or near end of month. Prior to 1961, elevations determined by hand level from spillway. Datum of gage is at mean sea level (levels by Montana Water Resources Board).
- Extremes for current year: Maximum contents observed, 12,260 acre-ft June 15 (elevation, 4,615.0 ft); minimum observed, 2,000 acre-ft Dec. 20 (elevation, 4,578.0 ft). Extremes for period of record: Maximum contents observed, 13,520 acre-ft June 3, 1953 (elevation, 4,618.3 ft); minimum observed, 914 acre-ft Nov. 16, 1961 (elevation, 4,570.5 ft).
- Reservoir is formed by earthfill dam with concrete spillway completed in 1938. Usable capacity, 12,640 acre-ft between elevation 4,551.5 ft (bottom of outlet) and 4,616.0 ft (spillway crest). Dead storage, 12 acre-ft below elevation 4,551.5 ft. Figures given herein represent usable contents. Water is used for irrigation and recreation. Records furnished by Montana Water Resources Board.
- 12342000 PAINTED ROCKS LAKE.--Lat 45°43'06", long 114°16'45", in NE¼SE¼ sec.26, T.1 S., R.22 W., Ravalli County, at dam on West Fork Bitterroot River, 7 miles upstream from Nez Perce Creek, 16.5 miles southwest of Conner, 23 miles south of Darby, and at mile 19.8. Drainage area, 317 sq mi. Period of record, June 1940 to current year (incomplete 1956-58, 1960-61). Prior to December 1958, figures of contents may be total or usable. Records for August 1954, published only in WSP 1736. May to September 1948 scattered daily contents, published in WSP 1080. Prior to October 1959, published as West Fork Bitterroot River Reservoir near Conner. Elevations determined at or near end of month by hand levels from spillway or from staff gage on right wing-wall above spillway. Prior to 1959, elevations determined by measuring from floor of control tower. Datum of gage is at mean sea level.
- Extremes for current year: Maximum contents observed, 33,230 acre-ft June 8 (elevation, 4,727.7 ft); minimum observed, 22,290 acre-ft Jan. 27 (elevation, 4,700.5 ft). Extremes for period of record: Maximum contents observed, 33,580 acre-ft May 13, 1960 (elevation, 4,728.2 ft); no storage October 1940 to January 1941, March 1952, March, April 1954.
- Reservoir is formed by earthfill dam with concrete spillway completed in 1940. Usable capacity, 31,700 acre-ft between elevation 4,625.5 ft (bottom of outlet) and 4,725.5 ft (spillway crest). Dead storage, 656 acre-ft below elevation 4,625.5 ft. Figures given herein represent usable contents. Water is used for irrigation and recreation. Records furnished by Montana Water Resources Board prior to December 1958; most monthly readings made by Geological Survey personnel thereafter. Revisions, WSP 1316: Drainage area.
- 12344500 LAKE COMO.--Lat 46°03'40", long 114°14'00", in NE¼NW¼ sec.32, T.4 N., R.21 W., Ravalli County, at dam on Rock Creek, 4 miles northwest of Darby, and at mile 3.6. Drainage area, 54.6 sq mi. Period of record, October 1939 to current year. April to August 1948 scattered daily gage height and contents, published in WSP 1080. Prior to October 1967, published as Como Lake. Nonrecording gage read at or near end of month in winter and more often during irrigation season but only monthend figures supplied. Datum of gage is at mean sea level.
- Extremes for current year: Maximum contents observed, 35,410 acre-ft May 31 (elevation, 4,243.0 ft); minimum observed, 384 acre-ft Oct. 1 (elevation, 4,190.5 ft). Extremes for period of record: Maximum contents observed, 36,920 acre-ft June 30, 1957, June 30, 1960, July 1, 1963, June 1, 1964 (elevation, 4,244.5 ft); no storage at times in several years.
- Reservoir is formed by earthfill dam with concrete spillway completed in 1909. Usable capacity, 34,920 acre-ft (corrected on basis of better defined capacity table) between elevation 4,188.0 ft (bottom of outlet) and 4,242.5 ft (spillway crest). Dead storage unknown below elevation 4,188.0 ft (elevation of natural lake outlet). Figures given herein represent usable contents. Water is used for irrigation and recreation. Records furnished by Bitterroot Irrigation District. Revisions, WSP 1316: Drainage area.



## Smaller reservoirs in Pend Oreille River basin in Montana--Continued

**CAMAS RESERVOIRS.**--A group of four reservoirs in the Little Bitterroot River basin operated for irrigation and recreation. Nonrecording gages are set to approximate sea level datum, and are read on the last day of the month. Figures given herein represent usable contents. Records furnished by Bureau of Indian Affairs. May to July 1948 scattered daily contents for individual reservoirs, published in WSP 1080.

12372500 **LITTLE BITTERROOT LAKE.**--Lat 48°05'34", long 114°41'51", in SE $\frac{1}{4}$ SE $\frac{1}{4}$ SW $\frac{1}{4}$  sec.16 (corrected), T.27 N., R.24 W., Flathead County, at dam on Little Bitterroot River, 2 miles southwest of Marion and at mile 70.3. Drainage area, 31.8 sq mi. Period of record, December 1939, April 1940, September 1940 to current year. Extremes for current year: Maximum contents observed, 19,600 acre-ft June 30, July 31 (elevation, 3,904.68 ft); minimum observed, 10,550 acre-ft Oct. 31 (elevation, 3,902.53 ft). Extremes for period of record: Maximum contents observed, 26,880 acre-ft May 31, 1959 (elevation, 3,906.60 ft); no storage at times in 1939-46.

Reservoir is formed by earthfill dam; storage began in 1918. Usable capacity, 26,400 acre-ft (24,000 acre-ft prior to 1960) between elevation 3,897.98 ft and 3,906.48 ft. No dead storage.

12373500 **HUBBART RESERVOIR.**--Lat 47°55'43", long 114°43'53", in SE $\frac{1}{4}$ NE $\frac{1}{4}$  sec.18, T.25 N., R.24 W., Flathead County, at dam on Little Bitterroot River, 9 miles northwest of Niarada, and at mile 55.8. Drainage area, 114 sq mi. Period of record, December 1939, April 1940, September 1940 to current year.

Extremes for current year: Maximum contents observed, 12,130 acre-ft May 31, June 30 (elevation, 3,219.0 ft); minimum observed, 3,350 acre-ft Oct. 1 (elevation, 3,192.9 ft). Extremes for period of record: Maximum contents observed, 13,050 acre-ft May 31, 1959 (elevation, 3,220.92 ft); no storage September to December 1958.

Reservoir is formed by concrete variable-radius dam; storage began in 1924. Usable capacity, 12,120 acre-ft between elevation 3,140.0 ft and 3,219.0 ft. No dead storage.

12375000 **UPPER DRY FORK RESERVOIR.**--Lat 47°44'55", long 114°40'53", in SE $\frac{1}{4}$ SE $\frac{1}{4}$ SW $\frac{1}{4}$  sec.16, T.23 N., R.24 W., Sanders County, at dam on Dry Fork Creek, 4 miles northwest of Lonepine. Drainage area, 8.53 sq mi. Period of record, April 1940, September 1940 to current year.

Extremes for current year: Maximum contents observed, 2,940 acre-ft June 30 (elevation, 2,928.9 ft) minimum observed, 259 acre-ft Oct. 1 (elevation, 2,912.6 ft). Extremes for period of record: Maximum contents observed, 2,940 June 30, 1971 (elevation, 2,928.9 ft); no storage at times in 1940, 1942, 1943.

Reservoir is formed by earthfill dam, storage began in 1940. Usable capacity, 2,810 acre-ft (2,700 acre-ft prior to 1960) between elevation 2,900.0 ft and 2,928.5 ft. No dead storage. Natural flow of Alder Creek in Thompson River basin is diverted in SW $\frac{1}{4}$  sec.16, T.23 N., R.25 W., and carried by inter-basin canal to upper Dry Fork Creek for storage in this reservoir.

12375500 **DRY FORK RESERVOIR.**--Lat 47°42'00", long 114°40'02", in SW $\frac{1}{4}$ NW $\frac{1}{4}$ NW $\frac{1}{4}$  sec.3, T.22 N., R.24 W., Sanders County, at dam on Dry Fork Creek, 1 mile west of Lonepine. Drainage area, 17.8 sq mi. Period of record, December 1939, April 1940, September 1940 to current year. Records published in WSP 1316 were listed in error and should not be used.

Extremes for current year: Maximum contents observed, 3,860 acre-ft Apr. 30 (elevation, 2,856.3 ft); minimum observed, 971 acre-ft Aug. 31 (elevation, 2,844.6 ft). Extremes for period of record: Maximum contents observed, 4,080 acre-ft Apr. 30, 1942 (elevation, 2,856.91 ft); no storage Aug. 31, 1944, Aug. 31, Sept. 30, 1946, Oct. 31, 1951.

Reservoir is formed by earthfill dam; storage began in 1921. Usable capacity, 3,860 acre-ft (4,000 acre-ft prior to 1960) between elevation 2,830.5 ft and 2,856.3 ft. No dead storage.

**MISSION VALLEY RESERVOIRS.**--A group of eight reservoirs, in an area east of and tributary to Flathead River and between Flathead Lake and Jocko River, Lake County, is operated for irrigation. Period of record, December 1939, September 1940 to current year. Nonrecording gages are set to approximate sea level datum, and are read on the last day of the month. Figures given herein represent usable contents. Records furnished by Bureau of Indian Affairs. April to July 1948 monthend contents and daily maximums for individual reservoirs, published in WSP 1080.

12371000 **TURTLE LAKE.**--Lat 47°40'19", long 114°04'32", in SW $\frac{1}{4}$ NW $\frac{1}{4}$ NE $\frac{1}{4}$  sec.18, T.22 N., R.19 W., at outlet works 4 miles southeast of Polson, fed entirely by various canals; storage began in 1932. Prior to October 1968, published as Twin Reservoir. Usable capacity, 899 acre-ft between elevation 3,061.0 ft and 3,090.5 ft. No dead storage.

Extremes for current year: Maximum contents observed, 835 acre-ft May 31 (elevation, 3,089.5 ft); minimum observed, 368 acre-ft Aug. 31 (elevation, 3,079.6 ft). Extremes for period of record: Maximum contents observed, 899 acre-ft June 30, 1956, June 30, 1964 (elevation, 3,090.5 ft); no storage at times in July 1941, August, September 1944, October 1957.

12376700 **LOWER CROW RESERVOIR.**--Lat 47°30'09", long 114°13'35", in SW $\frac{1}{4}$ SE $\frac{1}{4}$ SE $\frac{1}{4}$  sec.11, T.20 N., R.21 W., at outlet works on Crow Creek, 6 miles west of Ronan, and at mile 3.44; storage began in 1933. Usable capacity, 10,350 acre-ft between elevation 2,800 ft and 2,877 ft. No dead storage.

Extremes for current year: Maximum contents observed, 9,880 acre-ft June 30 (elevation, 2,875.6 ft); minimum observed, 5,670 acre-ft Nov. 30 (elevation, 2,860.0 ft). Extremes for period of record: Maximum contents observed, 10,770 acre-ft May 21, 22, 1948 (elevation, 2,878.2 ft); no storage Sept. 30, 1963.

12377200 **MISSION RESERVOIR.**--Lat 47°18'54", long 114°01'15", in NW $\frac{1}{4}$ SW $\frac{1}{4}$ SE $\frac{1}{4}$  sec.16 (corrected), T.18 N., R.19 W., at outlet works on Mission Creek, 4 miles east of St. Ignatius, and at mile 16.7; storage began in 1935. Usable capacity, 7,250 acre-ft between elevation 3,340.7 ft and 3,406.0 ft.

Extremes for current year: Maximum contents observed, 7,870 acre-ft July 31 (elevation, 3,408.1 ft); minimum observed, 954 acre-ft Sept. 30 (elevation, 3,378.6 ft). Extremes for period of record: Maximum contents observed, 8,370 acre-ft June 30, 1970 (elevation, 3,409.8 ft); no storage at times during September 1949, February, March 1964.

12377300 **ST. MARYS LAKE.**--Lat 47°15'58", long 113°56'08", in SW $\frac{1}{4}$ NW $\frac{1}{4}$ NE $\frac{1}{4}$  sec.6, T.17 N., R.18 W., at outlet works on Dry Creek, 8 miles southwest of St. Ignatius, fed by water diverted from Jocko River; storage began in 1919. Prior to October 1968, published as Tabor Reservoir. Usable capacity, 23,300 acre-ft between elevation 3,911.5 ft and 4,025 ft, not including contents of natural lake. No dead storage.

Extremes for current year: Maximum contents observed, 22,660 acre-ft June 30 (elevation, 4,022.7 ft); minimum observed, 2,180 acre-ft Oct. 31 (elevation, 3,925.5 ft). Extremes for period of record: Maximum contents observed, 23,480 acre-ft June 30, 1970 (elevation, 4,025.6 ft); no storage Sept. 30, 1969.

## Smaller reservoirs in Pend Oreille River basin in Montana--Continued

## Mission Valley Reservoirs.--Continued

- 12377900 PABLO RESERVOIR.--Lat 47°38'25", long 114°08'33", in SW $\frac{1}{4}$ SW $\frac{1}{4}$ NE $\frac{1}{4}$  sec.27, T.22 N., R.20 W., at outlet works 3 miles south of Polson, fed entirely by various canals, some water supplied by Flathead pumping plant; storage began in 1914. Usable capacity, 27,100 acre-ft between elevation 3,179 ft (gate sill) and 3,210.2 ft. No dead storage.  
Extremes for current year: Maximum contents observed, 27,610 acre-ft June 30 (elevation, 3,210.5 ft); minimum observed, 1,140 acre-ft Sept. 30 (elevation, 3,187.2 ft). Extremes for period of record: Maximum contents observed, 28,120 acre-ft June 30, 1968 (elevation, 3,210.77 ft); no storage at times in several years.
- 12378200 McDONALD RESERVOIR.--Lat 47°25'31", long 113°59'27", in SE $\frac{1}{4}$ NE $\frac{1}{4}$ NE $\frac{1}{4}$  sec.10, T.19 N., R.19 W., at outlet works on Post Creek, 9 miles east of Charlo, and at mile 12.4; storage began in 1919. Usable capacity, 8,220 acre-ft between elevation 3,545 ft and 3,598 ft, not including contents of natural lake. No dead storage.  
Extremes for current year: Maximum contents observed, 8,230 acre-ft June 30 (elevation, 3,598.0 ft); minimum observed, 490 acre-ft Oct. 31 (elevation, 3,550.0 ft). Extremes for period of record: Maximum contents observed, 8,230 acre-ft June 30, 1971 (elevation, 3,598.0 ft); no storage Aug. 31, 1961, Aug. 30, 1966.
- 12379700 KICKING HORSE RESERVOIR.--Lat 47°27'25", long 114°04'35", in SE $\frac{1}{4}$ NE $\frac{1}{4}$ NE $\frac{1}{4}$  sec.36, T.20 N., R.20 W., at outlet works 5 miles south of Ronan, fed entirely by various canals; storage began in 1930. Usable capacity, 8,350 acre-ft between elevation 3,042.0 ft and 3,061.94 ft. Dead storage, 70 acre-ft below 3,042.0 ft.  
Extremes for current year: Maximum contents observed, 9,280 acre-ft June 30 (elevation, 3,063.1 ft); minimum observed, 1,360 acre-ft Sept. 30 (elevation, 3,049.5 ft). Extremes for period of record, 9,760 acre-ft June 30, 1969 (elevation, 3,063.7 ft); no storage Aug. 31, 1961.
- 12380000 NINEPIPE RESERVOIR.--Lat 47°27'20", long 114°08'08", in NE $\frac{1}{4}$ NW $\frac{1}{4}$ NW $\frac{1}{4}$  sec.34, T.20 N., R.20 W., at outlet works 2 miles northeast of Charlo, fed entirely by various canals; storage began in 1911. Usable capacity, 14,870 acre-ft between elevation 2,895.4 ft and 3,010.0 ft. No dead storage.  
Extremes for current year: Maximum contents observed, 16,150 acre-ft June 30 (elevation, 3,010.9 ft); minimum observed, 3,290 acre-ft Oct. 31 (elevation, 3,000.2 ft). Extremes for period of record: Maximum contents observed, 16,790 acre-ft June 30, 1966 (elevation, 3,011.2 ft); no storage Aug. 31, 1961.
- 12380500 LOWER JOCKO LAKE.--Lat 47°12'10", long 113°45'35", in NW $\frac{1}{4}$ SW $\frac{1}{4}$ NW $\frac{1}{4}$  sec.27, T.17 N., R.17 W., Missoula County, at dam on Jocko River, 15 miles east of Arlee, and at mile 39.2. Drainage area, 7.39 sq mi. Period of record, December 1939, April 1940, September 1940 to current year (no winter records most years since 1947). Records for November 1957, published only in WSP 1736. May to July 1948 scattered daily contents, published in WSP 1080. Nonrecording gage read at end of month. Datum of gage is at mean sea level (levels by Bureau of Indian Affairs).  
Extremes for current year: Maximum contents observed, 6,070 acre-ft June 30 (elevation, 4,337.3 ft); no storage most of year. Extremes for period of record: Maximum contents observed, 6,700 acre-ft June 8, 1948 (elevation, 4,342.7 ft); no storage at times.  
Reservoir is formed by earthen dam; storage began in 1937. Usable capacity, 6,380 acre-ft between elevation 4,267 ft and 4,340 ft. Prior to 1960, usable capacity, 7,600 acre-ft at elevation 4,350 ft. Dead storage unknown below elevation 4,267 ft (elevation of natural lake outlet). Transmountain diversion takes water from Placid Creek in Clearwater River basin in SW $\frac{1}{4}$  sec.29, T.17 N., R.16 W., to Upper Jocko Lake, thence to Lower Jocko Lake. Some water may then be diverted to St. Mary's Lake for use in the Mission Valley. Figures given herein represent usable contents. Water is used for irrigation and recreation. Records furnished by Bureau of Indian Affairs.
- 12390000 THOMPSON FALLS RESERVOIR.--Lat 47°35'42", long 115°21'36", in NE $\frac{1}{4}$  sec.7, T.21 N., R.29 W., Sanders County, at dam on Clark Fork at Thompson Falls, at mile 208.0. Drainage area, 20,968 sq mi. Period of record, October 1939 to current year. Nonrecording gage is read several times daily but only monthend figures supplied. Datum of gage is at mean sea level (levels by The Montana Power Co.).  
Extremes for current year: Maximum contents observed, 13,810 acre-ft Jan. 31 (elevation, 2,395.2 ft); minimum observed, 2,990 acre-ft Apr. 30 (elevation, 2,384.9 ft). Extremes for period of record: Maximum contents observed, 16,060 acre-ft Nov. 30, 1949; no storage July 31, 1958.  
Reservoir is formed by two concrete dams, first generator installed July 1915. Usable capacity, 14,970 acre-ft between elevation 2,380.0 ft (spillway crest) and 2,396.0 ft (top of flashboards). Dead storage unknown. Figures given herein represent usable contents. Water is used for power development and recreation. Records furnished by The Montana Power Co.
- 12391300 NOXON RAPIDS RESERVOIR.--Lat 47°57'38", long 115°44'00", in NE $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$  sec.33, T.26 N., R.32 W., Sanders County, at dam on Clark Fork, 3 miles southeast of Noxon, 7.2 miles upstream from Bull River, and at mile 169.7. Drainage area, 21,833 sq mi. Period of record, April 1959 to current year. Prior to October 1962, published as Noxon Reservoir. Record of daily elevations on file in Helena district office. Water-stage recorder, midnight readings. Datum of gage is at mean sea level (levels by The Washington Water Power Co.).  
Extremes for current year: Maximum contents, 333,800 acre-ft Feb. 14 (elevation, 2,330.90 ft); minimum, 128,600 acre-ft Apr. 23 (elevation, 2,299.90 ft). Extremes for period of record: Maximum contents, 335,400 acre-ft Apr. 7, 1960 (elevation, 2,331.10 ft); minimum since first filling, 26,380 acre-ft May 10, 1967 (elevation, 2,277.15 ft).  
Reservoir is formed by concrete and earthen dam; construction began in 1955, completed in 1959. Storage began Apr. 3, 1959. Usable capacity, 334,600 acre-ft between elevation 2,270.00 ft (minimum operating level) and 2,331.00 ft (controlled spillway elevation). Dead storage, 161,000 acre-ft below elevation 2,270.00 ft. Figures given herein represent usable contents. Water is used for power production, flood control, and recreation. Records furnished by The Washington Water Power Co.



## PEND OREILLE RIVER BASIN

Smaller reservoirs in Pend Oreille River basin in Montana--Continued

Monthend contents, in acre-feet, water year October 1970 to September 1971

| Date               | Georgetown<br>Lake     | East Fork<br>Rock Creek<br>Reservoir | Nevada<br>Creek<br>Reservoir | Painted<br>Rocks<br>Lake | Lake<br>Como | Camas<br>Reservoirs | Mission<br>Valley<br>Reservoirs |
|--------------------|------------------------|--------------------------------------|------------------------------|--------------------------|--------------|---------------------|---------------------------------|
| Sept. 30 . . . . . | 30,060                 | a4,550                               | b4,110                       | a29,440                  | 384          | 17,840              | 20,990                          |
| Oct. 31 . . . . .  | 30,150                 | a3,960                               | a2,650                       | a27,950                  | b2,030       | 15,210              | 25,110                          |
| Nov. 30 . . . . .  | 30,510                 | b4,540                               | a2,410                       | a25,950                  | b3,520       | 15,600              | 27,550                          |
| Dec. 31 . . . . .  | 29,170                 | -                                    | a2,160                       | a24,180                  | 5,250        | 16,160              | 30,790                          |
| Jan. 31 . . . . .  | 27,770                 | -                                    | 5,340                        | a22,770                  | 10,070       | 18,340              | 35,150                          |
| Feb. 28 . . . . .  | 26,550                 | -                                    | 8,350                        | a25,430                  | 11,730       | 21,520              | 41,710                          |
| Mar. 31 . . . . .  | 24,970                 | -                                    | b8,980                       | 23,760                   | 14,390       | 23,770              | 44,830                          |
| Apr. 30 . . . . .  | 23,970                 | c9,500                               | a11,040                      | a28,840                  | 20,040       | 30,190              | 54,230                          |
| May 31 . . . . .   | 27,100                 | a13,990                              | a12,160                      | a32,860                  | 35,410       | 37,050              | 80,640                          |
| June 30 . . . . .  | 30,270                 | b16,040                              | b10,480                      | a32,670                  | 35,020       | 38,130              | 102,400                         |
| July 31 . . . . .  | 30,600                 | b11,480                              | a8,990                       | a31,630                  | 33,680       | 35,560              | 89,110                          |
| Aug. 31 . . . . .  | 30,300                 | a6,520                               | 5,600                        | a29,860                  | 15,750       | 27,130              | 37,400                          |
| Sept. 30 . . . . . | 30,000                 | 1,570                                | 2,580                        | a27,150                  | 3,790        | 24,180              | 18,260                          |
| Date               | Lower<br>Jocko<br>Lake | Thompson<br>Falls<br>Reservoir       | Noxon<br>Rapids<br>Reservoir |                          |              |                     |                                 |
| Sept. 30 . . . . . | 0                      | 14,100                               | 328,800                      |                          |              |                     |                                 |
| Oct. 31 . . . . .  | 0                      | 13,250                               | 316,600                      |                          |              |                     |                                 |
| Nov. 30 . . . . .  | 0                      | 9,220                                | 326,100                      |                          |              |                     |                                 |
| Dec. 31 . . . . .  | 0                      | 10,510                               | 324,400                      |                          |              |                     |                                 |
| Jan. 31 . . . . .  | 0                      | 13,810                               | 332,100                      |                          |              |                     |                                 |
| Feb. 28 . . . . .  | 0                      | 11,130                               | 331,400                      |                          |              |                     |                                 |
| Mar. 31 . . . . .  | 0                      | 11,780                               | 205,600                      |                          |              |                     |                                 |
| Apr. 30 . . . . .  | 1,140                  | 2,990                                | 148,500                      |                          |              |                     |                                 |
| May 31 . . . . .   | 5,500                  | 7,260                                | 310,200                      |                          |              |                     |                                 |
| June 30 . . . . .  | 6,070                  | 3,520                                | 327,500                      |                          |              |                     |                                 |
| July 31 . . . . .  | 5,010                  | 13,520                               | 313,100                      |                          |              |                     |                                 |
| Aug. 31 . . . . .  | 1,020                  | 11,520                               | 328,100                      |                          |              |                     |                                 |
| Sept. 30 . . . . . | 0                      | 10,510                               | 320,500                      |                          |              |                     |                                 |

a Interpolated.

b Figure of contents for first day of following month.

c Estimate.

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 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 generally 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 a stream. The column headed "Period of record" shows the water years in which measurements were made at the same, or practically the same, site.

| Discharge measurements made at low-flow partial-record stations during water year 1971 |                                     |                                                                                                                          |                       |                  |                                                       |                                     |
|----------------------------------------------------------------------------------------|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------|-----------------------|------------------|-------------------------------------------------------|-------------------------------------|
| Station No.                                                                            | Station name                        | Location                                                                                                                 | Drainage area (sq mi) | Period of record | Measurements                                          |                                     |
|                                                                                        |                                     |                                                                                                                          |                       |                  | Date                                                  | Discharge (cfs)                     |
| Musselshell River basin                                                                |                                     |                                                                                                                          |                       |                  |                                                       |                                     |
| *06126300                                                                              | Currant Creek near Roundup          | SW $\frac{1}{4}$ sec.7, T.7 N., R.25 E., Musselshell County, at bridge on U.S. Highway 12, 7 miles southwest of Roundup. | 220                   | 1958-71          | 11- 6-70<br>5-14-71<br>8-17-71<br>9-15-71             | a0.10<br>a1.0<br>a1.5<br>a.10       |
| Big Dry Creek basin                                                                    |                                     |                                                                                                                          |                       |                  |                                                       |                                     |
| *06130950                                                                              | Little Dry Creek near Van Norman    | SE $\frac{1}{4}$ sec.4, T.18 N., R.42 E., Garfield County, on State Highway 200, 1.5 miles southeast of Van Norman.      | 1,224                 | 1958-71          | 10-14-70<br>11- 5-70<br>7- 9-71<br>7-22-71<br>7-29-71 | a4.0<br>a4.0<br>a.20<br>.55<br>a.30 |
| Yellowstone River basin                                                                |                                     |                                                                                                                          |                       |                  |                                                       |                                     |
| *06295050                                                                              | Little Porcupine Creek near Forsyth | NE $\frac{1}{4}$ sec.3, T.6 N., R.41 E., Rosebud County, at bridge on county road, 6 miles northeast of Forsyth.         | 614                   | 1958-71          | 10- 7-70<br>11- 4-70<br>7- 7-71<br>8- 3-71            | a1.0<br>a1.0<br>2.99<br>a1.3        |

\* Also a crest-stage station.

a Estimate.

## DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

The following table contains annual maximum discharge for crest-stage stations. A crest-stage 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 |                                                 |                                                                                                                                                             |                       |                                                                                         |                |                    |                  |
|-----------------------------------------------------------------|-------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-----------------------------------------------------------------------------------------|----------------|--------------------|------------------|
| Station No.                                                     | Station name                                    | Location                                                                                                                                                    | Drainage area (sq mi) | Period of record                                                                        | Annual maximum |                    |                  |
|                                                                 |                                                 |                                                                                                                                                             |                       |                                                                                         | Date           | Gage height (feet) | Dis-charge (cfs) |
| Junction Creek basin                                            |                                                 |                                                                                                                                                             |                       |                                                                                         |                |                    |                  |
| 06013200                                                        | Traux Creek near Lima                           | NW $\frac{1}{4}$ sec.15, T.14 S., R.8 W., Beaverhead County, at culvert 300 ft above Inter-state Highway 15 and U.S. Highway 91, 2 miles southeast of Lima. | 2.77                  | 1960-71                                                                                 | 6- 2-71        | --                 | 0.1              |
| Big Sheep Creek basin                                           |                                                 |                                                                                                                                                             |                       |                                                                                         |                |                    |                  |
| 06013400                                                        | Muddy Creek near Dell                           | SW $\frac{1}{4}$ sec.3, T.14 S., R.10 W., Beaverhead County, 0.5 mile above mouth, 8 miles southwest of Dell.                                               | 62.7                  | 1960-71                                                                                 | 4- 8-71        | 3.06               | 45               |
| 06013500                                                        | Big Sheep Creek below Muddy Creek, near Dell    | SE $\frac{1}{4}$ sec.35, T.13 S., R.10 W., Beaverhead County, 6.5 miles southwest of Dell.                                                                  | 280                   | 1936 $\pm$ , 1946-53 $\pm$ , 1960-71                                                    | 5-31-71        | 5.17               | 300              |
| Grasshopper Creek basin                                         |                                                 |                                                                                                                                                             |                       |                                                                                         |                |                    |                  |
| 06015500                                                        | Grasshopper Creek near Dillon                   | SW $\frac{1}{4}$ NW $\frac{1}{4}$ sec.26, T.8 S., R.10 W., Beaver-head County, 1.3 miles above mouth, and 11 miles southwest of Dillon.                     | 348                   | 1921-29 $\pm$ , 1930-33 $\pm$ , 1945-53 $\pm$ , 1955-58 $\pm$ , 1959-61 $\pm$ , 1961-71 | 6- 2-71        | 4.21               | 465              |
| Tributary between Rattlesnake Creek and Blacktail Deer Creek    |                                                 |                                                                                                                                                             |                       |                                                                                         |                |                    |                  |
| 06016900                                                        | Beaverhead River tributary near Dillon          | SE $\frac{1}{4}$ sec.15, T.7 S., R.9 W., Beaverhead County, 250 ft above settling basin, 2 miles west of Dillon.                                            | 0.62                  | 1960-71                                                                                 | --             | --                 | (a)              |
| Ruby River basin                                                |                                                 |                                                                                                                                                             |                       |                                                                                         |                |                    |                  |
| 06019800                                                        | Idaho Creek near Alder                          | Center of sec.30, T.7 S., R.4 W., Madison County, at bridge on county road, 9 miles south of Alder.                                                         | 10.8                  | 1960-71                                                                                 | 6- 3-71        | 0.11               | 12               |
| Big Hole River basin                                            |                                                 |                                                                                                                                                             |                       |                                                                                         |                |                    |                  |
| 06025300                                                        | Moose Creek near Divide                         | NW $\frac{1}{4}$ sec.34, T.1 S., R.9 W., Silver Bow County, at culverts on Interstate High-way 15 and U.S. Highway 91, 3.5 miles southeast of Divide.       | 41.4                  | 1960-71                                                                                 | 5-12-71        | 1.25               | 91               |
| Fish Creek basin                                                |                                                 |                                                                                                                                                             |                       |                                                                                         |                |                    |                  |
| 06027700                                                        | Fish Creek near Silver Star                     | NW $\frac{1}{4}$ sec.8, T.1 S., R.5 W., Silver Bow County, at bridge on county road, 6 miles north of Silver Star.                                          | 39.5                  | 1959-71                                                                                 | 6-27-71        | 0.91               | 85               |
| Tributaries between Whitetail Creek and Boulder River           |                                                 |                                                                                                                                                             |                       |                                                                                         |                |                    |                  |
| 06030200                                                        | Jefferson River tributary near Whitehall        | SE $\frac{1}{4}$ sec.32, T.2 N., R.3 W., Jefferson County, at culvert on Interstate High-way 90 and U.S. Highway 10, 5 miles east of Whitehall.             | 1.85                  | 1960-71                                                                                 | --             | --                 | (a)              |
| 06030300                                                        | Jefferson River tributary No. 2 near Whitehall  | SE $\frac{1}{4}$ sec.33, T.2 N., R.3 W., Jefferson County, at culvert on State Secondary Highway 281, 6 miles east of Whitehall.                            | 4.50                  | 1958-71                                                                                 | 1-17-71        | 0.10               | 5                |
| Sand Creek basin                                                |                                                 |                                                                                                                                                             |                       |                                                                                         |                |                    |                  |
| 06034700                                                        | Sand Creek at Sappington                        | SW $\frac{1}{4}$ sec.32, T.1 N., R.1 W., Gallatin County, 0.8 mile southeast of Sappington.                                                                 | 9.41                  | 1960-71                                                                                 | --             | --                 | (a)              |
| Tributary between Sand Creek and Willow Creek                   |                                                 |                                                                                                                                                             |                       |                                                                                         |                |                    |                  |
| 06034800                                                        | Jefferson River tributary No. 3 near Sappington | SW $\frac{1}{4}$ sec.14, T.1 N., R.1 W., Jefferson County, at culvert on Interstate High-way 90 and U.S. Highway 10, 4 miles northeast of Sappington.       | 1.14                  | 1960-71                                                                                 | --             | --                 | (a)              |

See footnotes at end of table, p. 249

## Annual maximum discharge at crest-stage partial-record stations--Continued

| Annual maximum discharge at crest-stage partial-record stations--Continued |                                                         |                                                                                                                                                    |                       |                            |                |                    |                  |
|----------------------------------------------------------------------------|---------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|----------------------------|----------------|--------------------|------------------|
| Station No.                                                                | Station name                                            | Location                                                                                                                                           | Drainage area (sq mi) | Period of record           | Annual maximum |                    |                  |
|                                                                            |                                                         |                                                                                                                                                    |                       |                            | Date           | Gage height (feet) | Dis-charge (cfs) |
| Tributaries between Willow Creek and Madison River                         |                                                         |                                                                                                                                                    |                       |                            |                |                    |                  |
| 06036600                                                                   | Jefferson River tributary No. 4 near Three Forks        | SW $\frac{1}{4}$ sec.28, T.2 N., R.1 E., Broadwater County, at culverts on Interstate Highway 90 and U.S. Highway 10, 3 miles west of Three Forks. | 0.53                  | 1960-71                    | 1-17-71        | 0.10               | 1                |
| 06036700                                                                   | Jefferson River tributary No. 5 near Three Forks        | NE $\frac{1}{4}$ sec.21, T.2 N., R.1 E., Broadwater County, at culvert on State Highway 287, 3 miles west of Three Forks.                          | 3.69                  | 1960-71                    | 1-17-71        | --                 | b1               |
| Gallatin River basin                                                       |                                                         |                                                                                                                                                    |                       |                            |                |                    |                  |
| 06043200                                                                   | Squaw Creek near Gallatin Gateway                       | SW $\frac{1}{4}$ sec.34, T.4 S., R.4 E., Gallatin County, at private bridge, 10 miles south of Gallatin Gateway.                                   | 40.4                  | 1959-71                    | 6-27-71        | 1.63               | 260              |
| 06043300                                                                   | Logger Creek near Gallatin Gateway                      | SW $\frac{1}{4}$ sec.28, T.4 S., R.4 E., Gallatin County, at culvert on U.S. Highway 191, 10 miles south of Gallatin Gateway.                      | 2.48                  | 1959-71                    | 6-27-71        | .90                | 17               |
| 06046500                                                                   | Rocky Creek near Bozeman                                | NE $\frac{1}{4}$ sec.23, T.2 S., R.6 E., Gallatin County, 5 miles east of Bozeman.                                                                 | 49.0                  | 1951-53*, 1956-57, 1959-71 | 4-24-71        | 3.61               | 1,230            |
| 06046700                                                                   | Pitcher Creek near Bozeman                              | NW $\frac{1}{4}$ sec.24, T.2 S., R.6 E., Gallatin County, at culvert on county road, 5 miles east of Bozeman.                                      | 2.33                  | 1951-53, 1960-71           | 4-24-71        | 3.10               | 60               |
| 06047000                                                                   | Bear Canyon Creek near Bozeman                          | NW $\frac{1}{4}$ sec.36, T.2 S., R.6 E., Gallatin County, 6 miles southeast of Bozeman.                                                            | 17.0                  | 1951-53*, 1959-71          | 5- 2-71        | 1.28               | 137              |
| Deep Creek basin                                                           |                                                         |                                                                                                                                                    |                       |                            |                |                    |                  |
| 06056200                                                                   | Castle Creek tributary near Ringling                    | NE $\frac{1}{4}$ sec.21, T.7 N., R.5 E., Broadwater County, at culverts on U.S. Highway 12, 15 miles northwest of Ringling.                        | 2.59                  | 1960-71                    | 5- 3-71        | c2.98              | 22               |
| 06056300                                                                   | Cabin Creek near Townsend                               | NW $\frac{1}{4}$ sec.27, T.7 N., R.4 E., Broadwater County, 100 ft above mouth, 14.5 miles east of Townsend.                                       | 12.6                  | 1960-71                    | 5- 4-71        | 1.31               | 19               |
| 06056600                                                                   | Deep Creek below North Fork Deep Creek, near Townsend   | SE $\frac{1}{4}$ sec.25, T.7 N., R.3 E., Broadwater County, at bridge on county road, 11 miles east of Townsend.                                   | 87.7                  | 1959-71                    | 5- 3-71        | 3.12               | 180              |
| Spokane Creek basin                                                        |                                                         |                                                                                                                                                    |                       |                            |                |                    |                  |
| 06058700                                                                   | Mitchell Gulch near East Helena                         | NW $\frac{1}{4}$ sec.2, T.9 N., R.2 W., Lewis and Clark County, at culvert on U.S. Highway 12, 4.7 miles east of East Helena.                      | 8.09                  | 1959-71                    | 2-10-71        | -1.07              | 4                |
| Prickly Pear Creek basin                                                   |                                                         |                                                                                                                                                    |                       |                            |                |                    |                  |
| 06061700                                                                   | Jackson Creek near East Helena                          | SE $\frac{1}{4}$ sec.4, T.8 N., R.2 W., Jefferson County, 300 ft above mouth, 8.5 miles southeast of East Helena.                                  | 3.44                  | 1961-71                    | 6- 4-71        | 2.12               | 9                |
| 06061800                                                                   | Crystal Creek near East Helena                          | NW $\frac{1}{4}$ sec.4, T.8 N., R.2 W., Jefferson County, 0.3 mile above mouth, 8 miles southeast of East Helena.                                  | 3.77                  | 1961-71                    | 5- 2-71        | 1.68               | 27               |
| 06061900                                                                   | McClellan Creek at City diversion dam, near East Helena | SE $\frac{1}{4}$ sec.17, T.9 N., R.2 W., Jefferson County, 300 ft upstream from diversion dam, 4.5 miles southeast of East Helena.                 | 33.2                  | 1960-71                    | 5-30-71        | 1.20               | 130              |
| 06062700                                                                   | Little Porcupine Creek tributary near Helena            | SW $\frac{1}{4}$ sec.29, T.10 N., R.5 W., Lewis and Clark County, at culvert on U.S. Highway 12, 11 miles west of Helena.                          | .48                   | 1959-71                    | 5- 2-71        | .38                | 1.8              |
| Little Prickly Pear Creek basin                                            |                                                         |                                                                                                                                                    |                       |                            |                |                    |                  |
| 06071200                                                                   | Lyons Creek near Wolf Creek                             | NE $\frac{1}{4}$ sec.29, T.14 N., R.4 W., Lewis and Clark County, 135 ft above mouth, 5.5 miles southwest of Wolf Creek.                           | 29.4                  | 1959-71                    | 5-30-71        | 1.57               | 150              |
| Dog Creek basin                                                            |                                                         |                                                                                                                                                    |                       |                            |                |                    |                  |
| 06071400                                                                   | Dog Creek near Craig                                    | NW $\frac{1}{4}$ sec.4, T.15 N., R.3 W., Lewis and Clark County, at bridge on county road, 2 miles west of Craig.                                  | 15.9                  | 1960-71                    | 2-13-71        | 3.24               | 340              |

See footnotes at end of table, p. 249

## DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

## Annual maximum discharge at crest-stage partial-record stations--Continued

| Annual maximum discharge at crest-stage partial-record stations--Continued |                                                |                                                                                                                                                    |                       |                   |                |                    |                  |
|----------------------------------------------------------------------------|------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-------------------|----------------|--------------------|------------------|
| Station No.                                                                | Station name                                   | Location                                                                                                                                           | Drainage area (sq mi) | Period of record  | Annual maximum |                    |                  |
|                                                                            |                                                |                                                                                                                                                    |                       |                   | Date           | Gage height (feet) | Dis-charge (cfs) |
| Wegner Creek basin                                                         |                                                |                                                                                                                                                    |                       |                   |                |                    |                  |
| 06071600                                                                   | Wegner Creek at Craig                          | NW $\frac{1}{4}$ sec.11, T.15 N., R.3 W., Lewis and Clark County, at bridge on Interstate Highway 15 and U.S. Highway 91, 0.9 miles east of Craig. | 35.0                  | 1960-71           | 2-13-71        | -0.54              | 30               |
| Smith River basin                                                          |                                                |                                                                                                                                                    |                       |                   |                |                    |                  |
| 06075600                                                                   | Five Mile Creek near White Sulphur Springs     | SW $\frac{1}{4}$ sec.20, T.10 N., R.8 E., Meagher County, at culvert on U.S. Highway 12, 8 miles northeast of White Sulphur Springs.               | 6.00                  | 1960-71           | 5- 3-71        | 3.11               | 46               |
| 06076000                                                                   | Newland Creek near White Sulphur Springs       | Near line between secs.9 and 10, Meagher County, T.11 N., R.7 E., 13 miles north of White Sulphur Springs, 15 miles above mouth.                   | 6.74                  | 1945-53*, 1960-71 | 5-16-71        | 2.24               | 5                |
| 06076700                                                                   | Sheep Creek near Neihart                       | SE $\frac{1}{4}$ sec.15, T.12 N., R.8 E., Meagher County, at culvert on U.S. Highway 89, 10 miles south of Neihart.                                | 5.30                  | 1960-71           | 6- 3-71        | 1.32               | 51               |
| 06076800                                                                   | Nugget Creek near Neihart                      | NE $\frac{1}{4}$ sec.27, T.12 N., R.8 E., Meagher County, at culvert on U.S. Highway 89, 11 miles south of Neihart.                                | 1.48                  | 1959-71           | 5-16-71        | .83                | 9                |
| 06077700                                                                   | Smith River tributary near Eden                | SW $\frac{1}{4}$ sec.13, T.18 N., R.2 E., Cascade County, at bridge on county road, 7.5 miles northwest of Eden.                                   | 1.63                  | 1960-71           | --             | --                 | (a)              |
| 06077800                                                                   | Goodman Coulee near Eden                       | Center of sec.12, T.18 N., R.2 E., Cascade County, at culvert on county road, 8 miles northwest of Eden.                                           | 21.8                  | 1959-71           | 9- 1-71        | 4.33               | 100              |
| Sun River basin                                                            |                                                |                                                                                                                                                    |                       |                   |                |                    |                  |
| 06079600                                                                   | Beaver Creek at Gibson Dam, near Augusta       | SE $\frac{1}{4}$ sec.4, T.21 N., R.9 W., Lewis and Clark County, at bridge on county road, 19 miles northwest of Augusta.                          | 20.3                  | 1959-71           | 6- 3-71        | 0.51               | 75               |
| 06087900                                                                   | Muddy Creek tributary near Power               | South line of SW $\frac{1}{4}$ sec.10, T.23 N., R.1 W., Teton County, at culvert on county road, 3.5 miles northwest of Power.                     | 3.15                  | 1963-71           | 5-20-71        | 1.24               | 26               |
| 06089300                                                                   | Sun River tributary near Great Falls           | SW $\frac{1}{4}$ sec.31, T.21 N., R.3 E., Cascade County, at culvert on old U.S. Highways 89 and 91, 4 miles northwest of Great Falls.             | 21.1                  | 1956-71           | 2-14-71        | 2.03               | 40               |
| Marias River basin                                                         |                                                |                                                                                                                                                    |                       |                   |                |                    |                  |
| 06099700                                                                   | Middle Fork Dry Fork Marias River near Dupuyer | NE $\frac{1}{4}$ sec.35, T.28 N., R.7 W., Pondera County, at culvert on county road, 4 miles southeast of Dupuyer.                                 | 20.2                  | 1960-71           | 2-14-71        | 2.50               | 70               |
| 06100200                                                                   | Heines Coulee tributary near Valier            | NE $\frac{1}{4}$ sec.27, T.29 N., R.5 W., Pondera County, at culvert on county road, 4 miles south of Valier.                                      | .60                   | 1960-71           | 2-14-71        | c4.94              | b5               |
| 06100300                                                                   | Lone Man Coulee near Valier                    | SE $\frac{1}{4}$ sec.27, T.29 N., R.5 W., Pondera County, at culvert on county road, 5 miles south of Valier.                                      | 14.1                  | 1960-71           | 2-14-71        | c5.44              | b200             |
| 06101600                                                                   | Marias River tributary No. 3 near Chester      | NE $\frac{1}{4}$ sec.36, T.29 N., R.6 E., Liberty County, at culvert on State Secondary Highway 223, 20 miles southeast of Chester.                | .32                   | 1962-71           | 2-13-71        | 1.21               | 10               |
| 06101700                                                                   | Cottonwood Creek tributary near Chester        | Near center of east line of sec.9, T.31 N., R.5 E., Liberty County, at culvert on county road, 6.5 miles southwest of Chester.                     | 2.28                  | 1963-71           | 2-25-71        | 1.80               | 25               |
| 06101800                                                                   | Cottonwood Creek tributary No. 2 near Chester  | NW $\frac{1}{4}$ sec.27, T.30 N., R.6 E., Liberty County, at bridge on State Secondary Highway 223, 12.5 miles south of Chester.                   | 24.6                  | 1963-71           | 2-25-71        | .98                | 3                |

See footnotes at end of table, p. 249



## DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

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## Annual maximum discharge at crest-stage partial-record stations--Continued

| Annual maximum discharge at crest-stage partial-record stations--Continued |                                                     |                                                                                                                                                                   |                       |                      | Annual maximum                                                 |                                              |                                         |
|----------------------------------------------------------------------------|-----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|----------------------|----------------------------------------------------------------|----------------------------------------------|-----------------------------------------|
| Station No.                                                                | Station name                                        | Location                                                                                                                                                          | Drainage area (sq mi) | Period of record     | Date                                                           | Gage height (feet)                           | Dis-charge (cfs)                        |
|                                                                            |                                                     |                                                                                                                                                                   |                       |                      |                                                                |                                              |                                         |
| Marias River basin--Continued                                              |                                                     |                                                                                                                                                                   |                       |                      |                                                                |                                              |                                         |
| 06101900                                                                   | Dead Indian Coulee near Fort Benton                 | Center of sec.21, T.27 N., R.7 E., Chouteau County, at culvert on State Secondary Highway 223, 20 miles north-west of Fort Benton.                                | 2.73                  | 1963-71              | 2-12-71                                                        | 3.44                                         | 40                                      |
| 06102100                                                                   | Dry Fork Coulee tributary near Loma                 | SW $\frac{1}{4}$ sec.2, T.25 N., R.9 E., Chouteau County, at culvert on county road, 2 miles west of Loma.                                                        | .84                   | 1959-71              | 2-13-71                                                        | 2.64                                         | 40                                      |
| 06102200                                                                   | Marias River tribu-tary at Loma                     | SW $\frac{1}{4}$ SE $\frac{1}{4}$ sec.1, T.25 N., R.9 E., Chouteau County, at bridge on county road, 0.6 mile west of Loma.                                       | 1.62                  | 1956-71              | 3-30-71                                                        | c3.48                                        | 22                                      |
| 06102300                                                                   | Marias River tribu-tary No. 2 at Loma               | NE $\frac{1}{4}$ NE $\frac{1}{4}$ sec.12, T.25 N., R.9 E., Chouteau County, at culvert on approach to U.S. Highway 87, 0.3 mile north of Loma.                    | .25                   | 1956-71              | 2-14-71                                                        | 1.23                                         | 1.5                                     |
| 06105800                                                                   | Bruce Coulee tribu-tary near Choteau                | Center of sec.21, T.23 N., R.5 W., Teton County, at culvert on county road, 6 miles southwest of Choteau.                                                         | 1.70                  | 1963-71              | 2-13-71                                                        | .83                                          | 30                                      |
| 06108200                                                                   | Kinley Coulee near Dutton                           | Center of north line of sec.15, T.24 N., R.1 E., Teton County, at culverts on county road, 5.1 miles east of Dutton.                                              | 9.67                  | 1963-71              | 2-13-71                                                        | c2.01                                        | b5                                      |
| 06108300                                                                   | Kinley Coulee trib-utary near Dutton                | North line of sec.13, T.24 N., R.1 E., Teton County, at culverts on county road, 6.5 miles east of Dutton.                                                        | 2.65                  | 1963-71              | 2-13-71                                                        | c1.96                                        | b2                                      |
| Judith River basin                                                         |                                                     |                                                                                                                                                                   |                       |                      |                                                                |                                              |                                         |
| 06109900                                                                   | Judith River tribu-tary near Utica                  | SW $\frac{1}{4}$ sec.13, T.13 N., R.11 E., Judith Basin County, at bridge on county road, 10 miles southwest of Utica.                                            | 7.17                  | 1960-71              | 3-18-60<br>6-14-62<br>2- 4-63<br>3-10-66<br>6-10-67<br>2-13-71 | 0.65<br>1.00<br>c3.33<br>2.06<br>.55<br>1.90 | d15<br>d25<br>bd10<br>d104<br>d10<br>85 |
| 06111700                                                                   | Casino Creek tribu-tary near Lewis-town             | NE $\frac{1}{4}$ sec.9, T.14 N., R.18 E., Fergus County, at culverts on county road, 5 miles south of Lewistown.                                                  | 3.53                  | 1960-71              | 3-30-71                                                        | 2.31                                         | 28                                      |
| 06112100                                                                   | Cottonwood Creek near Moore                         | NW $\frac{1}{4}$ sec.18, T.14 N., R.18 E., Fergus County, 30 ft downstream from bridge on county road, 9.5 miles east of Moore, and 12 miles upstream from mouth. | 47.9                  | 1957-63*,<br>1965-71 | 5-28-70<br>6- 7-71                                             | 6.76<br>6.20                                 | e400<br>440                             |
| Tributary between Judith River and Duval Creek                             |                                                     |                                                                                                                                                                   |                       |                      |                                                                |                                              |                                         |
| 06115100                                                                   | Missouri River tributary near Landusky              | NW $\frac{1}{4}$ sec.31, T.22 N., R.24 E., Fergus County, at culvert on county road, 19 miles south of Landusky.                                                  | 3.39                  | 1962-71              | 8-30-71                                                        | 3.75                                         | 100                                     |
| Duval Creek basin                                                          |                                                     |                                                                                                                                                                   |                       |                      |                                                                |                                              |                                         |
| 06115300                                                                   | Duval Creek near Landusky                           | Center of sec.13, T.23 N., R.23 E., Phillips County, at culvert on U.S. Highway 191, 11 miles southwest of Landusky.                                              | 3.31                  | 1963-71              | 3-16-71                                                        | 2.79                                         | 17                                      |
| Musselshell River basin                                                    |                                                     |                                                                                                                                                                   |                       |                      |                                                                |                                              |                                         |
| 06120600                                                                   | Antelope Creek tributary near Harlowton             | NE $\frac{1}{4}$ sec.8, T.10 N., R.14 E., Wheatland County, at culvert on county road, 18.3 miles northwest of Harlowton.                                         | 0.47                  | 1956-71              | 4-26-71                                                        | 1.21                                         | 0.8                                     |
| 06120700                                                                   | Antelope Creek tributary near mouth, near Harlowton | NW $\frac{1}{4}$ sec.22, T.10 N., R.14 E., Wheatland County, at bridge on county road, 16.3 miles northwest of Harlowton.                                         | 1.92                  | 1956-71              | 3-10-71                                                        | c1.40                                        | 3                                       |
| 06120800                                                                   | Antelope Creek tributary No. 2 near Harlowton       | SE $\frac{1}{4}$ sec.10, T.8 N., R.15 E., Wheatland County, at E. S. Bacon ranch, 1.5 miles north of Harlowton.                                                   | 21.2                  | 1956-71              | 3-10-71                                                        | --                                           | 5                                       |
| 06120900                                                                   | Antelope Creek at Harlowton                         | NE $\frac{1}{4}$ sec.22, T.8 N., R.15 E., Wheatland County, on overpass on U.S. Highway 12, at Harlowton.                                                         | 88.7                  | 1950,<br>1954-71     | 5-30-71                                                        | --                                           | 15                                      |

See footnotes at end of table, p. 249

## Annual maximum discharge at crest-stage partial-record stations--Continued

| Station No.                        | Station name                                        | Location                                                                                                                                       | Drainage area (sq mi) | Period of record                               | Annual maximum                                                                                                                |                                                                                     |                                                                           |
|------------------------------------|-----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------|
|                                    |                                                     |                                                                                                                                                |                       |                                                | Date                                                                                                                          | Gage height (feet)                                                                  | Dis-charge (cfs)                                                          |
| Musselshell River basin--Continued |                                                     |                                                                                                                                                |                       |                                                |                                                                                                                               |                                                                                     |                                                                           |
| *06126300                          | Currant Creek near Roundup                          | See previous table.                                                                                                                            | 220                   | 1958-71                                        | 2-12-71                                                                                                                       | 4.92                                                                                | 440                                                                       |
| 06127100                           | South Willow Creek tributary near Roundup           | Center of E $\frac{1}{2}$ sec.28, T.9 N., R.25 E., Musselshell County, at culvert on U.S. Highway 87, 4.5 miles north of Roundup.              | 1.38                  | 1962-71                                        | 2-13-71                                                                                                                       | 1.07                                                                                | 25                                                                        |
| 06127200                           | Musselshell River tributary near Musselshell        | SW $\frac{1}{4}$ sec.30, T.9 N., R.28 E., Musselshell County, at bridge on U.S. Highway 12, 8 miles west of Musselshell.                       | 10.8                  | 1963-71                                        | 2-12-71                                                                                                                       | 2.04                                                                                | 126                                                                       |
| 06127570                           | Butts Coulee near Melstone                          | Center of E $\frac{1}{2}$ sec.9, T.10 N., R.31 E., Musselshell County, at culvert on county road, 4 miles northeast of Melstone.               | 5.96                  | 1963-71                                        | 2-13-71                                                                                                                       | 3.43                                                                                | 95                                                                        |
| 06128400                           | South Fork Bear Creek near Roy                      | SW $\frac{1}{4}$ sec.28, T.17 N., R.23 E., Fergus County, at bridge on State Highway 19, 12 miles southeast of Roy.                            | 39.6                  | 1962-71                                        | 2-13-71                                                                                                                       | 3.54                                                                                | 490                                                                       |
| 06128500                           | South Fork Bear Creek tributary near Roy            | SW $\frac{1}{4}$ sec.16, T.17 N., R.23 E., Fergus County, at culvert on State Highway 19, 10.5 miles southeast of Roy.                         | 5.40                  | 1962-71                                        | 2-13-71                                                                                                                       | 4.66                                                                                | 148                                                                       |
| 06128900                           | Box Elder Creek tributary near Winnett              | SW $\frac{1}{4}$ NW $\frac{1}{4}$ sec.34, T.15 N., R.28 E., Petroleum County, 0.3 mile north of State Highway 200, 8 miles east of Winnett.    | 16.2                  | 1955-71                                        | 2-16-71                                                                                                                       | c4.32                                                                               | b20                                                                       |
| 06129100                           | North Fork McDonald Creek tributary near Heath      | NE $\frac{1}{4}$ sec.17, T.15 N., R.20 E., Fergus County, at culvert on U.S. Highway 87, and State Highway 200, 5 miles northeast of Heath.    | 2.24                  | 1960-71                                        | 3-18-60<br>10-1-61<br>5-21-62<br>5-12-63<br>6- 8-64<br>3- -65<br>3-31-66<br>4- -67<br>8- -68<br>3-20-69<br>4- 6-70<br>2-14-71 | 1.04<br>.02<br>1.21<br>.38<br>1.51<br>.90<br>.96<br>.83<br>.34<br>.40<br>.51<br>.50 | d22<br>d1<br>d27<br>d6<br>d36<br>d18<br>d20<br>d16<br>d5<br>d6<br>d8<br>8 |
| 06129200                           | Alkali Creek near Heath                             | SE $\frac{1}{4}$ sec.11, T.15 N., R.20 E., Fergus County, at bridge on county road, 7.5 miles northeast of Heath.                              | 3.76                  | 1960-71                                        | 2-14-71                                                                                                                       | .04                                                                                 | 11                                                                        |
| 06129400                           | South Fork McDonald Creek tributary near Grassrange | Center of sec.3, T.14 N., R.23 E., Fergus County, at culvert on U.S. Highway 87, 1.5 miles southeast of Grassrange.                            | .51                   | 1963-71                                        | 2-14-71                                                                                                                       | 1.53                                                                                | 24                                                                        |
| 06129500                           | McDonald Creek at Winnett                           | NW $\frac{1}{4}$ sec.7, T.14 N., R.27 E., Petroleum County, at bridge on State Secondary Highway 244, 0.8 mile south of Winnett.               | 421                   | 1930-32*,<br>1934-45*,<br>1953-56*,<br>1957-71 | 2-14-71                                                                                                                       | c9.48                                                                               | b750                                                                      |
| 06129700                           | Gorman Coulee near Cat Creek                        | SW $\frac{1}{4}$ SW $\frac{1}{4}$ sec.31, T.15 N., R.29 E., Petroleum County, at culvert on State Highway 200, 6 miles southwest of Cat Creek. | 2.32                  | 1955-71                                        | 6-27-71                                                                                                                       | 2.88                                                                                | 135                                                                       |
| 06129800                           | Gorman Coulee tributary near Cat Creek              | SE $\frac{1}{4}$ SW $\frac{1}{4}$ sec.31, T.15 N., R.29 E., Petroleum County, at culvert on State Highway 200, 6 miles southwest of Cat Creek. | .81                   | 1955-71                                        | 6-27-71                                                                                                                       | 2.52                                                                                | 115                                                                       |
| 06130600                           | Cat Creek near Cat Creek                            | SW $\frac{1}{4}$ sec.23, T.15 N., R.29 E., Petroleum County, at culvert on county road, 2.5 miles south of Cat Creek.                          | 36.5                  | 1958-71                                        | 2-26-71                                                                                                                       | 2.54                                                                                | 85                                                                        |
| Big Dry Creek basin                |                                                     |                                                                                                                                                |                       |                                                |                                                                                                                               |                                                                                     |                                                                           |
| 06130800                           | Second Creek tributary near Jordan                  | NW $\frac{1}{4}$ NW $\frac{1}{4}$ sec.31, T.17 N., R.39 E., Garfield County, at culvert on State Highway 22, 11 miles southeast of Jordan.     | 0.75                  | 1954,<br>1958-71                               | 2-14-71                                                                                                                       | 2.06                                                                                | 25                                                                        |
| 061308500                          | Second Creek tributary No. 2 near Jordan            | NW $\frac{1}{4}$ sec.25, T.17 N., R.38 E., Garfield County, at culvert on State Highway 22, 9.5 miles southeast of Jordan.                     | 1.90                  | 1958-71                                        | 2-14-71                                                                                                                       | .19                                                                                 | 8                                                                         |

See footnotes at end of table, p. 249

## Annual maximum discharge at crest-stage partial-record stations--Continued

| Annual maximum discharge at crest-stage partial-record stations--continued |                                            |                                                                                                                                                                       |                       |                                   |                |                    |                  |
|----------------------------------------------------------------------------|--------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-----------------------------------|----------------|--------------------|------------------|
| Station No.                                                                | Station name                               | Location                                                                                                                                                              | Drainage area (sq mi) | Period of record                  | Annual maximum |                    |                  |
|                                                                            |                                            |                                                                                                                                                                       |                       |                                   | Date           | Gage height (feet) | Dis-charge (cfs) |
| Big Dry Creek basin--Continued                                             |                                            |                                                                                                                                                                       |                       |                                   |                |                    |                  |
| 06130900                                                                   | Second Creek tributary No. 3 near Jordan   | NE $\frac{1}{4}$ sec.23, T.17 N., R.38 E., Garfield County, at culvert on State Highway 22, 8.5 miles southeast of Jordan.                                            | .60                   | 1958-71                           | 2-14-71        | .83                | 14               |
| *06130950                                                                  | Little Dry Creek near Van Norman           | See previous table.                                                                                                                                                   | 1,224                 | 1958-71                           | 3-13-71        | 4.51               | 2,300            |
| Milk River basin                                                           |                                            |                                                                                                                                                                       |                       |                                   |                |                    |                  |
| 06132400                                                                   | Dry Fork Milk River near Babb              | SE $\frac{1}{4}$ sec.32, T.36 N., R.12 W., Glacier County, at bridge on State Secondary Highway 464, 11 miles east of Babb.                                           | 17.4                  | 1961-71                           | 4-15-71        | 2.99               | 62               |
| 06134800                                                                   | Van Cleeve Coulee tributary near Sunburst  | North line of NE $\frac{1}{4}$ sec.14, T.36 N., R.2 W., Toole County, at culverts on county road, 3.7 miles east of interchange on Interstate Highway 15 at Sunburst. | 10.8                  | 1963-71                           | 2-14-71        | 1.26               | 11               |
| 06137900                                                                   | Sage Creek tributary at Hingham            | Center of sec.3, T.32 N., R.10 E., Hill County, at culvert on farm road, 0.5 mile northeast of Hingham.                                                               | 1.08                  | 1960-71                           | 3-13-71        | 1.83               | 28               |
| 06138700                                                                   | South Fork Spring Coulee near Havre        | NE $\frac{1}{4}$ sec.31, T.31 N., R.15 E., Hill County, at culvert on county road, 12 miles southwest of Havre.                                                       | 6.47                  | 1960-71                           | 2-12-71        | 2.38               | 50               |
| 06138800                                                                   | Spring Coulee near Havre                   | NW $\frac{1}{4}$ sec.25, T.31 N., R.14 E., Hill County, at culverts on county road, 13 miles southwest of Havre.                                                      | 17.8                  | 1959-71                           | 2-12-71        | 5.75               | 263              |
| 06140400                                                                   | Bullhook Creek near Havre                  | NE $\frac{1}{4}$ sec.27, T.32 N., R.16 E., Hill County, at bridge on county road, 3.5 miles south of Havre.                                                           | 39.6                  | 1960-71                           | 1-20-71        | 6.04               | 700              |
| 06141900                                                                   | Milk River tributary near Lohman           | SW $\frac{1}{4}$ sec.30, T.33 N., R.18 E., Blaine County, at culvert on U.S. Highway 2, 1.2 miles west of Lohman.                                                     | .16                   | 1960-71                           | 2-12-71        | 1.14               | 6                |
| 06155200                                                                   | Alkali Creek near Malta                    | Center of sec.16, T.29 N., R.29 E., Phillips County, at bridge on U.S. Highway 191, 8.3 miles southwest of Malta.                                                     | 162                   | 1956-71                           | 3-30-71        | 2.63               | 550              |
| 06155300                                                                   | Disjardin Coulee near Malta                | SE $\frac{1}{4}$ NW $\frac{1}{4}$ sec.16, T.29 N., R.29 E., Phillips County, at bridge on U.S. Highway 191, 8 miles southwest of Malta.                               | 3.42                  | 1956-71                           | 3-31-71        | .53                | 17               |
| 06155400                                                                   | South Fork Taylor Creek near Malta         | SE $\frac{1}{4}$ sec.26, T.30 N., R.29 E., Phillips County, at bridge on U.S. Highway 191, 3.5 miles southwest of Malta.                                              | 5.08                  | 1956-71                           | 3-31-71        | 1.44               | 24               |
| 06172300                                                                   | Unger Creek near Vandalia                  | SW $\frac{1}{4}$ sec.9, T.30 N., R.38 E., Valley County, at bridge on U.S. Highway 2, 4.5 miles northeast of Vandalia.                                                | 11.1                  | 1958-71                           | 5-30-71        | 2.23               | 195              |
| 06172350                                                                   | Mooney Coulee near Tampico                 | NW $\frac{1}{4}$ sec.7, T.29 N., R.39 E., Valley County, at bridge on U.S. Highway 2, 5.5 miles east of Tampico.                                                      | 12.8                  | 1961-71                           | 5-30-71        | 1.29               | 63               |
| Sand Creek basin                                                           |                                            |                                                                                                                                                                       |                       |                                   |                |                    |                  |
| 06175550                                                                   | East Fork Sand Creek near Vida             | NW $\frac{1}{4}$ sec.31, T.24 N., R.48 E., McCone County, at culverts on county road, 6 miles southwest of Vida.                                                      | 8.51                  | 1963-71                           | 3-31-71        | 2.07               | 130              |
| Wolf Creek basin                                                           |                                            |                                                                                                                                                                       |                       |                                   |                |                    |                  |
| 06175700                                                                   | East Fork Wolf Creek near Lustre           | SE $\frac{1}{4}$ sec.30, T.31 N., R.46 E., Valley County, at culverts on county road, 4 miles east of Lustre.                                                         | 9.61                  | 1956-71                           | 4- 9-71        | 5.33               | 236              |
| 06175900                                                                   | Wolf Creek tributary No. 2 near Wolf Point | Sec.11, T.28 N., R.46 E., Roosevelt County, at bridge on county road, 9.5 mile northwest of Wolf Point.                                                               | 6.54                  | 1955-71                           | 4- 9-71        | 3.37               | 155              |
| 06176500                                                                   | Wolf Creek near Wolf Point                 | N $\frac{1}{2}$ sec.17, T.27 N., R.47 E., Roosevelt County, 2 miles northwest of Wolf Point.                                                                          | 251                   | 1908-14+, 1950-53+, 1954, 1956-71 | --             | --                 | (+)              |

See footnotes at end of table, p. 249

## Annual maximum discharge at crest-stage partial-record stations--Continued

| Annual maximum discharge at crest-stage partial-record stations--Continued |                                                |                                                                                                                                           |                       |                  |                                                                          |                                                     |                                              |
|----------------------------------------------------------------------------|------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------------------|--------------------------------------------------------------------------|-----------------------------------------------------|----------------------------------------------|
| Station No.                                                                | Station name                                   | Location                                                                                                                                  | Drainage area (sq mi) | Period of record | Annual maximum                                                           |                                                     |                                              |
|                                                                            |                                                |                                                                                                                                           |                       |                  | Date                                                                     | Gage height (feet)                                  | Dis-charge (cfs)                             |
| Redwater River basin                                                       |                                                |                                                                                                                                           |                       |                  |                                                                          |                                                     |                                              |
| 06177050                                                                   | East Fork Duck Creek near Brockway             | Sec.31, T.17 N., R.47 E., McCone County, at bridge on county road, 8 miles south of Brockway                                              | 12.4                  | 1955-71          | 3-30-71                                                                  | 1.59                                                | 130                                          |
| 06177100                                                                   | Duck Creek near Brockway                       | SE $\frac{1}{4}$ sec.11, T.17 N., R.46 E., McCone County, at bridge on county road, 5 miles southwest of Brockway.                        | 54.0                  | 1921-22, 1957-71 | 3-30-71                                                                  | 2.03                                                | 160                                          |
| 06177150                                                                   | Redwater River at Brockway                     | NW $\frac{1}{4}$ sec.20, T.18 N., R.47 E., McCone County, at bridge on county road, 0.3 mile northwest of Brockway.                       | 216                   | 1957-71          | 4- 7-71                                                                  | 5.84                                                | 1,730                                        |
| 06177200                                                                   | Tusler Creek near Brockway                     | SE $\frac{1}{4}$ sec.24, T.18 N., R.47 E., McCone County, at bridge on county road, 4 miles east of Brockway.                             | 90.2                  | 1957-71          | 4- 7-71                                                                  | 3.32                                                | 420                                          |
| 06177250                                                                   | Tusler Creek tribu-<br>tary near Brockway      | NE $\frac{1}{4}$ sec.26, T.18 N., R.47 E., McCone County, at bridge on county road, 4 miles east of Brockway.                             | 3.17                  | 1957-71          | 7-14-57<br>3-18-59<br>8-16-60<br>2-26-63<br>3-18-69<br>3- -70<br>3-14-71 | .81<br>.46<br>1.10<br>cl.49<br>3.04<br>5.08<br>4.83 | d61<br>d37<br>d85<br>bd30<br>d3<br>d41<br>35 |
| 06177300                                                                   | Redwater River tributary near Brockway         | NE $\frac{1}{4}$ SE $\frac{1}{4}$ sec.2, T.18 N., R.47 E., McCone County, at culvert on State Highway 200, 4 miles northeast of Brockway. | .29                   | 1954, 1957-71    | --                                                                       | --                                                  | (a)                                          |
| 06177350                                                                   | South Fork Dry Ash Creek near Circle           | NW $\frac{1}{4}$ sec.27, T.18 N., R.48 E., McCone County, at bridge on county road, 9.3 miles south of Circle.                            | 5.74                  | 1955-71          | 3-13-71                                                                  | 1.83                                                | 53                                           |
| 06177400                                                                   | McCune Creek near Circle                       | NW $\frac{1}{4}$ sec.3, T.18 N., R.48 E., McCone County, near bridge on county road, 5 miles south of Circle.                             | 29.9                  | 1955-71          | 3-13-71                                                                  | 4.23                                                | 500                                          |
| 06177700                                                                   | Cow Creek tribu-<br>tary near Vida             | SE $\frac{1}{4}$ sec.36, T.23 N., R.48 E., McCone County, at bridge on State Highway 13, 8.8 miles south of Vida.                         | 1.71                  | 1963-71          | 3-31-71                                                                  | 1.30                                                | 53                                           |
| 06177800                                                                   | Wolf Creek tribu-<br>tary near Vida            | SE $\frac{1}{4}$ sec.15, T.25 N., R.48 E., McCone County, at bridge on State Highway 13, 5.5 miles north of Vida.                         | .91                   | 1962-71          | 3-31-71                                                                  | .46                                                 | 7                                            |
| Tributary between Poplar River and Big Muddy Creek                         |                                                |                                                                                                                                           |                       |                  |                                                                          |                                                     |                                              |
| 06181200                                                                   | Missouri River tributary No. 2 near Brockton   | NE $\frac{1}{4}$ sec.29, T.28 N., R.53 E., Roosevelt County, at culverts on U.S. Highway 2, 1.2 miles east of Brockton.                   | 1.60                  | 1962-71          | 3-15-71                                                                  | 1.10                                                | 44                                           |
| Big Muddy Creek basin                                                      |                                                |                                                                                                                                           |                       |                  |                                                                          |                                                     |                                              |
| 06183100                                                                   | Box Elder Creek near Plentywood                | Sec. 34, T.36 N., R.55 E., Sheridan County, at culverts on county road, 4 miles northeast of Plentywood.                                  | 9.40                  | 1956-71          | 4- 5-71                                                                  | 3.83                                                | 93                                           |
| 06183300                                                                   | Spring Creek near Pentywood                    | SW $\frac{1}{4}$ sec.6, T.35 N., R.55 E., Sheridan County, at culvert on county road, 5 miles northeast of Plentywood.                    | 7.05                  | 1955-71          | 4- 5-71                                                                  | 1.00                                                | 11                                           |
| 06183400                                                                   | Spring Creek at Highway 16, near Pentywood     | SE $\frac{1}{4}$ sec.21, T.35 N., R.55 E., Sheridan County, at bridge on State Highway 16, 1.5 miles east of Plenyword.                   | 16.9                  | 1955-71          | 5-31-71                                                                  | 1.17                                                | 20                                           |
| 06185100                                                                   | Big Muddy Creek tributary near Culbertson      | Center of east line of sec.11, T.28 N., R.54 E., Roosevelt County, at culverts on county road, 9 miles northwest of Culbertson.           | 7.38                  | 1963-71          | 3-16-71                                                                  | 2.21                                                | 22                                           |
| Tributaries between Big Muddy Creek and Yellowstone River                  |                                                |                                                                                                                                           |                       |                  |                                                                          |                                                     |                                              |
| 06185200                                                                   | Missouri River tributary No. 3 near Culbertson | Center of sec.8, T.27 N., R.56 E., Richland County, at culvert on county road, 3 miles south of Culbertson.                               | 1.29                  | 1963-71          | 6-24-71                                                                  | 2.45                                                | 47                                           |
| 06185300                                                                   | Missouri River tributary No. 4 near Bainville  | NW $\frac{1}{4}$ sec.34, T.28 N., R.57 E., Roosevelt County, at culvert on U.S. Highway 2, 6 miles west of Bainville.                     | 11.6                  | 1963-71          | 6-24-71                                                                  | 2.43                                                | 270                                          |

See footnotes at end of table, p. 249



## Annual maximum discharge at crest-stage partial-record stations--Continued

| Station No.                                                          | Station name                                            | Location                                                                                                                                                           | Drainage area (sq mi) | Period of record            | Annual maximum |                    |                  |
|----------------------------------------------------------------------|---------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-----------------------------|----------------|--------------------|------------------|
|                                                                      |                                                         |                                                                                                                                                                    |                       |                             | Date           | Gage height (feet) | Dis-charge (cfs) |
| Tributaries between Big Muddy Creek and Yellowstone River--Continued |                                                         |                                                                                                                                                                    |                       |                             |                |                    |                  |
| 06185400                                                             | Missouri River tributary No. 5 at Culbertson            | SE $\frac{1}{4}$ sec.20, T.28 N., R.56 E., Roosevelt County, at culvert on State Highway 16, at Culbertson Rodeo Grounds.                                          | 3.67                  | 1963-71                     | 3-16-71        | 2.00               | 85               |
| Yellowstone River basin                                              |                                                         |                                                                                                                                                                    |                       |                             |                |                    |                  |
| 06201550                                                             | Yellowstone River tributary near Greycliff              | SE $\frac{1}{4}$ sec.23, T.1 S., R.16 E., Sweet Grass County, at culvert on Interstate Highway 90 and U.S. Highway 10, $\frac{1}{4}$ miles southeast of Greycliff. | 2.72                  | 1960-71                     | 2-15-71        | 0.80               | 8                |
| 06201600                                                             | Bridger Creek near Greycliff                            | NW $\frac{1}{4}$ sec.2, T.2 S., R.16 E., Sweet Grass County, at bridge on county road, 6 miles southeast of Greycliff.                                             | 61.5                  | 1960-71                     | 4-26-71        | 2.57               | 135              |
| 06201650                                                             | Work Creek near Reed Point                              | SE $\frac{1}{4}$ sec.33, T.1 S., R.17 E., Sweet Grass County, at bridge on county road, 4 miles west of Reed Point.                                                | 32.5                  | 1959-71                     | 2-15-71        | 2.54               | 80               |
| 06201700                                                             | Hump Creek near Reed Point                              | NE $\frac{1}{4}$ sec.35, T.1 S., R.17 E., Sweet Grass County, at bridge on Interstate Highway 90 and U.S. Highway 10, 2 miles west of Reed Point.                  | 7.61                  | 1960-71                     | 2-15-71        | .76                | 18               |
| 06201750                                                             | Berry Creek near Columbus                               | NW $\frac{1}{4}$ sec.33, T.1 S., R.19 E., Stillwater County, at bridge on county road, 8 miles northwest of Columbus.                                              | 23.5                  | 1958-71                     | 2-15-71        | 1.70               | 11               |
| 06205100                                                             | Allen Creek near Park City                              | NE $\frac{1}{4}$ sec.7, T.3 S., R.22 E., Stillwater County, 7 miles west of Park City.                                                                             | 7.17                  | 1961-71                     | 2-28-71        | 1.75               | 75               |
| 06216200                                                             | Wets Creek near Billings                                | SW $\frac{1}{4}$ sec.28, T.2 S., R.27 E., Yellowstone County, at bridge on county road, 19 miles southeast of Billings.                                            | 8.14                  | 1955-71                     | 6-10-71        | 2.23               | 138              |
| 06216300                                                             | West Buckeye Creek near Billings                        | NE $\frac{1}{4}$ sec.21, T.2 S., R.27 E., Yellowstone County, 2,000 ft upstream from bridge on county road, 17 miles southeast of Billings.                        | 1.54                  | 1955-71                     | 6-10-71        | 2.65               | 142              |
| 06216500                                                             | Pryor Creek near Billings                               | Sec.30, T.1 S., R.28 E., Yellowstone County, at bridge on Interstate Highway 90 and U.S. Highways 87 and 212, 11 miles southeast of Billings.                      | 435                   | 1911-24+, 1938-53+, 1955-71 | 2-14-71        | 9.39               | b750             |
| 06217700                                                             | Crooked Creek tributary near Shepherd                   | SW $\frac{1}{4}$ sec.21, T.4 N., R.26 E., Yellowstone County, at bridge on county road, 12 miles northwest of Shepherd.                                            | 7.21                  | 1962-71                     | 2-12-71        | .88                | 85               |
| 06217800                                                             | Yellowstone River tributary No. 2 near Pompeys Pillar   | NW $\frac{1}{4}$ sec.6, T.3 N., R.32 E., Yellowstone County, at culvert on Interstate Highway 94 and U.S. Highways 10 and 312, 8 miles east of Pompeys Pillar.     | .70                   | 1962-71                     | 2-12-71        | .76                | 11               |
| 06294400                                                             | Andresen Coulee near Custer                             | Center of W $\frac{1}{2}$ sec.30, T.4 N., R.34 E., Yellowstone County, at culvert on State Highway 47, $\frac{1}{4}$ miles south of Custer.                        | 2.35                  | 1963-71                     | 2-12-71        | cl.72              | b5               |
| 06294800                                                             | Unknown Creek near Bighorn                              | SE $\frac{1}{4}$ sec.12, T.5 N., R.34 E., Treasure County, at bridge on Interstate Highway 94 and U.S. Highways 10 and 312, 4 miles east of Bighorn.               | 14.6                  | 1962-71                     | 7-15-71        | .88                | 55               |
| 06294850                                                             | Buckingham Coulee near Myers                            | SW $\frac{1}{4}$ sec.25, T.6 N., R.35 E., Treasure County, at bridge on Interstate Highway 94 and U.S. Highways 10 and 312, 3 miles southeast of Myers.            | 2.63                  | 1962-71                     | 7- 2-71        | 1.91               | 84               |
| 06294900                                                             | Middle Fork Froze to Death Creek tributary near Ingomar | NE $\frac{1}{4}$ sec.35, T.10 N., R.34 E., Rosebud County, at culverts on U.S. Highway 12, 1.1 miles west of Ingomar.                                              | 1.36                  | 1962-71                     | 5-31-71        | 1.23               | 45               |
| 06295020                                                             | Yellowstone River tributary No. 3 near Forsyth          | NW $\frac{1}{4}$ sec.12, T.6 N., R.40 E., Rosebud County, at bridge on county road, 2 miles north of Forsyth.                                                      | 4.38                  | 1962-71                     | 8-30-71        | 6.55               | 910              |

See footnotes at end of table, p. 249



## DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

## Annual maximum discharge at crest-stage partial-record stations--Continued

| Station No.                        | Station name                                        | Location                                                                                                                                       | Drainage area (sq mi) | Period of record | Annual maximum                           |                                |                          |
|------------------------------------|-----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------------------|------------------------------------------|--------------------------------|--------------------------|
|                                    |                                                     |                                                                                                                                                |                       |                  | Date                                     | Gage height (feet)             | Dis-charge (cfs)         |
| Yellowstone River basin--Continued |                                                     |                                                                                                                                                |                       |                  |                                          |                                |                          |
| *06295050                          | Little Porcupine Creek near Forsyth                 | See previous table.                                                                                                                            | 614                   | 1958-71          | 4-10-71                                  | 2.45                           | 580                      |
| 06295100                           | Rosebud Creek near Kirby                            | NE $\frac{1}{4}$ sec.16, T.7 S., R.39 E., Big Horn County, at culvert on private road, 7 miles south of Kirby.                                 | 34.2                  | 1960-71          | 4-25-71                                  | 4.51                           | 165                      |
| 06295130                           | Rosebud Creek tributary near Busby                  | NE $\frac{1}{4}$ sec.13, T.3 S., R.39 E., Big Horn County, at bridge on U.S. Highway 212, 6 miles northeast of Busby.                          | 1.14                  | 1963-71          | 4-25-71                                  | 1.16                           | 8                        |
| 06295200                           | Whitedirt Creek near Lame Deer                      | NE $\frac{1}{4}$ sec.2, T.3 S., R.40 E., Big Horn County, at bridge on county road, 4.5 miles west of Lame Deer.                               | 1.58                  | 1959-71          | 3-25-71                                  | 1.24                           | 23                       |
| 06296100                           | Snell Creek near Hathaway                           | NW $\frac{1}{4}$ sec.7, T.6 N., R.45 E., Rosebud County, at bridge on old U.S. Highways 10 and 12, 2.5 miles northeast of Hathaway.            | 10.5                  | 1963-71          | 3-25-71                                  | c1.95                          | b70                      |
| 06306900                           | Spring Creek near Decker                            | NW $\frac{1}{4}$ sec.33, T.8 S., R.40 E., Big Horn County, at bridge on county road, 5 miles north of Decker.                                  | 36.3                  | 1958-71          | 2-14-71                                  | 6.50                           | 1,400                    |
| 06306950                           | Leaf Rock Creek near Kirby                          | Center of sec.35, T.7 S., R.39 E., Big Horn County, at culvert on county road, 10 miles south of Kirby.                                        | 6.04                  | 1958-71          | 2-14-71                                  | 1.49                           | 40                       |
| 06307640                           | Spring Creek near Ashland                           | NW $\frac{1}{4}$ sec.27, T.3 S., R.44 E., Rosebud County, at culvert on county road, 3 miles south of Ashland.                                 | 1.48                  | 1962-71          | 8-30-71                                  | 4.53                           | 117                      |
| 06307660                           | Walking Horse Creek near Ashland                    | NW $\frac{1}{4}$ sec.3, T.3 S., R.44 E., Rosebud County, at culvert on county road, 1.5 miles northwest of Ashland.                            | 2.79                  | 1963-71          | 7- 1-65<br>6-12-67<br>2- -68<br>2-14-71  | .50<br>.28<br>1.75<br>1.20     | d5<br>d1<br>d58<br>24    |
| 06307760                           | Stebbins Creek near Ashland                         | Center of sec.34, T.2 S., R.43 E., Rosebud County, at culvert on U.S. Highway 212, 7.5 road miles west of Ashland.                             | 5.41                  | 1963-71          | 8-23-65<br>8-23-68<br>3-19-69<br>2-14-71 | 1.59<br>2.18<br>c1.90<br>c2.40 | d16<br>d39<br>e25<br>b10 |
| 06307780                           | Stebbins Creek at mouth, near Ashland               | NW $\frac{1}{4}$ sec.27, T.2 S., R.44 E., Rosebud County, at bridge on county road, 3.5 miles northwest of Ashland.                            | 20.8                  | 1963-71          | 2-17-71                                  | 1.94                           | 30                       |
| 06308200                           | Basin Creek tributary near Volborg                  | NW $\frac{1}{4}$ sec.31, T.2 N., R.49 E., Custer County, at culvert on county road, 3.5 miles north of Volborg.                                | .14                   | 1955-71          | 6-16-71                                  | 2.37                           | 29                       |
| 06308300                           | Basin Creek near Volborg                            | NW $\frac{1}{4}$ sec.32, T.2 N., R.49 E., Custer County, at bridge on U.S. Highway 312, 4 miles north of Volborg.                              | 10.9                  | 1955-71          | 6-16-71                                  | 5.86                           | 990                      |
| 06309020                           | North Fork Sunday Creek tributary at Rock Springs   | SE $\frac{1}{4}$ sec.1, T.12 N., R.43 E., Rosebud County, at culverts on State Highway 22, 0.4 mile northwest of Rock Springs.                 | 1.19                  | 1963-71          | 3-31-71                                  | c2.37                          | b10                      |
| 06309040                           | Dry House Creek near Angela                         | NE $\frac{1}{4}$ sec.27, T.11 N., R.44 E., Rosebud County, near bridge on State Highway 22, 3.2 miles south of Angela.                         | 35.6                  | 1963-71          | 3-31-71                                  | 4.18                           | 530                      |
| 06309060                           | North Fork Sunday Creek tributary No. 2 near Angela | NE $\frac{1}{4}$ sec.4, T.9 N., R.45 E., Custer County, at culvert on State Highway 22, 13 miles southeast of Angela.                          | .34                   | 1962-71          | 3-31-71                                  | 2.00                           | 32                       |
| 06309080                           | Deep Creek near Kinsey                              | SW $\frac{1}{4}$ sec.12, T.9 N., R.48 E., Custer County, at culvert on Interstate Highway 94 and U.S. Highway 10, 2 miles southeast of Kinsey. | 11.1                  | 1962-71          | 6- 9-71                                  | 3.02                           | 200                      |

See footnotes at end of table, p. 249

## DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

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## Annual maximum discharge at crest-stage partial-record stations--Continued

| Station No.                        | Station name                                  | Location                                                                                                                             | Drainage area (sq mi) | Period of record  | Annual maximum                                                                       |                                                            |                                                   |
|------------------------------------|-----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-------------------|--------------------------------------------------------------------------------------|------------------------------------------------------------|---------------------------------------------------|
|                                    |                                               |                                                                                                                                      |                       |                   | Date                                                                                 | Gage height (feet)                                         | Dis-charge (cfs)                                  |
| Yellowstone River basin--Continued |                                               |                                                                                                                                      |                       |                   |                                                                                      |                                                            |                                                   |
| 06309090                           | Meadow Creek near Locate                      | Center of N½ sec.17, T.7 N., R.50 E., Custer County, at wooden culvert on State Secondary Highway 333, 10 miles southwest of Locate. | 6.67                  | 1962-71           | 6-21-63<br>8-29-64<br>4- 1-65<br>3-14-66<br>6-12-67<br>5-13-68<br>5- 8-70<br>3-31-71 | .31<br>1.60<br>2.96<br>.80<br>1.77<br>3.63<br>1.84<br>3.22 | d1<br>d18<br>d60<br>d5<br>d19<br>d90<br>d20<br>70 |
| 06324700                           | Sand Creek near Broadus                       | SE¼ sec.5, T.5 S., R.51 E., Powder River County, at culverts on Moorhead road, 1.8 miles southwest of Broadus.                       | 10.6                  | 1955-71           | 2-14-71                                                                              | 4.71                                                       | b55                                               |
| 06326400                           | Meyers Creek near Locate                      | SE¼ sec.1, T.7 N., R.51 E., Custer County, at culvert on county road, 3 miles southeast of Locate.                                   | 9.58                  | 1962-71           | 6-16-71                                                                              | 2.75                                                       | 82                                                |
| 06326600                           | O'Fallon Creek near Ismay                     | East edge of sec.30, T.8 N., R.56 E., Fallon County, at bridge on U.S. Highway 12, 6.5 miles southeast of Ismay.                     | 669                   | 1962-71           | 3-13-71                                                                              | 5.19                                                       | 1,430                                             |
| 06326650                           | O'Fallon Creek tributary near Ismay           | SE¼ sec.29, T.8 N., R.56 E., Fallon County, at culvert on U.S. Highway 12, 7 miles southeast of Ismay.                               | .17                   | 1962-71           | 3-14-71                                                                              | 1.06                                                       | 20                                                |
| 06326700                           | Deep Creek near Baker                         | SW¼ sec.2, T.6 N., R.59 E., Fallon County, at culverts on State Highway 7, 5 miles south of Baker.                                   | 1.55                  | 1962-71           | 6- 5-71                                                                              | 4.25                                                       | 225                                               |
| 06326800                           | Pennel Creek near Baker                       | South edge of sec.36, T.9 N., R.59 E., Fallon County, at culvert on State Highway 7, 8 miles north of Baker.                         | 1.00                  | 1962-71           | 4- 6-71                                                                              | 2.90                                                       | 45                                                |
| 06326900                           | Yellowstone River tributary No. 4 near Fallon | SW¼ sec.23, T.13 N., R.52 E., Prairie County, at culvert on Interstate Highway 94 and U.S. Highway 10, 2 miles north of Fallon.      | .67                   | 1962-71           | 3- 5-71                                                                              | 4.82                                                       | 195                                               |
| 06326950                           | Yellowstone River tributary No. 5 near Marsh  | SW¼ sec.21, T.14 N., R.54 E., Dawson County, at culvert on Interstate Highway 94 and U.S. Highway 10, 5 miles northeast of Marsh.    | .87                   | 1962-71           | 3-31-71                                                                              | 1.92                                                       | 34                                                |
| 06328700                           | Linden Creek at Intake                        | NE¼ sec.25, T.18 N., R.56 E., Dawson County, at bridge on State Highway 16, 0.8 mile northeast of Intake.                            | 5.01                  | 1958-71           | 6-14-67<br>2-27-68<br>7- 3-69<br>5-22-71                                             | 1.36<br>1.04<br>1.38<br>1.25                               | e22<br>e15<br>e23<br>20                           |
| 06328800                           | Indian Creek at Intake                        | SW¼ sec.25, T.18 N., R.56 E., Dawson County, at culvert on State Highway 16, 500 ft northeast of Intake.                             | .45                   | 1958-71           | 5-22-71                                                                              | 1.99                                                       | 10                                                |
| 06328900                           | War Dance Creek near Intake                   | SW¼ sec.8, T.18 N., R.57 E., Dawson County, at culvert on State Highway 16, 3.5 miles northeast of Intake.                           | 4.31                  | 1958-71           | 3-17-59<br>3-20-60<br>6- 6-62<br>6-16-65<br>3- -67<br>3- -69<br>4- 7-70<br>3-27-71   | 1.96<br>1.83<br>.94<br>.81<br>1.36<br>1.38<br>1.45<br>.38  | d62<br>d55<br>d18<br>d15<br>d33<br>d34<br>d6<br>5 |
| 06329570                           | First Hay Creek near Sidney                   | SE¼ sec.16, T.24 N., R.58 E., Richland County, at bridge on State Highway 16, 10 miles northwest of Sidney.                          | 30.0                  | 1963-71           | 3-27-71                                                                              | 2.40                                                       | 160                                               |
| Little Missouri River basin        |                                               |                                                                                                                                      |                       |                   |                                                                                      |                                                            |                                                   |
| 06332900                           | North Creek near Alzada                       | SE¼NW¼ sec.7, T.9 S., R.59 E., Carter County, 8 miles northwest of Alzada.                                                           | 0.68                  | 1951+,<br>1955-71 | 5-30-71                                                                              | 4.81                                                       | 480                                               |
| 06334100                           | Wolf Creek near Hammond                       | SE¼ sec.5, T.8 S., R.57 E., Carter County, at culvert on U.S. Highway 212, 8 miles southeast of Hammond.                             | 9.09                  | 1955-71           | 6-11-71                                                                              | 5.83                                                       | 590                                               |
| 06334200                           | Willow Creek near Alzada                      | Center of sec.27, T.8 S., R.58 E., Carter County, near bridge on U.S. Highway 212, 11 miles northwest of Alzada.                     | 123                   | 1958-71           | 3-27-71                                                                              | 11.30                                                      | 1,400                                             |

See footnotes at end of table, p. 249

## DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

## Annual maximum discharge at crest-stage partial-record stations--Continued

| Station No.                            | Station name                              | Location                                                                                                                                                | Drainage area (sq mi) | Period of record                           | Annual maximum                |                      |                     |
|----------------------------------------|-------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|--------------------------------------------|-------------------------------|----------------------|---------------------|
|                                        |                                           |                                                                                                                                                         |                       |                                            | Date                          | Gage height (feet)   | Dis-charge (cfs)    |
| Little Missouri River basin--Continued |                                           |                                                                                                                                                         |                       |                                            |                               |                      |                     |
| 06334640                               | North Fork Coal Bank Creek near Mill Iron | SW $\frac{1}{4}$ sec.12, T.2 N., R.61 E., Fallon County, at bridge on county road, 9 miles northeast of Mill Iron.                                      | 15.0                  | 1962-71                                    | 7-10-63<br>6-16-71            | 2.65<br>3.28         | d355<br>450         |
| 06334720                               | Soda Creek tributary near Webster         | NE $\frac{1}{4}$ sec.23, T.3 N., R.61 E., Fallon County, at culvert on county road, 8 miles southeast of Webster.                                       | 2.22                  | 1962-71                                    | 6-16-71                       | 2.50                 | 30                  |
| 06336450                               | Spring Creek near Wibaux                  | Sec.14, T.13 N., R.59 E., Wibaux County, near bridge on State Highway 7, 7 miles south of Wibaux.                                                       | 3.88                  | 1956-71                                    | 3-30-71                       | c1.33                | b30                 |
| Kootenai River basin                   |                                           |                                                                                                                                                         |                       |                                            |                               |                      |                     |
| 12300500                               | Fortine Creek near Trego                  | NE $\frac{1}{4}$ sec.11, T.33 N., R.26 W., Lincoln County, 5.5 miles southwest of Trego.                                                                | 112                   | 1946-53 <sup>a</sup> ,<br>1954,<br>1958-71 | 5- 4-71                       | 11.46                | 1,030               |
| 12300800                               | Deep Creek near Fortine                   | SW $\frac{1}{4}$ sec.30, T.35 N., R.25 W., Lincoln County, at culvert on county road, 1.3 miles east of Fortine.                                        | 17.9                  | 1959-71                                    | 5- 4-71                       | 2.70                 | 126                 |
| 12301700                               | Kootenai River tributary near Rexford     | SE $\frac{1}{4}$ sec.11, T.35 N., R.29 W., Lincoln County, at culvert on State Highway 37, 7 miles southwest of Rexford (discontinued).                 | 1.11                  | 1959-70                                    | --                            | --                   | --                  |
| 12302400                               | Shaughnessy Creek near Libby              | W $\frac{1}{2}$ sec.5, T.29 N., R.31 W., Lincoln County, at culvert on county road, 6.5 miles southwest of Libby.                                       | 1.11                  | 1959-71                                    | 5- 5-71                       | .31                  | 13                  |
| 12304250                               | Whitetail Creek near Yaak                 | NE $\frac{1}{4}$ sec.1, T.35 N., R.33 W., Lincoln County, 500 ft upstream from mouth and 5 miles west of Yaak.                                          | 2.61                  | 1960-71                                    | 5- 4-71                       | .79                  | 32                  |
| 12304300                               | Cyclone Creek near Yaak                   | SE $\frac{1}{4}$ sec.32, T.35 N., R.33 W., Lincoln County, at bridge 0.3 mile upstream from mouth, 10.5 miles southwest of Yaak.                        | 5.66                  | 1960-71                                    | 5- 5-71                       | 1.25                 | 138                 |
| 12304400                               | Fourth of July Creek near Yaak            | NW $\frac{1}{4}$ sec.22, T.34 N., R.33 W., Lincoln County, at bridge 500 ft upstream from mouth, 12 miles southwest of Yaak.                            | 7.70                  | 1960-71                                    | 4-24-69<br>5-17-70<br>5-21-71 | 2.39<br>2.59<br>2.60 | e178<br>e180<br>164 |
| Pend Oreille River basin               |                                           |                                                                                                                                                         |                       |                                            |                               |                      |                     |
| 12323300                               | Smith Gulch near Silverbow                | N $\frac{1}{2}$ sec.1, T.2 N., R.9 W., Silver Bow County, at culvert on Interstate Highway 15 and U.S. Highway 91, 4 miles south of Silver Bow.         | 4.85                  | 1959-71                                    | 2-12-71                       | 3.30                 | 18                  |
| 12324700                               | Clark Fork tributary near Drummond        | SW $\frac{1}{4}$ sec.18, T.10 N., R.11 W., Powell County, 0.5 mile above Interstate Highway 90 and U.S. Highways 10 and 12, 6.5 miles east of Drummond. | 4.61                  | 1958-71                                    | 2-14-71                       | 1.99                 | 124                 |
| 12324800                               | Morris Creek near Drummond                | NW $\frac{1}{4}$ sec.34, T.11 N., R.12 W., Granite County, at culvert on State Secondary Highway 271, 2 miles east of Drummond.                         | 12.6                  | 1960-71                                    | 5- 5-71                       | .68                  | 5                   |
| 12339900                               | West Twin Creek near Bonner               | NW $\frac{1}{4}$ sec.2, T.13 N., R.17 W., Missoula County, at bridge on State Highway 200, 8 miles east of Bonner.                                      | 7.47                  | 1959-71                                    | 5-11-71                       | 1.25                 | 156                 |
| 12340200                               | Marshall Creek near Missoula              | NW $\frac{1}{4}$ sec.18, T.13 N., R.18 W., Missoula County, at culvert on Interstate Highway 90 and U.S. Highways 10 and 12, 3 miles east of Missoula.  | 5.47                  | 1959-71                                    | 6-13-71                       | .26                  | 23                  |
| 12344300                               | Burke Gulch near Darby                    | S $\frac{1}{2}$ sec.12, T.3 N., R.21 W., Ravalli County, 1 mile upstream from mouth 1.5 miles east of Darby.                                            | 6.28                  | 1958-71                                    | 5- 5-71                       | 1.66                 | 25                  |
| 12345800                               | Camas Creek near Hamilton                 | SW $\frac{1}{4}$ sec.34, T.5 N., R.21 W., Ravalli County, 8 miles southwest of Hamilton.                                                                | 6.01                  | 1958-71                                    | 6-13-71                       | 2.84                 | 150                 |

See footnotes at end of table, p. 249

## Annual maximum discharge at crest-stage partial-record stations--Continued

| Station No.                         | Station name                                         | Location                                                                                                                                                                    | Drainage area (sq mi) | Period of record                                                                                  | Annual maximum                                      |                                      |                                    |
|-------------------------------------|------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|---------------------------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------|------------------------------------|
|                                     |                                                      |                                                                                                                                                                             |                       |                                                                                                   | Date                                                | Gage height (feet)                   | Discharge (cfs)                    |
| Pend Oreille River basin--Continued |                                                      |                                                                                                                                                                             |                       |                                                                                                   |                                                     |                                      |                                    |
| 12348500                            | Willow Creek near Corvallis                          | SW $\frac{1}{4}$ NE $\frac{1}{4}$ sec.8 (corrected), T.6 N., R.19 W., Ravalli County, 800 ft downstream from Butterfly ranger station, 6 miles southeast of Corvallis.      | 22.4                  | 1920-24 $\frac{1}{2}$ , 1957-65 $\frac{1}{2}$ , 1966-71                                           | 5-13-71                                             | 1.80                                 | 120                                |
| 12350200                            | Gash Creek near Victor                               | W $\frac{1}{2}$ sec.32, T.8 N., R.21 W., Ravalli County, 5 miles west of Victor.                                                                                            | 3.37                  | 1958-71                                                                                           | 6- 5-71                                             | 1.74                                 | 157                                |
| 12350500                            | Kootenai Creek near Stevensville                     | SW $\frac{1}{4}$ NW $\frac{1}{4}$ sec.18, T.9 N., R.20 W., Ravalli County, 3 miles upstream from mouth, 4 miles northwest of Stevensville.                                  | 28.9                  | 1948-53 $\frac{1}{2}$ , 1957-63 $\frac{1}{2}$ , 1964-71                                           | 5-28-71                                             | 4.98                                 | 840                                |
| 12351000                            | Burnt Fork Bitterroot River near Stevensville        | NW $\frac{1}{4}$ SW $\frac{1}{4}$ sec.11, T.8 N., R.19 W., Ravalli County, 150 ft upstream from county road bridge, 8 miles southeast of Stevensville.                      | 74.0                  | 1920 $\frac{1}{2}$ , 1922-24 $\frac{1}{2}$ , 1938 $\frac{1}{2}$ , 1938-62 $\frac{1}{2}$ , 1963-71 | 6- 6-71                                             | 3.97                                 | 510                                |
| 12351400                            | Eightmile Creek near Florence                        | SW $\frac{1}{4}$ SW $\frac{1}{4}$ sec.2, T.10 N., R.19 W., Ravalli County, 0.6 mile upstream from Granite Creek, 5 miles upstream from mouth, and 6 miles east of Florence. | 20.6                  | 1957-63 $\frac{1}{2}$ , 1964-71                                                                   | 5- 5-71                                             | 3.75                                 | 65                                 |
| 12352200                            | Hayes Creek near Missoula                            | Center of sec.10, T.12 N., R.20 W., Missoula County, at culvert on U.S. Highways 12 and 93, 2 miles southwest of Missoula.                                                  | 4.16                  | 1959-71                                                                                           | 5- 5-71                                             | .30                                  | 18                                 |
| 12353400                            | Nigger Gulch near Alberton                           | NW $\frac{1}{4}$ sec.33, T.15 N., R.23 W., Mineral County, at culvert on county road, 2.6 miles west of Alberton.                                                           | 8.02                  | 1959-71                                                                                           | 5- 5-71                                             | .65                                  | 42                                 |
| 12353800                            | Thompson Creek near Superior                         | SW $\frac{1}{4}$ sec.28, T.17 N., R.26 W., Mineral County, 1.3 miles west of Superior.                                                                                      | 12.2                  | 1961-71                                                                                           | 5-13-71                                             | 1.07                                 | 109                                |
| 12353850                            | East Fork Timber Creek near Haugan                   | NE $\frac{1}{4}$ sec.16, T.19 N., R.30 W., Mineral County, at culvert on county road, 2 miles north of Haugan.                                                              | 2.72                  | 1961-71                                                                                           | 5- 5-71                                             | 1.22                                 | 55                                 |
| 12354100                            | North Fork Little Joe Creek near St. Regis           | SW $\frac{1}{4}$ SE $\frac{1}{4}$ sec.34, T.18 N., R.28 W., Mineral County, at bridge on county road, 3 miles southwest of St. Regis.                                       | 14.7                  | 1960-71                                                                                           | 5-13-71                                             | 1.97                                 | 262                                |
| 12356000                            | Skyland Creek near Essex                             | SE $\frac{1}{4}$ NW $\frac{1}{4}$ sec.9, T.29 N., R.14 W., Flathead County, 10 miles northeast of Essex.                                                                    | 8.09                  | 1946-52 $\frac{1}{2}$ , 1954, 1959-71                                                             | 6-13-71                                             | 3.38                                 | 176                                |
| 12357300                            | Moccasin Creek near West Glacier                     | SE $\frac{1}{4}$ sec.35, T.32 N., R.18 W., Flathead County, at culvert on U.S. Highway 2, 6.5 miles east of West Glacier.                                                   | 1.97                  | 1959-71                                                                                           | 5-29-65<br>5-26-66<br>6- 6-67<br>4-24-69<br>6-13-71 | 5.60<br>4.11<br>3.96<br>3.21<br>3.25 | bd490<br>d262<br>d226<br>e62<br>69 |
| 12357400                            | Middle Fork Flathead River tributary at West Glacier | NE $\frac{1}{4}$ sec.36, T.32 N., R.19 W., Flathead County, at culvert on U.S. Highway 2, 0.9 mile east of West Glacier.                                                    | .10                   | 1960-71                                                                                           | 5- 3-71                                             | .23                                  | 3                                  |
| 12363900                            | Rock Creek near Olney                                | NW $\frac{1}{4}$ sec.24, T.33 N., R.24 W., Flathead County, at culvert on U.S. Highway 93, 6 miles northwest of Olney.                                                      | 6.18                  | 1961-71                                                                                           | 5- 3-71                                             | 1.03                                 | 17                                 |
| 12370500                            | Dayton Creek near Proctor                            | NW $\frac{1}{4}$ sec.20, T.25 N., R.21 W., Lake County, at culvert on county road, 2.5 miles northwest of Proctor.                                                          | 20.9                  | 1959-71                                                                                           | 5-13-71                                             | 1.53                                 | 40                                 |
| 12370900                            | Teepee Creek near Polson                             | SW $\frac{1}{4}$ sec.22, T.24 N., R.19 W., Lake County, at culvert on State Highway 35, 11 miles northeast of Polson.                                                       | 2.55                  | 1960-71                                                                                           | 6-13-71                                             | .09                                  | 5                                  |
| 12374300                            | Mill Creek near Niarada                              | NE $\frac{1}{4}$ sec.20, T.24 N., R.24 W., Sanders County, at bridge on county road, 3.5 miles northwest of Niarada.                                                        | 28.0                  | 1959-71                                                                                           | 5-13-71                                             | 1.15                                 | 175                                |
| 12375700                            | Garden Creek near Hot Springs                        | SW $\frac{1}{4}$ sec.20, T.22 N., R.24 W., Sanders County, at bridge on county road, 3 miles north of Hot Springs.                                                          | 3.29                  | 1959-71                                                                                           | 6- 3-71                                             | .07                                  | 34                                 |

\* Also a low-flow partial-record station.  
† Discharge not determined.  
‡ Operated as a continuous-record station.  
a No evidence of flow during year.

b About.  
c Backwater from ice or debris.  
d Not previously published.  
e Revised.



## 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 1971

| Discharge measurements made at miscellaneous sites during water year 1971 |                  |                                                                                                                                                                                                                 |                       |                                   |                                                     |                                    |
|---------------------------------------------------------------------------|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-----------------------------------|-----------------------------------------------------|------------------------------------|
| Stream                                                                    | Tributary to     | Location                                                                                                                                                                                                        | Drainage area (sq mi) | Measured previously (water years) | Measurements                                        |                                    |
|                                                                           |                  |                                                                                                                                                                                                                 |                       |                                   | Date                                                | Discharge (cfs)                    |
| Part 5 Saskatchewan River basin                                           |                  |                                                                                                                                                                                                                 |                       |                                   |                                                     |                                    |
| Crooked Creek                                                             | Waterton River   | NE $\frac{1}{4}$ sec.16, T.2, R.29 W., fourth meridian, in Alberta, at bridge on Canadian Highway 5, 7 miles northeast of Waterton Park.                                                                        | 24.1                  | 1949-70                           | 5-10-71<br>6-17-71<br>7-19-71<br>8-15-71<br>9-29-71 | 31.3<br>30.9<br>5.2<br>1.51<br>7.7 |
| Part 6 Spring directly tributary to Beaverhead River                      |                  |                                                                                                                                                                                                                 |                       |                                   |                                                     |                                    |
| Gordon Spring                                                             | Beaverhead River | NW $\frac{1}{4}$ SE $\frac{1}{4}$ sec.32, T.9 S., R.10 W., Beaverhead County, at culvert in old railroad grade, just downstream from Clark Canyon Dam, 10.5 miles east of Grant.                                | -                     | 1962, 1964-70                     | 5-27-71<br>6-30-71<br>7-30-71<br>9- 2-71            | 20.9<br>23.1<br>24.3<br>24.0       |
| Big Hole River basin                                                      |                  |                                                                                                                                                                                                                 |                       |                                   |                                                     |                                    |
| Miner Creek<br>06024000                                                   | Big Hole River   | SW $\frac{1}{4}$ sec.3, T.6 S., R.16 W., Beaverhead County, 1 mile downstream from Miner Lake, 7 miles southwest of Jackson, and 7.5 miles upstream from mouth at site of former gaging station.                | 17.6                  | 1948-53†, 1961, 1966-70           | 10-14-70                                            | 16.5                               |
| Willow Creek<br>06025800                                                  | Big Hole River   | NE $\frac{1}{4}$ sec.34, T.4 S., R.10 W., Beaverhead County, 1 mile downstream from Bond Creek, 7 miles southwest of Glen at site of former gaging station.                                                     | 35.6                  | 1962-66†                          | 5-21-71<br>6- 2-71<br>6- 8-71<br>6-14-71            | 27.1<br>52.5<br>65.2<br>83.1       |
| Willow Creek                                                              | Big Hole River   | SW $\frac{1}{4}$ SE $\frac{1}{4}$ SE $\frac{1}{4}$ sec.32, T.4 S., R.9 W., Beaverhead County, upstream from all diversions, about 3 miles southwest of Glen.                                                    | -                     | -                                 | 6-15-71                                             | 98.9                               |
| Willow Creek                                                              | Big Hole River   | SW $\frac{1}{4}$ NE $\frac{1}{4}$ NE $\frac{1}{4}$ sec.26, T.4 S., R.9 W., Beaverhead County, about 1 mile upstream from mouth and about 1 mile southeast of Glen.                                              | -                     | -                                 | 6-15-71                                             | 30.9                               |
| Missouri River main stem                                                  |                  |                                                                                                                                                                                                                 |                       |                                   |                                                     |                                    |
| Jefferson River                                                           | Missouri River   | NW $\frac{1}{4}$ NE $\frac{1}{4}$ NE $\frac{1}{4}$ sec.14, T.1 N., R.4 W., Madison County, at bridge on F.A.S. Route 452, 3 miles southeast of Whitehall.                                                       | 7,940                 | -                                 | 10- 1-70<br>5-11-70                                 | a1,740<br>a7,870                   |
| Madison River basin                                                       |                  |                                                                                                                                                                                                                 |                       |                                   |                                                     |                                    |
| Firehole River<br>06036800                                                | Jefferson River  | Lat 44°26'33", long 110°48'15", Yellowstone National Park, 0.2 mile upstream from Kepler Cascades and diversion, and 1.5 miles southeast of Old Faithful.                                                       | -                     | 1934, 1967-70                     | 10-22-70                                            | *52.0                              |
| Iron Spring Creek<br>06036813                                             | Firehole River   | Lat 44°27'41", long 110°51'08", Yellowstone National Park, 300 ft east of Emerald Pool and 1.3 miles northwest of Old Faithful.                                                                                 | -                     | 1969-70                           | 10-22-70                                            | *36.9                              |
| Nez Perce Creek<br>06036900                                               | Firehole River   | Lat 44°35'05", long 110°46'41", Yellowstone National Park, at bridge on service road, 2.7 miles northeast of Fountain Paint Pot, about 3.8 miles upstream from mouth, and 9.0 miles north of Old Faithful.      | -                     | 1968-70                           | 10-22-70                                            | *57.6                              |
| Firehole River<br>06036910                                                | Jefferson River  | Lat 44°38'25", long 110°51'54", Yellowstone National Park, 0.2 mile upstream from confluence of Firehole and Gibbon Rivers, 12 miles east of West Yellowstone.                                                  | -                     | 1962, 1969-70                     | 10-21-70                                            | *298                               |
| Gibbon River<br>06036930                                                  | Madison River    | Lat 44°43'47", long 110°41'20", Yellowstone National Park, at bridge on Norris-Canyon Road, 0.3 mile east of Norris Junction, about 1 mile upstream from Solfatara Creek, and 9.8 miles west of Canyon Village. | -                     | 1968-70                           | 10-19-70                                            | *23.6                              |
| Cabin Creek                                                               | Madison River    | NW $\frac{1}{4}$ SE $\frac{1}{4}$ sec.15, T.11 S., R.3 E., Gallatin County, at bridge on U.S. Highway 287, 0.6 mile northwest of Hebgen Dam, and 19 miles northwest of West Yellowstone.                        | b30                   | 1959-61, 1966                     | 6-18-71                                             | 365                                |
| Beaver Creek                                                              | Madison River    | SW $\frac{1}{4}$ NE $\frac{1}{4}$ sec.21, T.11 S., R.3 E., Gallatin County, at bridge on U.S. Highway 287, 1.5 miles west of Hebgen Dam, and 19 miles northwest of West Yellowstone.                            | b40                   | 1959-61, 1966                     | 6-18-71                                             | 404                                |

See footnotes at end of table, p. 266



## Discharge measurements made at miscellaneous sites during water year 1971

| Discharge measurements made at miscellaneous sites during water year 1971 |                          |                                                                                                                                                                                |                       |                                   |                                                                                                                                    |                                                                                          |
|---------------------------------------------------------------------------|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-----------------------------------|------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|
| Stream                                                                    | Tributary to             | Location                                                                                                                                                                       | Drainage area (sq mi) | Measured previously (water years) | Measurements                                                                                                                       |                                                                                          |
|                                                                           |                          |                                                                                                                                                                                |                       |                                   | Date                                                                                                                               | Discharge (cfs)                                                                          |
| Gallatin River basin                                                      |                          |                                                                                                                                                                                |                       |                                   |                                                                                                                                    |                                                                                          |
| Gallatin River 06042920                                                   | Missouri River           | Lat 44°55'39", long 111°02'43", Yellowstone National Park, 0.5 mile east of Wyoming-Montana State line, 1 mile north of Divide Lake, and 18.5 miles north of West Yellowstone. | -                     | 1969-70                           | 10-21-70                                                                                                                           | *36.8                                                                                    |
| North Fork West Fork Gallatin River                                       | West Fork Gallatin River | SW¼NE¼ sec.35, T.6 S., R.3 E., Gallatin County, 0.2 mile upstream from confluence with Middle Fork, 1.5 miles west of Meadow Village at Big Sky Resort.                        | 9.4                   |                                   | 6-14-71<br>6-25-71<br>7-10-71                                                                                                      | 87.1<br>122<br>61.9                                                                      |
| West Fork Gallatin River                                                  | Gallatin River           | NE¼SE¼ sec.31, T.6 S., R.4 E., Gallatin County, at culvert on county road, 1 mile northeast of Meadow Village at Big Sky Resort.                                               | b35                   |                                   | 7-10-71                                                                                                                            | 132                                                                                      |
| South Fork West Fork Gallatin River                                       | West Fork Gallatin River | NW¼SW¼ sec.31, T.6 S., R.4 E., Gallatin County, about 1 mile upstream from mouth, at Meadow Village at Big Sky Resort.                                                         | 46.9                  |                                   | 6-13-71<br>6-25-71<br>7-10-71                                                                                                      | 594<br>389<br>175                                                                        |
| West Fork Gallatin River                                                  | Gallatin River           | NE¼NE¼ sec.32, T.6 S., R.4 E., Gallatin County, at mouth, at bridge on U.S. Highway 191, 2.5 miles east of Meadow Village at Big Sky Resort.                                   | 80.4                  |                                   | 6-14-71<br>6-25-71                                                                                                                 | 787<br>597                                                                               |
| Marias River basin                                                        |                          |                                                                                                                                                                                |                       |                                   |                                                                                                                                    |                                                                                          |
| Teton River                                                               | Marias River             | NW¼ sec.15, T.25 N., R.1 W., Teton County, at bridge on U.S. Highway 91, 4.2 miles east of Collins.                                                                            | -                     |                                   | 3-29-71<br>4-29-71                                                                                                                 | 273<br>295                                                                               |
| Arrow Creek basin                                                         |                          |                                                                                                                                                                                |                       |                                   |                                                                                                                                    |                                                                                          |
| Arrow Creek                                                               | Missouri River           | SW¼ sec.11, T.19 N., R.12 E., Fergus County, at bridge on State Secondary Highway 230, 6 miles northwest of Coffee Creek, and 19 miles north of Stanford.                      | -                     | 1968-70                           | 10-28-70<br>12- 4-70<br>1- 8-71<br>2- 4-71<br>3- 3-71<br>3-31-71<br>4-29-71<br>5-26-71<br>6-29-71<br>7-27-71<br>8-25-71<br>9-29-71 | *17.7<br>*12.2<br>*7.09<br>26.4<br>11.4<br>109<br>31.8<br>24.0<br>24.8<br>*1.0<br>0<br>0 |
| Coffee Creek                                                              | Arrow Creek              | Center of sec.2, T.19 N., R.14 E., Fergus County, at bridge on county road, 9 miles northeast of Denton.                                                                       | -                     | 1968-70                           | 10-27-70<br>12- 3-70<br>1- 7-71<br>2- 4-71<br>3- 3-71<br>3-31-71<br>4-29-71<br>5-25-71<br>6-29-71<br>7-27-71<br>8-25-71<br>9-29-71 | *3.51<br>*2.93<br>*1.29<br>4.94<br>5.43<br>12.5<br>7.58<br>*2.71<br>*1.09<br>0<br>0<br>0 |
| Judith River basin                                                        |                          |                                                                                                                                                                                |                       |                                   |                                                                                                                                    |                                                                                          |
| South Fork Judith River                                                   | Middle Fork Judith River | SW¼ sec.36, T.13 N., R.11 E., Judith Basin County, about 1 mile upstream from Middle Fork, and 12.8 miles southwest of Utica.                                                  | -                     | 1964                              | 6- 2-71                                                                                                                            | 43.2                                                                                     |
| Ross Fork 06111000                                                        | Judith River             | NW¼ sec.11, T.14 N., R.15 E., Fergus County, 1 mile downstream from Hauck Coulee, 3.5 miles east of Hobson, and 7 miles upstream from mouth at site of former gaging station.  | 337                   | 1946-53<br>1955-62<br>1968-70     | 10- 6-70<br>11- 4-70<br>12- 1-70<br>1- 5-71<br>2-16-71<br>3-30-71<br>4-28-71<br>6- 1-71<br>7- 1-71<br>8-26-71<br>9-29-71           | 15.7<br>12.9<br>25.9<br>9.32<br>116<br>135<br>67.3<br>34.1<br>14.6<br>.11<br>5.21        |

See footnotes at end of table, p. 266

## DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Discharge measurements made at miscellaneous sites during water year 1971

| Stream                        | Tributary to     | Location                                                                                                                                                                                               | Drainage area (sq mi) | Measured previously (water years) | Measurements                                                                                                                                   |                                                                                                              |
|-------------------------------|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
|                               |                  |                                                                                                                                                                                                        |                       |                                   | Date                                                                                                                                           | Discharge (cfs)                                                                                              |
| Judith River basin--Continued |                  |                                                                                                                                                                                                        |                       |                                   |                                                                                                                                                |                                                                                                              |
| Big Spring Creek<br>06111500  | Judith River     | SW $\frac{1}{4}$ NW $\frac{1}{4}$ sec.5, T.14 N., R.19 E., Fergus County, at old highway bridge, 0.5 mile downstream from Big Spring, 5 miles southeast of Lewistown at site of former gaging station. | 20.9                  | 1931,<br>1932-57+,<br>1966-70     | 10-26-70<br>12- 2-70<br>1- 6-71<br>2- 2-71<br>3- 4-71<br>3-30-71<br>4-28-71<br>5-24-71<br>6-28-71<br>7-26-71<br>8-25-71<br>9-28-71             | 142<br>*131<br>*132<br>*132<br>*133<br>178<br>151<br>135<br>141<br>*128<br>*129<br>*134                      |
| Big Spring Creek<br>06111850  | Judith River     | NW $\frac{1}{4}$ NW $\frac{1}{4}$ sec.27, T.16 N., R.17 E., Fergus County, upstream from bridge on county road, 0.6 mile west of Hanover, and 7 miles northwest of Lewistown.                          | -                     | 1931,<br>1967-70                  | 10-26-70<br>12- 2-70<br>1- 6-71<br>2- 2-71<br>3- 2-71<br>3-30-71<br>4-28-71<br>5-24-71<br>6-28-71<br>7-26-71<br>8-24-71<br>9-28-71             | *186<br>*185<br>*170<br>*179<br>187<br>586<br>291<br>193<br>228<br>*148<br>*148<br>*184                      |
| Cottonwood Creek<br>06112100  | Big Spring Creek | NW $\frac{1}{4}$ sec.18, T.14 N., R.18 E., Fergus County, 30 ft downstream from bridge on county road, 9.5 miles east of Moore, and 12 miles upstream from mouth at site of former gaging station.     | 47.9                  | 1957-63+,<br>1964-70++            | 10- 7-70<br>11- 4-70<br>12- 1-70<br>1- 5-71<br>2-17-71<br>3-30-71<br>4-27-71<br>6- 1-71<br>7- 1-71<br>7-27-71                                  | 1.77<br>.32<br>0<br>0<br>1.87<br>40.8<br>10.1<br>81.3<br>71.5<br>c6.5                                        |
| Cottonwood Creek              | Big Spring Creek | NE $\frac{1}{4}$ NE $\frac{1}{4}$ sec.28, T.16 N., R.17 E., Fergus County, 500 ft upstream from railroad trestle, 0.8 mile west of Hanover, and 8 miles northwest of Lewistown.                        | -                     | 1967-70                           | 10-26-70<br>12- 2-70<br>1- 6-71<br>2- 2-71<br>3- 2-71<br>3-30-71<br>4-28-71<br>5-24-71<br>6-28-71<br>7-26-71<br>8-24-71<br>9-28-71             | *20.7<br>*25.9<br>*12.0<br>*17.1<br>21.7<br>102<br>62.5<br>54.6<br>184<br>*8.99<br>*1.17<br>*8.89            |
| Sage Creek<br>06112500        | Judith River     | SW $\frac{1}{4}$ sec.12, T.15 N., R.12 E., Judith Basin County, at bridge 0.8 mile southwest of Windham at site of former gaging station.                                                              | 58.6                  | 1920-22+,<br>1968-70              | 10- 1-70<br>10-28-70<br>12- 4-70<br>1- 8-71<br>2- 4-71<br>3- 2-71<br>4- 1-71<br>4-27-71<br>5-27-71<br>6-30-71<br>7-28-71<br>8-25-71<br>9-29-71 | *3.28<br>*3.03<br>*2.34<br>*1.83<br>*1.91<br>2.41<br>*.92<br>3.34<br>2.74<br>*2.20<br>*1.17<br>*.96<br>*1.15 |
| Sage Creek                    | Judith River     | SE $\frac{1}{4}$ sec.31, T.18 N., R.16 E., Fergus County, at bridge on State Secondary Highway 235, 3.5 miles north of Danvers, and 11 miles east of Denton.                                           | -                     | 1968-70                           | 10-27-70<br>12- 3-70<br>1- 7-71<br>2- 3-71<br>3- 3-71<br>3-31-71<br>4-29-71<br>5-25-71<br>6-29-71<br>7-27-71<br>8-25-71<br>9-29-71             | *6.85<br>*4.15<br>*3.58<br>10.4<br>8.94<br>24.1<br>14.2<br>7.21<br>*3.73<br>*.73<br>*.29<br>*.23             |

See footnotes at end of table, p. 266

Discharge measurements made at miscellaneous sites during water year 1971

| Stream                        | Tributary to     | Location                                                                                                                                                                                                                      | Drainage area (sq mi) | Measured previously (water years)  | Measurements                                                                                                                       |                                                                                           |
|-------------------------------|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
|                               |                  |                                                                                                                                                                                                                               |                       |                                    | Date                                                                                                                               | Discharge (cfs)                                                                           |
| Judith River basin--Continued |                  |                                                                                                                                                                                                                               |                       |                                    |                                                                                                                                    |                                                                                           |
| Warm Spring Creek             | Judith River     | NE $\frac{1}{4}$ SW $\frac{1}{4}$ sec.19, T.17 N., R.18 E., Fergus County, 0.2 mile northwest of Warm Spring, 6 miles southwest of Hilger.                                                                                    | -                     | 1919, 1931, 1966-70                | 10-27-70<br>12- 2-70<br>1- 7-71<br>2- 3-71<br>3- 3-71<br>3-31-71<br>4-28-71<br>5-25-71<br>6-29-71<br>7-27-71<br>8-24-71<br>9-28-71 | *168<br>*166<br>*158<br>*169<br>*163<br>270<br>190<br>161<br>167<br>*157<br>*154<br>*156  |
| Warm Spring Creek<br>06112900 | Judith River     | SE $\frac{1}{4}$ SW $\frac{1}{4}$ sec.21, T.18 N., R.16 E., Fergus County, 200 ft upstream from county bridge, 2.2 miles upstream from mouth, and 5.5 miles northeast of Danvers.                                             | -                     | 1967-70                            | 10-27-70<br>12- 3-70<br>1- 7-71<br>2- 3-71<br>3- 3-71<br>3-31-71<br>4-28-71<br>5-25-71<br>6-29-71<br>7-27-71<br>8-24-71<br>9-28-71 | *166<br>*159<br>*157<br>*158<br>*163<br>422<br>188<br>151<br>146<br>*133<br>*144<br>*159  |
| Wolf Creek<br>06114500        | Judith River     | NE $\frac{1}{4}$ SE $\frac{1}{4}$ sec.26, T.16 N., R.11 E., Judith Basin County, 0.5 mile downstream from confluence of Dry Wolf and Running Wolf Creeks, and 4 miles southwest of Stanford at site of former gaging station. | 112                   | 1950-53, 1955-58, 1959-62, 1968-70 | 10- 7-70<br>11- 4-70<br>12- 1-70<br>1- 5-71<br>2-17-71<br>3-30-71<br>4-28-71<br>6- 1-71<br>6-30-71<br>9-29-71                      | 10.3<br>8.60<br>7.61<br>4.15<br>6.60<br>5.15<br>6.14<br>5.52<br>1.78<br>2.97              |
| Wolf Creek                    | Judith River     | SE $\frac{1}{4}$ sec.24, T.19 N., R.15 E., Fergus County, at county bridge, 11 miles northeast of Denton.                                                                                                                     | -                     | 1968-70                            | 10-27-70<br>12- 3-70<br>1- 8-71<br>2- 3-71<br>3- 3-71<br>3-31-71<br>4-29-71<br>5-27-71<br>6-29-71<br>7-27-71<br>8-25-71<br>9-29-71 | 9.46<br>*6.46<br>*3.08<br>9.58<br>19.7<br>46.3<br>34.3<br>8.11<br>*4.14<br>*.05<br>0<br>0 |
| Yellowstone River basin       |                  |                                                                                                                                                                                                                               |                       |                                    |                                                                                                                                    |                                                                                           |
| Arnica Creek<br>06185955      | Yellowstone Lake | Lat 44°28'40", long 110°32'30", Yellowstone National Park, at bridge on Grand Loop Road, 0.3 mile upstream from Yellowstone Lake, 4.4 miles northeast of West Thumb Junction.                                                 | -                     | 1969-70                            | 10-22-70                                                                                                                           | *4.20                                                                                     |
| Cub Creek<br>06185970         | Yellowstone Lake | Lat 44°30'15", long 110°11'40", Yellowstone National Park, at Cub Creek campground on East Entrance Road, 10.5 miles southeast of Lake Junction.                                                                              | -                     | 1969-70                            | 10-19-70                                                                                                                           | *1.53                                                                                     |
| Bridge Creek<br>06185985      | Yellowstone Lake | Lat 44°31'48", long 110°26'02", Yellowstone National Park, at bridge on Grand Loop Road, 250 ft upstream from Yellowstone Lake, 3.5 miles southwest of Lake Junction.                                                         | -                     | 1969-70                            | 10-22-70                                                                                                                           | *,40                                                                                      |
| Pebble Creek<br>06187920      | Soda Butte Creek | Lat 44°55'07", long 110°06'42", Yellowstone National Park, about 0.2 mile upstream from Northeast Entrance Road, 0.8 mile upstream from mouth, and 6.2 miles east of Lamar ranger station.                                    | -                     | 1969-70                            | 10-20-70                                                                                                                           | *9.02                                                                                     |

See footnotes at end of table, p. 266

## DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Discharge measurements made at miscellaneous sites during water year 1971

| Stream                                  | Tributary to         | Location                                                                                                                                                                                                                                                | Drainage area (sq mi) | Measured previously (water years)  | Measurements       |                 |
|-----------------------------------------|----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------------------------------------|--------------------|-----------------|
|                                         |                      |                                                                                                                                                                                                                                                         |                       |                                    | Date               | Discharge (cfs) |
| Yellowstone River basin--Continued      |                      |                                                                                                                                                                                                                                                         |                       |                                    |                    |                 |
| Slough Creek<br>06187980                | Lamar River          | Lat 44°56'55", long 110°18'15", Yellowstone National Park, at Slough Creek campground, 0.1 mile upstream from Buffalo Creek, and 5.1 miles northwest of Lamar ranger station.                                                                           | -                     | 1969-70                            | 10-20-70           | *47.2           |
| Lamar River<br>06188000                 | Yellowstone River    | Lat 44°55'40", long 110°23'35", Yellowstone National Park, 0.5 mile northeast of Cooke City highway, 0.5 mile upstream from mouth, and 1.5 miles northeast of Tower Falls ranger station at site of former gaging station.                              | 660                   | 1922*,<br>1923-69*,<br>1970        | 10-20-70           | *220            |
| Unnamed tributary<br>06189020           | Blacktail Deer Creek | Lat 44°57'31", long 110°35'40", Yellowstone National Park, at mouth, on lower Blacktail Trail, 0.2 mile north of Grand Loop Road, 5.2 miles east of Mammoth.                                                                                            | -                     | 1967,<br>1969-70                   | 10-20-70           | c.15            |
| Blacktail Deer Creek<br>06189030        | Yellowstone River    | Lat 44°57'42", long 110°35'26", Yellowstone National Park, at Howard Eaton Trail, 0.5 mile downstream from Grand Loop Road, 5.3 miles east of Mammoth.                                                                                                  | -                     | 1967-70                            | 10-20-70           | *5.73           |
| Gardner River<br>06189730               | Yellowstone River    | Lat 44°53'36", long 110°44'56", Yellowstone National Park, at diversion, 30 ft upstream from Panther Creek, 6.2 miles south of Mammoth.                                                                                                                 | -                     | 1929-30,<br>1967-70                | 10-21-70           | *20.9           |
| Glen Creek<br>06189902                  | Gardner River        | Lat 44°55'59", long 110°43'33" Yellowstone National Park, just downstream from unnamed right bank tributary, about 400 ft upstream from Rustic Falls, and 3.3 miles south of Mammoth.                                                                   | -                     | 1968-70                            | 10-21-70           | *16.1           |
| Lava Creek<br>06189980                  | Gardner River        | Lat 44°56'22", long 110°37'36", Yellowstone National Park, about 200 ft upstream from Lupine Creek, and 4.3 miles southeast of Mammoth.                                                                                                                 | -                     | 1967-70                            | 10-21-70           | *21.1           |
| Shields River                           | Yellowstone River    | SW $\frac{1}{4}$ NW $\frac{1}{4}$ SE $\frac{1}{4}$ sec.21, T.2 N., R.9 E., Park County, 100 ft upstream from bridge on U.S. Highway 89, 1.4 miles north of Clyde Park.                                                                                  | -                     |                                    | 6-22-71<br>9-22-71 | 326<br>68.6     |
| Shields River<br>06193500               | Yellowstone River    | NW $\frac{1}{4}$ NW $\frac{1}{4}$ sec.33, T.2 N., R.9 E., Park County, at highway bridge, 0.7 mile west of Clyde Park, 2.6 miles upstream from Bracket Creek, at mile 14.2 at site of former gaging station.                                            | 543                   | 1921-23*,<br>1929-32*,<br>1934-67* | 6-23-71            | 471             |
| Shields River                           | Yellowstone River    | NW $\frac{1}{4}$ NE $\frac{1}{4}$ SE $\frac{1}{4}$ sec.14, T.1 N., R.9 E., Park County, 100 ft downstream from bridge on U.S. Highway 89, 1 mile downstream from Canyon Creek, and 2.2 miles northwest of Chadborn.                                     | -                     |                                    | 9-22-71            | 133             |
| Shields River                           | Yellowstone River    | SW $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$ sec.13, T.1 N., R.9 E., Park County, at bridge on county road, 1.7 miles northwest of Chadborn.                                                                                                      | -                     |                                    | 6-23-71            | 674             |
| North Fork Big Timber Creek<br>06196000 | Yellowstone River    | SE $\frac{1}{4}$ NW $\frac{1}{4}$ SE $\frac{1}{4}$ sec.26, T.3 N., R.13 E., Sweet Grass County, 300 ft upstream from confluence with South Fork, 11.5 miles northwest of Big Timber at site of former gaging station.                                   | 36.6                  | 1907-12*                           | 8-30-71            | +d2,390         |
| Big Timber Creek                        | Yellowstone River    | S $\frac{1}{2}$ SE $\frac{1}{4}$ sec.25, T.3 N., R.13 E., Sweet Grass County, 100 ft downstream from South Fork, and 11.5 miles northwest of Big Timber.                                                                                                | -                     |                                    | 8-30-71            | +d5,870         |
| Boulder River                           | Yellowstone River    | SW $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$ sec.35, T.3 S., R.12 E., Sweet Grass County, 0.7 mile downstream from Contact Creek, 3.2 miles upstream from falls, 0.4 mile east of Main Boulder ranger station and 11.1 miles southwest of McLeod. | 210                   | 1970                               | 10- 3-70           | 138             |

See footnotes at end of table, p. 266

## DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

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Discharge measurements made at miscellaneous sites during water year 1971

| Stream                                 | Tributary to                  | Location                                                                                                                                                                              | Drainage area (sq mi) | Measured previously (water years) | Measurements                                                                                                            |                                                                                 |
|----------------------------------------|-------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-----------------------------------|-------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|
|                                        |                               |                                                                                                                                                                                       |                       |                                   | Date                                                                                                                    | Discharge (cfs)                                                                 |
| Yellowstone River basin--Continued     |                               |                                                                                                                                                                                       |                       |                                   |                                                                                                                         |                                                                                 |
| Sweet Grass Creek<br>06200500          | Yellowstone River             | NW $\frac{1}{4}$ sec.27, T.5 N., R.13 E., Sweet Grass County, 1.5 miles upstream from Basin Creek, 7.5 miles northwest of Melville at site of former gaging station.                  | 63.8                  | 1913-24†, 1937-69†                | 8-30-71                                                                                                                 | †d3,630                                                                         |
| Stillwater River<br>06202530           | Yellowstone River             | SE $\frac{1}{4}$ SE $\frac{1}{4}$ SW $\frac{1}{4}$ sec.2, T.5 S., R.15 E., Stillwater County, at bridge to Keogh Ranch, 1.8 miles southwest of Nye.                                   | -                     |                                   | 4-12-71                                                                                                                 | 69.7                                                                            |
| West Fork Stillwater River<br>06202598 | Stillwater River              | W $\frac{1}{2}$ sec.26, T.4 S., R.15 E., Stillwater County, at bridge 300 ft downstream from Castle Creek, 2.7 miles northwest of Nye, and 3 miles upstream from mouth.               | -                     |                                   | 11-12-70<br>12-10-70<br>1-12-71<br>2-10-71<br>3-10-71<br>4-12-71<br>5-11-71<br>6-10-71<br>7- 8-71<br>8-16-71<br>9- 8-71 | 62.0<br>46.1<br>32.8<br>35.8<br>30.6<br>31.7<br>130<br>899<br>448<br>143<br>128 |
| West Fork Stillwater River             | Stillwater River              | NE $\frac{1}{4}$ SW $\frac{1}{4}$ sec.31, T.4 S., R.16 E., Stillwater County, 300 ft downstream from county bridge, 0.5 mile north of Nye, 0.7 mile upstream from mouth.              | -                     |                                   | 10- 5-70                                                                                                                | 56.8                                                                            |
| Little Rocky Creek<br>06202605         | Stillwater River              | NW $\frac{1}{4}$ sec.4, T.5 S., R.16 E., Stillwater County, at bridge on State Highway 419, 2 miles upstream from mouth, 2.2 miles east of Nye.                                       | -                     |                                   | 10- 5-70<br>11-12-70                                                                                                    | 1.21<br>5.23                                                                    |
| eBig Sand Coulee                       | Clarks Fork Yellowstone River | NW $\frac{1}{4}$ sec.32, T.9 S., R.22 E., Carbon County, 300 ft upstream from mouth, 0.2 mile north of Wyoming-Montana State line, 9.5 miles southeast of Belfry.                     | -                     | 1934-48†, 1962-63                 | 4-29-71<br>5-28-71<br>8-18-71                                                                                           | 3.72<br>44.5<br>44.6                                                            |
| Clarks Fork Yellowstone River          | Yellowstone River             | SW $\frac{1}{4}$ NE $\frac{1}{4}$ sec.27, T.8 S., R.22 E., Carbon County, 200 ft upstream from irrigation canal diversion, 2 miles south of Belfry, 3 miles upstream from Bear Creek. | -                     |                                   | 4-29-71                                                                                                                 | 499                                                                             |
| Bear Creek                             | Clarks Fork Yellowstone River | NE $\frac{1}{4}$ NE $\frac{1}{4}$ sec.15, T.8 S., R.22 E., Carbon County, at bridge on State Highway 308, at Belfry 0.5 mile upstream from mouth.                                     | -                     |                                   | 4-29-71<br>5-28-71<br>8-18-71                                                                                           | 7.19<br>29.8<br>11.7                                                            |
| Silver Tip Creek                       | Clarks Fork Yellowstone River | S $\frac{1}{2}$ sec.35, T.7 S., R.22 E., Carbon County, at bridge on State Highway 308, 0.3 mile upstream from mouth, and 2.5 miles northeast of Belfry.                              | -                     |                                   | 4-29-71<br>5-28-71<br>8-18-71                                                                                           | c.1<br>31.2<br>20.7                                                             |
| Dry Creek                              | Clarks Fork Yellowstone River | SE $\frac{1}{4}$ sec.26, T.7 S., R.22 E., Carbon County, at mouth, 3.5 miles northeast of Belfry.                                                                                     | -                     |                                   | 4-29-71<br>5-28-71<br>8-18-71                                                                                           | 4.88<br>17.9<br>9.00                                                            |
| Clarks Fork Yellowstone River          | Yellowstone River             | South line of sec.18, T.7 S., R.23 E., Carbon County, at county bridge 2.5 miles upstream from Cottonwood Creek, 5.5 miles southwest of Bridger.                                      | -                     |                                   | 4-29-71<br>5-28-71<br>8-18-71                                                                                           | 524<br>4,810<br>730                                                             |
| Cottonwood Creek                       | Clarks Fork Yellowstone River | East line of sec.8, T.7 S., R.23 E., Carbon County, at county bridge, 0.6 mile upstream from mouth, 4 miles south of Bridger.                                                         | -                     |                                   | 4-30-71<br>5-28-71<br>8-18-71                                                                                           | .44<br>9.37<br>6.12                                                             |
| Bridger Creek                          | Clarks Fork Yellowstone River | SE $\frac{1}{4}$ SW $\frac{1}{4}$ SE $\frac{1}{4}$ sec.33, T.6 S., R.23 E., Carbon County, at bridge on U.S. Highway 310, 300 ft upstream from mouth, 2 miles south of Bridger.       | -                     |                                   | 4-30-71<br>5-28-71<br>8-18-71                                                                                           | 5.02<br>6.66<br>12.4                                                            |
| Sand Creek                             | Clarks Fork Yellowstone River | SW $\frac{1}{4}$ NE $\frac{1}{4}$ SW $\frac{1}{4}$ sec.4, T.6 S., R.23 E., Carbon County, at bridge on U.S. Highway 310, 0.1 mile upstream from mouth, 3 miles north of Bridger.      | -                     |                                   | 4-30-71<br>5-28-71<br>8-18-71                                                                                           | .91<br>33.3<br>6.19                                                             |

See footnotes at end of table, p. 266



## DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Discharge measurements made at miscellaneous sites during water year 1971

| Discharge measurements made at miscellaneous sites during water year 1971 |                               |                                                                                                                                                                                                                        |                       |                                           |                                                                                                                                                |                                                                        |
|---------------------------------------------------------------------------|-------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|
| Stream                                                                    | Tributary to                  | Location                                                                                                                                                                                                               | Drainage area (sq mi) | Measured previously (water years)         | Measurements                                                                                                                                   |                                                                        |
|                                                                           |                               |                                                                                                                                                                                                                        |                       |                                           | Date                                                                                                                                           | Discharge (cfs)                                                        |
| Yellowstone River basin--Continued                                        |                               |                                                                                                                                                                                                                        |                       |                                           |                                                                                                                                                |                                                                        |
| Clarks Fork Yellowstone River                                             | Yellowstone River             | SE $\frac{1}{4}$ NE $\frac{1}{4}$ sec.20, T.5 S., R.23 E., Carbon County, 0.1 mile upstream from Blue-water Creek, 0.5 mile southeast of Fromberg.                                                                     | -                     |                                           | 4-30-71<br>5-28-71<br>8-18-71                                                                                                                  | 488<br>4,290<br>702                                                    |
| Bluewater Creek 06207850                                                  | Clarks Fork Yellowstone River | SE $\frac{1}{4}$ SW $\frac{1}{4}$ sec.6, T.6 S., R.24 E., Carbon County, at Sanford Ranch, 0.5 mile north of county road, 4.8 miles north-east of Bridger, and 8 miles upstream from mouth.                            | 43.9                  | 1960-70                                   | 10- 1-70                                                                                                                                       | 27.3                                                                   |
| Bluewater Creek 06207870                                                  | Clarks Fork Yellowstone River | SW $\frac{1}{4}$ SE $\frac{1}{4}$ sec.27, T.5 S., R.23 E., Carbon County, 100 ft downstream from bridge on county road, 2.8 miles southeast of Fromberg, and 4.7 miles upstream from mouth.                            | 46.6                  | 1960-70                                   | 10- 1-70                                                                                                                                       | 25.4                                                                   |
| Bluewater Creek 06207900                                                  | Clarks Fork Yellowstone River | NW $\frac{1}{4}$ SW $\frac{1}{4}$ sec.21, T.5 S., R.23 E., Carbon County, 0.3 mile upstream from mouth and 0.7 mile southeast of Fromberg at site of former gaging station.                                            | 53.2                  | 1960-61,<br>1961-64*,<br>1965,<br>1969-70 | 4-30-71<br>5-28-71<br>8-18-71                                                                                                                  | 52.6<br>44.2<br>9.06                                                   |
| Elbow Creek                                                               | Clarks Fork Yellowstone River | SE $\frac{1}{4}$ NE $\frac{1}{4}$ NE $\frac{1}{4}$ sec.34, T.4 S., R.23 E., Carbon County, at bridge on U.S. Highway 310, 500 ft upstream from mouth, 1.5 miles southwest of Edgar.                                    | -                     |                                           | 4-30-71<br>5-28-71<br>8-19-71                                                                                                                  | 8.66<br>13.3<br>25.5                                                   |
| Five Mile Creek                                                           | Clarks Fork Yellowstone River | NE $\frac{1}{4}$ NE $\frac{1}{4}$ SW $\frac{1}{4}$ sec.24, T.4 S., R.23 E., Carbon County, at county bridge, 0.3 mile up-stream from mouth, 1 mile northeast of Edgar.                                                 | -                     |                                           | 4-30-71<br>5-28-71<br>8-19-71                                                                                                                  | 4.97<br>3.83<br>1.45                                                   |
| Rock Creek 06214000                                                       | Clarks Fork Yellowstone River | NW $\frac{1}{4}$ SW $\frac{1}{4}$ NW $\frac{1}{4}$ sec.2, T.4 S., R.23 E., Carbon County, at bridge on U.S. Highway 310, 0.4 mile southwest of Rockvale, 2 miles upstream from mouth at site of former gaging station. | 569                   | 1920-22*,<br>1932-40*,<br>1941-42         | 5- 1-71<br>5-28-71<br>8-19-71                                                                                                                  | 515<br>354<br>19.5                                                     |
| Cottonwood Creek                                                          | Clarks Fork Yellowstone River | SW $\frac{1}{4}$ SW $\frac{1}{4}$ sec.19, T.3 S., R.24 E., Carbon County, at ford to farm house, 0.3 mile upstream from mouth, 1 mile east of Silesia.                                                                 | -                     |                                           | 5- 1-71<br>5-28-71<br>8-19-71                                                                                                                  | 3.71<br>1.37<br>0                                                      |
| Kettle Gulch                                                              | Little Bighorn River          | NW $\frac{1}{4}$ NE $\frac{1}{4}$ sec.20, T.58 N., R.89 W., Sheridan County, in Wyoming, at mouth, 0.4 mile south of Wyoming-Montana State line, and 15 miles west of Parkman, Wyo.                                    | -                     | 1970                                      | 10- 8-70<br>11- 6-70<br>12- 3-70<br>1- 6-71<br>2- 5-71<br>3- 3-71<br>4- 6-71<br>8- 2-71<br>9- 2-71                                             | .50<br>c.3<br>c.2<br>0<br>0<br>0<br>0<br>c1<br>c1.5<br>c.5             |
| Elkhorn Creek                                                             | Little Bighorn River          | SE $\frac{1}{4}$ sec.17, T.58 N., R.89 W., Sheridan County, in Wyoming, at mouth, 15 miles west of Parkman, Wyo.                                                                                                       | -                     | 1970                                      | 10- 8-70<br>11- 6-70<br>12- 3-70<br>1- 6-71<br>2- 5-71<br>3- 3-71<br>4- 6-71<br>5- 4-71<br>5-31-71<br>6-18-71<br>7- 6-71<br>8- 2-71<br>9- 2-71 | 0<br>0<br>0<br>0<br>0<br>0<br>0<br>6.08<br>11.9<br>2.53<br>0<br>0<br>0 |
| Spring Creek                                                              | Little Bighorn River          | NE $\frac{1}{4}$ sec.30, T.9 S., R.34 E., Big Horn County, at county bridge 500 ft up-stream from mouth, 11.5 miles southwest of Wyola.                                                                                | -                     | 1970                                      | 10- 8-70<br>11- 6-70<br>12- 3-70<br>7- 6-71<br>9- 2-71                                                                                         | 4.01<br>3.30<br>4.09<br>8.68<br>3.70                                   |

See footnotes at end of table, p. 266

## Discharge measurements made at miscellaneous sites during water year 1971

| Stream                                   | Tributary to                         | Location                                                                                                                                                                                                                   | Drainage area (sq mi) | Measured previously (water years) | Measurements                                                                                                             |                                                                      |
|------------------------------------------|--------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|
|                                          |                                      |                                                                                                                                                                                                                            |                       |                                   | Date                                                                                                                     | Discharge (cfs)                                                      |
| Yellowstone River basin--Continued       |                                      |                                                                                                                                                                                                                            |                       |                                   |                                                                                                                          |                                                                      |
| Ed's Creek                               | Little Bighorn River                 | SE $\frac{1}{4}$ sec.19, T.9 S., R.3 $\frac{1}{2}$ E., Big Horn County, at county bridge 200 ft upstream from mouth, 11 miles southwest of Wyola.                                                                          | -                     | 1970                              | 10- 8-70<br>11- 6-70<br>12- 3-70<br>1- 6-71<br>2- 5-71<br>4- 6-71<br>5- 4-71<br>5-31-71<br>7- 6-71<br>8- 2-71<br>9- 2-71 | c.2<br>c.2<br>c.1<br>0<br>0<br>c.1<br>c.5<br>c2<br>c.5<br>c.5<br>c.5 |
| Little Bighorn River                     | Bighorn River                        | SW $\frac{1}{4}$ SW $\frac{1}{4}$ sec.17, T.9 S., R.3 $\frac{1}{2}$ E., Big Horn County, just upstream from Antler Land Co. ditch, 0.5 mile upstream from county bridge, 10 miles southwest of Wyola.                      | -                     | 1960, 1970                        | 10- 8-70<br>11- 6-70<br>12- 3-70<br>1- 8-71<br>2- 5-71<br>4- 6-71<br>5- 4-71<br>7- 6-71<br>8- 2-71<br>9- 2-71            | 107<br>109<br>100<br>103<br>80.5<br>86.6<br>194<br>286<br>164<br>123 |
| Yellowstone River                        | Missouri River                       | SW $\frac{1}{4}$ SE $\frac{1}{4}$ sec.21, T.6 N., R.3 $\frac{1}{2}$ E., Treasure County, at bridge on State Highway 311, 0.4 mile west of Myers.                                                                           | -                     |                                   | 5-19-71<br>6- 2-71<br>6-15-71<br>6-25-71                                                                                 | 24,300<br>38,600<br>49,900<br>58,600                                 |
| Part 12 Kootenai River basin             |                                      |                                                                                                                                                                                                                            |                       |                                   |                                                                                                                          |                                                                      |
| Blacktail Creek                          | Phillips Creek                       | Lat 49°00'25", long 114°58'45", British Columbia, 100 ft upstream from mouth, 3.5 miles northeast of Roosville Port of Entry.                                                                                              | -                     | 1966-70                           | 11- 4-70<br>8- 5-71<br>9- 2-71                                                                                           | 2.54<br>11.5<br>7.40                                                 |
| Phillips Creek                           | Closed basin in Kootenai River basin | Lat 49°01'30", long 115°00'55", British Columbia, 2.5 miles northeast of Roosville Port of Entry, at site of former Canadian gaging station.                                                                               | 23                    | 1914-23, 1924, 1927-31, 1966-70   | 11- 4-70<br>7-12-71<br>8- 5-71<br>9- 2-71                                                                                | 9.24<br>64.0<br>27.8<br>21.9                                         |
| Phillips Creek                           | Closed basin in Kootenai River basin | Southwest corner of NW $\frac{1}{4}$ sec.1, T.37 N., R.27 W., Lincoln County, upstream from bridge on county road, and from diversion point for irrigation ditch, 0.3 mile west of Roosville, and 8 miles north of Eureka. | -                     | 1966-70                           | 11- 4-70<br>7-12-71<br>8- 5-71<br>9- 2-71                                                                                | 0<br>50.1<br>7.64<br>c.01                                            |
| Phillips Creek                           | Closed basin in Kootenai River basin | On west line of NW $\frac{1}{4}$ sec.14, T.37 N., R.27 W., Lincoln County, at culvert on county road, 2 miles southwest of Roosville, and 7 miles northwest of Eureka.                                                     | -                     | 1966-70                           | 11- 4-70<br>7-12-71<br>8- 5-71<br>9- 2-71                                                                                | 0<br>37.7<br>0<br>0                                                  |
| Kootenai River 12301933                  | Columbia River                       | SE $\frac{1}{4}$ NE $\frac{1}{4}$ sec.17, T.30 N., R.29 W., Lincoln County, at bridge 3.5 miles downstream from Libby Dam, 11 miles east of Libby, and at mile 218.2.                                                      | 9,047                 | 1969-70                           | 9-17-71                                                                                                                  | 5,910                                                                |
| Ross Creek 12303400 (head of Lake Creek) | Kootenai River                       | SE $\frac{1}{4}$ NE $\frac{1}{4}$ sec.8, T.28 N., R.33 W., Lincoln County, Kootenai National Forest, at downstream side of road bridge, 0.8 mile upstream from Bull Lake, and 17.5 miles south of Troy.                    | -                     |                                   | 11-17-70<br>5- 4-71                                                                                                      | 28.7<br>498                                                          |
| Pend Oreille River basin                 |                                      |                                                                                                                                                                                                                            |                       |                                   |                                                                                                                          |                                                                      |
| Blacktail Creek                          | Silver Bow Creek                     | SW $\frac{1}{4}$ SW $\frac{1}{4}$ sec.19, T.3 N., R.7 W., Silver Bow County, at Lexington Avenue Bridge in Butte.                                                                                                          | -                     |                                   | 10-19-70                                                                                                                 | 11.7                                                                 |
| Browns Gulch                             | Silver Bow Creek                     | NW $\frac{1}{4}$ SW $\frac{1}{4}$ sec.14, T.3 N., R.9 W., Silver Bow County, 200 ft downstream from culvert in U.S. Highway 10 and Interstate Highway 90, 0.5 mile northwest of Ramsay.                                    | -                     |                                   | 10-19-70                                                                                                                 | c3                                                                   |

See footnotes at end of table, p. 266

## DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Discharge measurements made at miscellaneous sites during water year 1971

| Stream                              | Tributary to           | Location                                                                                                                                                                                                     | Drainage area (sq mi) | Measured previously (water years) | Measurements                                                                  |                                               |
|-------------------------------------|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-----------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------|
|                                     |                        |                                                                                                                                                                                                              |                       |                                   | Date                                                                          | Discharge (cfs)                               |
| Pend Oreille River basin--Continued |                        |                                                                                                                                                                                                              |                       |                                   |                                                                               |                                               |
| Silver Bow Creek                    | Head of Columbia River | NE $\frac{1}{4}$ SE $\frac{1}{4}$ sec.16, T.3 N., R.9 W., Silver Bow County, 0.3 mile upstream from bridge on McCleery Road, 2 miles west of Ramsay.                                                         | -                     |                                   | 10-19-70                                                                      | 43.0                                          |
| German Gulch Creek                  | Silver Bow Creek       | SE $\frac{1}{4}$ SW $\frac{1}{4}$ sec.12, T.3 N., R.10 W., Silver Bow County, 100 ft upstream from mouth, 5 miles west of Ramsay.                                                                            | -                     |                                   | 10-19-70                                                                      | c7                                            |
| Silver Bow Creek                    | Head of Columbia River | SE $\frac{1}{4}$ sec.14, T.4 N., R.10 W., Deer Lodge County, 1.5 miles southwest of Opportunity.                                                                                                             | -                     |                                   | 10-19-70                                                                      | 58.8                                          |
| Mill Creek                          | Silver Bow Creek       | SW $\frac{1}{4}$ sec.9, T.4 N., R.10 W., Deer Lodge County, at bridge on U.S. Highway 10A, 1 mile west of Opportunity.                                                                                       | -                     |                                   | 10-19-70                                                                      | c.2                                           |
| Willow Creek                        | Mill Creek             | NE $\frac{1}{4}$ NW $\frac{1}{4}$ sec.14, T.4 N., R.10 W., Deer Lodge County, 100 ft upstream from bridge on U.S. Highway 10A, 0.9 mile east of Opportunity.                                                 | -                     |                                   | 10-19-70                                                                      | 11.0                                          |
| Warm Springs Creek                  | Silver Bow Creek       | NW $\frac{1}{4}$ SE $\frac{1}{4}$ sec.18, T.5 N., R.9 W., Deer Lodge County, at mouth, 1 mile northeast of Warm Springs.                                                                                     | -                     |                                   | 10-19-70                                                                      | c13                                           |
| Clark Fork                          | Columbia River         | SW $\frac{1}{4}$ NE $\frac{1}{4}$ sec.18, T.5 N., R.9 W., Deer Lodge County, 400 ft downstream from county bridge, 1,000 ft downstream from Warm Springs Creek, and 1 mile northeast of Warm Springs.        | -                     |                                   | 10-19-70                                                                      | 188                                           |
| Clark Fork 12323800                 | Columbia River         | NE $\frac{1}{4}$ NE $\frac{1}{4}$ sec.7, T.5 N., R.9 W., Deer Lodge County, on upstream side of county bridge, 1.6 miles downstream from Warm Springs Creek, 1.9 mile southeast of Galen, and at mile 481.9. | 940                   |                                   | 7-25-71<br>8-18-71<br>9-15-71                                                 | 29.2<br>80.4<br>45.3                          |
| Lost Creek                          | Clark Fork             | SW $\frac{1}{4}$ NW $\frac{1}{4}$ sec.6, T.5 N., R.9 W., Deer Lodge County, 100 ft downstream from bridge on U.S. Highway 10, 1.3 miles south of Galen.                                                      | -                     |                                   | 10-19-70                                                                      | 53.5                                          |
| Modesty Creek                       | Clark Fork             | NW $\frac{1}{4}$ SW $\frac{1}{4}$ sec.29, T.6 N., R.9 W., Deer Lodge County, at U.S. Highway 10, 1 mile northeast of Galen.                                                                                  | -                     |                                   | 10-19-70                                                                      | c7                                            |
| Racetrack Creek                     | Clark Fork             | SE $\frac{1}{4}$ SE $\frac{1}{4}$ sec.8, T.6 N., R.9 W., Powell County, 50 ft downstream from bridge on U.S. Highway 10, 0.3 mile north of Dempsey.                                                          | -                     |                                   | 10-19-70                                                                      | c10                                           |
| Dempsey Creek                       | Clark Fork             | SE $\frac{1}{4}$ SE $\frac{1}{4}$ sec.32, T.7 N., R.9 W., Powell County, 50 ft downstream from bridge on U.S. Highway 10, 2.2 miles north of Dempsey.                                                        | -                     |                                   | 10-19-70                                                                      | 12.9                                          |
| Peterson Creek                      | Clark Fork             | NE $\frac{1}{4}$ SW $\frac{1}{4}$ sec.4, T.7 N., R.9 W., Powell County, just downstream from bridge on U.S. Highway 10, at Deer Lodge.                                                                       | -                     |                                   | 10-19-70                                                                      | 0                                             |
| Tincup Joe Creek                    | Clark Fork             | NE $\frac{1}{4}$ SE $\frac{1}{4}$ sec.5, T.7 N., R.9 W., Powell County, at culverts in county road, 0.7 mile southwest of Deer Lodge.                                                                        | -                     |                                   | 10-19-70                                                                      | c.3                                           |
| Clark Fork 12324200                 | Columbia River         | SW $\frac{1}{4}$ SW $\frac{1}{4}$ sec.33, T.8 N., R.9 W., Powell County, at bridge in Deer Lodge, and at mile 461.2.                                                                                         | 1,005                 | 1969-70                           | 10- 8-70<br>10-19-70<br>11- 4-70<br>12- 2-70<br>3- 4-71<br>5- 5-71<br>6- 4-71 | 229<br>287<br>323<br>340<br>311<br>575<br>583 |
| Cottonwood Creek                    | Clark Fork             | NE $\frac{1}{4}$ SW $\frac{1}{4}$ sec.33, T.8 N., R.9 W., Powell County, at culvert in U.S. Highway 10, in Deer Lodge.                                                                                       | -                     |                                   | 10-19-70                                                                      | c.4                                           |

See footnotes at end of table, p. 266

## Discharge measurements made at miscellaneous sites during water year 1971

| Stream                              | Tributary to   | Location                                                                                                                                                                                           | Drainage area (sq mi) | Measured previously (water years) | Measurements                                                                             |                                                            |
|-------------------------------------|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-----------------------------------|------------------------------------------------------------------------------------------|------------------------------------------------------------|
|                                     |                |                                                                                                                                                                                                    |                       |                                   | Date                                                                                     | Discharge (cfs)                                            |
| Pend Oreille River basin--Continued |                |                                                                                                                                                                                                    |                       |                                   |                                                                                          |                                                            |
| Johnson Creek                       | Clark Fork     | SE $\frac{1}{4}$ NW $\frac{1}{4}$ sec.33, T.8 N., R.9 W., Powell County, at culvert in U.S. Highway 10, in Deer Lodge.                                                                             | -                     |                                   | 10-19-70                                                                                 | c1.4                                                       |
| Little Blackfoot River              | Clark Fork     | NW $\frac{1}{4}$ SE $\frac{1}{4}$ sec.24, T.9 N., R.10 W., Powell County, at bridge on U.S. Highway 10 and Interstate Highway 90, 0.5 mile upstream from mouth, and 0.9 mile east of Garrison.     | 407                   | 1970                              | 10-19-70<br>4- 8-71                                                                      | 74.2<br>138                                                |
| Clark Fork<br>12324600              | Columbia River | Near center of east line of sec.23, T.9 N., R.10 W., Powell County, at county bridge at Garrison, 1 mile downstream from Little Blackfoot River, and at mile 44+.5.                                | 1,550                 | 1969-70                           | 10- 8-70<br>10-19-70<br>11- 5-70<br>12- 3-70<br>3- 4-71<br>5- 5-71<br>6- 2-71<br>6- 8-71 | 318<br>378<br>379<br>383<br>422<br>1,130<br>1,460<br>1,190 |
| Rock Creek                          | Clark Fork     | NE $\frac{1}{4}$ SW $\frac{1}{4}$ sec.23, T.9 N., R.10 W., Powell County, 100 ft upstream from mouth, at Garrison.                                                                                 | -                     |                                   | 10-19-70                                                                                 | c18                                                        |
| Willow Creek                        | Clark Fork     | NW $\frac{1}{4}$ SW $\frac{1}{4}$ sec.14, T.9 N., R.10 W., Powell County, at mouth, 1 mile northwest of Garrison.                                                                                  | -                     |                                   | 10-19-70                                                                                 | c2                                                         |
| Warm Springs Creek                  | Clark Fork     | SE $\frac{1}{4}$ SW $\frac{1}{4}$ sec.10, T.9 N., R.10 W., Powell County, 10 ft downstream from U.S. Highway 10, 2 miles northwest of Garrison.                                                    | -                     |                                   | 10-19-70                                                                                 | c9                                                         |
| Brock Creek                         | Clark Fork     | SW $\frac{1}{4}$ SW $\frac{1}{4}$ sec.4, T.9 N., R.10 W., Powell County, at mouth, 3.5 miles northwest of Garrison.                                                                                | -                     |                                   | 10-19-70                                                                                 | c2                                                         |
| Gold Creek<br>12324660              | Clark Fork     | SE $\frac{1}{4}$ NE $\frac{1}{4}$ sec.36, T.10 N., R.11 W., Powell County, 500 ft upstream from mouth, 0.5 mile downstream from site of former gaging station and 0.8 mile southeast of Goldcreek. | 64.1                  | 1963-66+                          | 10-19-70                                                                                 | 16.3                                                       |
| Clark Fork                          | Columbia River | NW $\frac{1}{4}$ SW $\frac{1}{4}$ sec.25, T.10 N., R.11 W., Powell County, 0.4 mile north of Goldcreek, 1.1 mile downstream from Gold Creek.                                                       | -                     |                                   | 10-19-70                                                                                 | 486                                                        |
| Hoover Creek                        | Clark Fork     | NE $\frac{1}{4}$ NW $\frac{1}{4}$ sec.29, T.10 N., R.11 W., Powell County, at mouth at Jens.                                                                                                       | -                     |                                   | 10-19-70                                                                                 | c.5                                                        |
| Trout Creek                         | Flint Creek    | SW $\frac{1}{4}$ NE $\frac{1}{4}$ sec.5, T.5 N., R.14 W., Granite County, at bridge on State Highway 38, 3 miles southwest of Porters Corners.                                                     | -                     |                                   | 10-21-70                                                                                 | c11                                                        |
| Flint Creek                         | Clark Fork     | NE $\frac{1}{4}$ NW $\frac{1}{4}$ sec.26, T.7 N., R.14 W., Granite County, at county bridge, 0.5 mile west of Philipsburg.                                                                         | -                     |                                   | 10-21-70                                                                                 | 68.8                                                       |
| Flint Creek                         | Clark Fork     | SW $\frac{1}{4}$ NE $\frac{1}{4}$ sec.10, T.9 N., R.13 W., Granite County, 50 ft upstream from Douglas Creek, 150 ft upstream from bridge, 2.7 miles southwest of Hall.                            | -                     |                                   | 10-21-70                                                                                 | 130                                                        |
| Lower Willow Creek                  | Flint Creek    | NE $\frac{1}{4}$ NE $\frac{1}{4}$ NW $\frac{1}{4}$ sec.24, T.10 N., R.13 W., Granite County, 10 ft downstream from bridge on U.S. Highway 10A, 2.2 miles northwest of Hall.                        | -                     |                                   | 10-21-70                                                                                 | c13                                                        |
| Flint Creek                         | Clark Fork     | SE $\frac{1}{4}$ NE $\frac{1}{4}$ sec.6, T.10 N., R.12 W., Granite County, near mouth, 1 mile south of Drummond.                                                                                   | 499                   |                                   | 10-19-70                                                                                 | 190                                                        |
| Clark Fork<br>12331600              | Columbia River | SE $\frac{1}{4}$ NW $\frac{1}{4}$ SE $\frac{1}{4}$ sec.31, T.11 N., R.12 W., Granite County, at bridge on U.S. Highway 10A, 0.4 mile southwest of Drummond and at mile 417.0.                      | 2,378                 | 1967-68                           | 10-19-70<br>6-16-71<br>7-24-71<br>8-17-71<br>9-15-71                                     | 695<br>1,310<br>246<br>223<br>384                          |

See footnotes at end of table, p. 266

Discharge measurements made at miscellaneous sites during water year 1971

| Stream                              | Tributary to           | Location                                                                                                                                                                          | Drainage area (sq mi) | Measured previously (water years) | Measurements        |                 |
|-------------------------------------|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-----------------------------------|---------------------|-----------------|
|                                     |                        |                                                                                                                                                                                   |                       |                                   | Date                | Discharge (cfs) |
| Pend Oreille River basin--Continued |                        |                                                                                                                                                                                   |                       |                                   |                     |                 |
| Clark Fork                          | Columbia River         | NE $\frac{1}{4}$ SW $\frac{1}{4}$ sec.14, T.11 N., R.14 W., Granite County, at upstream side of bridge, 0.4 mile north of Bearmouth.                                              | -                     |                                   | 10-19-70<br>6-16-71 | 742<br>1,430    |
| Clark Fork                          | Columbia River         | SE $\frac{1}{4}$ NW $\frac{1}{4}$ sec.7, T.11 N., R.16 W., Missoula County, at downstream side of bridge, 1.2 miles upstream from Rock Creek, and 4.5 miles southwest of Clinton. | -                     |                                   | 10-19-70            | 792             |
| East Fork Rock Creek                | Middle Fork Rock Creek | SW $\frac{1}{4}$ NE $\frac{1}{4}$ sec.8, T.5 N., R.15 W., Granite County, 500 ft upstream from mouth, 9 miles southwest of Porters Corners.                                       | -                     |                                   | 10-22-70            | 19.2            |
| West Fork Rock Creek                | Middle Fork Rock Creek | SE $\frac{1}{4}$ SW $\frac{1}{4}$ sec.31, T.6 N., R.15 W., Granite County, just upstream from Ross Fork, 9.5 miles southwest of Porters Corners.                                  | -                     |                                   | 10-21-70            | 29.0            |
| Ross Fork                           | West Fork Rock Creek   | NE $\frac{1}{4}$ NW $\frac{1}{4}$ sec.6, T.5 N., R.15 W., Granite County, 400 ft upstream from mouth, 9.5 miles southwest of Porters Corners.                                     | -                     |                                   | 10-22-70            | 21.2            |
| Rock Creek                          | Clark Fork             | NE $\frac{1}{4}$ NE $\frac{1}{4}$ sec.30, T.6 N., R.15 W., Granite County, just downstream from Mallard Creek, 9 miles southwest of Porters Corners.                              | -                     |                                   | 10-22-70            | 116             |
| Willow Creek                        | Rock Creek             | SE $\frac{1}{4}$ NE $\frac{1}{4}$ sec.25, T.7 N., R.16 W., Granite County, at farm bridge 400 ft upstream from mouth, 11 miles west of Philipsburg.                               | -                     |                                   | 10-22-70            | 17.3            |
| Cornish Gulch                       | Rock Creek             | NW $\frac{1}{4}$ NE $\frac{1}{4}$ sec.35, T.7 N., R.16 W., Granite County, at Forest Service Route 102, 13 miles west of Philipsburg.                                             | -                     |                                   | 9-23-71             | 0               |
| Eureka Gulch                        | Rock Creek             | NW $\frac{1}{4}$ NW $\frac{1}{4}$ sec.35, T.7 N., R.16 W., Granite County, at Forest Service Route 102, 13.5 miles west of Philipsburg.                                           | -                     |                                   | 9-23-71             | 0               |
| Flat Gulch                          | Rock Creek             | SE $\frac{1}{4}$ SW $\frac{1}{4}$ sec.22, T.7 N., R.16 W., Granite County, at mouth, 14 miles west of Philipsburg.                                                                | -                     |                                   | 9-23-71             | 0               |
| Windlass Creek                      | Rock Creek             | SW $\frac{1}{4}$ SE $\frac{1}{4}$ sec.16, T.7 N., R.16 W., Granite County, at mouth, 15 miles west of Philipsburg.                                                                | -                     |                                   | 9-23-71             | 0               |
| Rock Creek                          | Clark Fork             | SW $\frac{1}{4}$ SE $\frac{1}{4}$ sec.17, T.7 N., R.16 W., Granite County, at log bridge, 0.2 mile downstream from Sheep Gulch, 15 miles west of Philipsburg.                     | -                     |                                   | 10-22-70            | 156             |
| Juno Gulch                          | Rock Creek             | SW $\frac{1}{4}$ NW $\frac{1}{4}$ sec.17, T.7 N., R.16 W., Granite County, at mouth, 16 miles west of Philipsburg.                                                                | -                     |                                   | 9-23-71             | 0               |
| Unnamed Creek                       | Rock Creek             | SW $\frac{1}{4}$ NE $\frac{1}{4}$ sec.7, T.7 N., R.16 W., Granite County, at mouth, 17 miles northwest of Philipsburg.                                                            | -                     |                                   | 9-23-71             | 0               |
| Unnamed Creek                       | Rock Creek             | NE $\frac{1}{4}$ NW $\frac{1}{4}$ sec.7, T.7 N., R.16 W., Granite County, at mouth, 16.5 miles south of Quigley.                                                                  | -                     |                                   | 9-23-71             | 0               |
| Williams Gulch                      | Rock Creek             | SW $\frac{1}{4}$ NE $\frac{1}{4}$ sec.1, T.7 N., R.17 W., Granite County, at mouth, 15.5 miles south of Quigley.                                                                  | -                     |                                   | 9-23-71             | 0               |
| Weasel Gulch                        | Rock Creek             | SE $\frac{1}{4}$ SE $\frac{1}{4}$ sec.27, T.8 N., R.17 W., Granite County, at mouth, 14 miles southwest of Quigley.                                                               | -                     |                                   | 9-23-71             | 0               |
| Unnamed Creek                       | Rock Creek             | NE $\frac{1}{4}$ SW $\frac{1}{4}$ sec.27, T.8 N., R.17 W., Granite County, at mouth, 14 miles southwest of Quigley.                                                               | -                     |                                   | 9-23-71             | 0               |

See footnotes at end of table, p. 266



Discharge measurements made at miscellaneous sites during water year 1971

| Stream                              | Tributary to | Location                                                                                                                                                        | Drainage area (sq mi) | Measured previously (water years) | Measurements |                 |
|-------------------------------------|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-----------------------------------|--------------|-----------------|
|                                     |              |                                                                                                                                                                 |                       |                                   | Date         | Discharge (cfs) |
| Pend Oreille River basin--Continued |              |                                                                                                                                                                 |                       |                                   |              |                 |
| Tindall Gulch                       | Rock Creek   | NW $\frac{1}{4}$ NW $\frac{1}{4}$ sec.27, T.8 N., R.17 W., Granite County, at mouth, 13.5 miles southwest of Quigley.                                           | -                     |                                   | 9-23-71      | 0               |
| Little Hogback Creek                | Rock Creek   | NE $\frac{1}{4}$ SW $\frac{1}{4}$ sec.17, T.8 N., R.17 W., Granite County, at mouth, 12.8 miles southwest of Quigley.                                           | -                     |                                   | 9-23-71      | 0               |
| Unnamed Creek                       | Rock Creek   | SW $\frac{1}{4}$ SE $\frac{1}{4}$ sec.31, T.9 N., R.17 W., Granite County, at mouth, 10.8 miles southwest of Quigley.                                           | -                     |                                   | 9-23-71      | 0               |
| Miller Gulch                        | Rock Creek   | SE $\frac{1}{4}$ SE $\frac{1}{4}$ sec.31, T.9 N., R.17 W., Granite County, at mouth, 10.5 miles southwest of Quigley.                                           | -                     |                                   | 9-23-71      | 0               |
| Unnamed Creek                       | Rock Creek   | NE $\frac{1}{4}$ SE $\frac{1}{4}$ SE $\frac{1}{4}$ sec.19, T.9 N., R.17 W., Granite County, at mouth, 9 miles southwest of Quigley.                             | -                     |                                   | 9-23-71      | 0               |
| Harrys Gulch                        | Rock Creek   | NE $\frac{1}{4}$ SE $\frac{1}{4}$ SE $\frac{1}{4}$ sec.17, T.9 N., R.17 W., Granite County, at mouth at Harrys Flat campground, 7.5 miles southwest of Quigley. | -                     |                                   | 9-23-71      | 0               |
| Pawnee Gulch                        | Rock Creek   | NW $\frac{1}{4}$ NW $\frac{1}{4}$ sec.16, T.9 N., R.17 W., Granite County, at mouth, 7.0 miles southwest of Quigley.                                            | -                     |                                   | 9-23-71      | 0               |
| Waho Gulch                          | Rock Creek   | SW $\frac{1}{4}$ SE $\frac{1}{4}$ sec.9, T.9 N., R.17 W., Granite County, at mouth, 6.5 miles southwest of Quigley.                                             | -                     |                                   | 9-23-71      | 0               |
| Unnamed Gulch                       | Rock Creek   | SE $\frac{1}{4}$ NE $\frac{1}{4}$ sec.9, T.9 N., R.17 W., Granite County, at mouth, 5.9 miles southwest of Quigley.                                             | -                     |                                   | 9-23-71      | 0               |
| Gratton Gulch                       | Rock Creek   | SW $\frac{1}{4}$ SE $\frac{1}{4}$ sec.35, T.10 N., R.17 W., Granite County, at mouth, 3.6 miles southwest of Quigley.                                           | -                     |                                   | 9-23-71      | 0               |
| Unnamed Creek                       | Rock Creek   | NE $\frac{1}{4}$ NE $\frac{1}{4}$ NW $\frac{1}{4}$ sec.30, T.10 N., R.16 W., Granite County, at mouth, 1.1 miles southwest of Quigley.                          | -                     |                                   | 9-23-71      | 0               |
| Hamm Gulch                          | Rock Creek   | SW $\frac{1}{4}$ NW $\frac{1}{4}$ SE $\frac{1}{4}$ sec.19, T.10 N., R.16 W., Granite County, at mouth, 0.7 mile southwest of Quigley.                           | -                     |                                   | 9-23-71      | 0               |
| Mecca Gulch                         | Rock Creek   | SW $\frac{1}{4}$ NE $\frac{1}{4}$ NE $\frac{1}{4}$ sec.18, T.10 N., R.16 W., Granite County, at mouth, 1.1 miles northwest of Quigley.                          | -                     |                                   | 9-23-71      | 0               |
| West Gulch                          | Rock Creek   | SE $\frac{1}{4}$ SE $\frac{1}{4}$ sec.7, T.10 N., R.16 W., Granite County, at mouth, 1.4 miles north of Quigley.                                                | -                     |                                   | 9-23-71      | 0               |
| Goat Creek                          | Rock Creek   | NE $\frac{1}{4}$ NE $\frac{1}{4}$ sec.7, T.10 N., R.16 W., Granite County, at mouth, 2 miles north of Quigley.                                                  | -                     |                                   | 9-23-71      | 0               |
| Lone Gulch                          | Rock Creek   | SE $\frac{1}{4}$ NW $\frac{1}{4}$ NE $\frac{1}{4}$ sec.7, T.10 N., R.16 W., Granite County, at mouth, 2.1 miles northwest of Quigley.                           | -                     |                                   | 9-23-71      | 0               |
| Unnamed Creek                       | Rock Creek   | NW $\frac{1}{4}$ NE $\frac{1}{4}$ NE $\frac{1}{4}$ sec.36, T.11 N., R.17 W., Missoula County, at mouth, 4.4 miles northwest of Quigley.                         | -                     |                                   | 9-23-71      | 0               |
| Tamarack Gulch                      | Rock Creek   | SE $\frac{1}{4}$ SW $\frac{1}{4}$ SE $\frac{1}{4}$ sec.25, T.11 N., R.17 W., Missoula County, at mouth, 4.6 miles northwest of Quigley.                         | -                     |                                   | 9-23-71      | 0               |
| Fiddler Gulch                       | Rock Creek   | NE $\frac{1}{4}$ NE $\frac{1}{4}$ sec.24, T.11 N., R.17 W., Missoula County, at mouth, 5.5 miles southeast of Clinton.                                          | -                     |                                   | 9-23-71      | 0               |

See footnotes at end of table, p. 266

## Discharge measurements made at miscellaneous sites during water year 1971

| Stream                              | Tributary to    | Location                                                                                                                                                                                                         | Drainage area (sq mi) | Measured previously (water years) | Measurements |                 |
|-------------------------------------|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-----------------------------------|--------------|-----------------|
|                                     |                 |                                                                                                                                                                                                                  |                       |                                   | Date         | Discharge (cfs) |
| Pend Oreille River basin--Continued |                 |                                                                                                                                                                                                                  |                       |                                   |              |                 |
| Rickard Gulch                       | Rock Creek      | SE $\frac{1}{4}$ SW $\frac{1}{4}$ sec.12, T.11 N., R.17 W., Missoula County, at mouth, 4.2 miles southeast of Clinton.                                                                                           | -                     |                                   | 9-23-71      | 0               |
| Rock Creek<br>12324510              | Clark Fork      | SW $\frac{1}{4}$ SE $\frac{1}{4}$ NW $\frac{1}{4}$ sec.12, T.11 N., R.17 W., Missoula County, at mouth, 3.7 miles southeast of Clinton.                                                                          | -                     |                                   | 10-19-70     | 273             |
| Clark Fork                          | Columbia River  | NW $\frac{1}{4}$ NW $\frac{1}{4}$ sec.1, T.12 N., R.18 W., Missoula County, 0.8 mile southeast of Turah, 4 miles southeast of Bonner.                                                                            | -                     | 1961                              | 10-19-70     | 1,160           |
| Cadotte Creek                       | Blackfoot River | SW $\frac{1}{4}$ NE $\frac{1}{4}$ SE $\frac{1}{4}$ sec.13, T.15 N., R.7 W., Lewis and Clark County, 0.4 mile upstream from State Highway 200, 0.5 mile upstream from mouth, and 13.8 miles northeast of Lincoln. | -                     | 1970                              | 10- 1-70     | 0               |
| Blackfoot River                     | Clark Fork      | SE $\frac{1}{4}$ SW $\frac{1}{4}$ SE $\frac{1}{4}$ sec.23, T.15 N., R.7 W., Lewis and Clark County, in center of campground, 0.4 mile downstream from First Gulch, and 12.5 miles northeast of Lincoln.          | -                     | 1970                              | 10- 1-70     | 5.49            |
| Willow Creek                        | Blackfoot River | NE $\frac{1}{4}$ NE $\frac{1}{4}$ SE $\frac{1}{4}$ sec.34, T.15 N., R.7 W., Lewis and Clark County, 150 ft upstream from mouth, 10.8 miles northeast of Lincoln.                                                 | -                     | 1970                              | 10- 1-70     | 1.52            |
| Alice Creek                         | Blackfoot River | SW $\frac{1}{4}$ NW $\frac{1}{4}$ SE $\frac{1}{4}$ sec.27, T.15 N., R.7 W., Lewis and Clark County, 300 ft upstream from bridge on State Highway 200, 11 miles northeast of Lincoln.                             | -                     | 1970                              | 10- 1-70     | 8.00            |
| Hardscrabble Creek                  | Blackfoot River | SE $\frac{1}{4}$ NW $\frac{1}{4}$ SE $\frac{1}{4}$ sec.33, T.15 N., R.7 W., Lewis and Clark County, 200 ft downstream from culverts in State Highway 200, 9.8 miles northeast of Lincoln.                        | -                     | 1970                              | 10- 1-70     | .92             |
| Blackfoot River                     | Clark Fork      | SE $\frac{1}{4}$ NW $\frac{1}{4}$ sec.13, T.14 N., R.8 W., Lewis and Clark County, 0.3 mile upstream from Landers Fork, 6 miles east of Lincoln.                                                                 | -                     |                                   | 10-21-70     | 15.2            |
| Landers Fork                        | Blackfoot River | SW $\frac{1}{4}$ NW $\frac{1}{4}$ sec.13, T.14 N., R.8 W., Lewis and Clark County, 200 ft upstream from mouth, 6 miles east of Lincoln.                                                                          | -                     | 1958, 1970                        | 10-21-70     | 36.1            |
| Blackfoot River                     | Clark Fork      | SE $\frac{1}{4}$ SW $\frac{1}{4}$ sec.24, T.14 N., R.9 W., Lewis and Clark County, at bridge on county road, 0.8 mile south of Lincoln.                                                                          | -                     |                                   | 10-21-70     | 10.2            |
| Poorman Creek                       | Blackfoot River | SE $\frac{1}{4}$ SE $\frac{1}{4}$ sec.36, T.14 N., R.9 W., Lewis and Clark County, 500 ft upstream from bridge on county road, 2.7 miles south of Lincoln.                                                       | -                     |                                   | 10- 3-70     | 3.79            |
| Humbug Creek                        | Poorman Creek   | NE $\frac{1}{4}$ SE $\frac{1}{4}$ SE $\frac{1}{4}$ sec.25, T.14 N., R.8 W., Lewis and Clark County, at county bridge, 1.6 miles southeast of Lincoln.                                                            | -                     |                                   | 10- 3-70     | 0               |
| Keep Cool Creek                     | Blackfoot River | SW $\frac{1}{4}$ NE $\frac{1}{4}$ sec.22, T.14 N., R.9 W., Lewis and Clark County, at State Highway 200, 1.8 miles west of Lincoln.                                                                              | -                     |                                   | 10-20-70     | 17.1            |
| Beaver Creek                        | Keep Cool Creek | SE $\frac{1}{4}$ NW $\frac{1}{4}$ sec.22, T.14 N., R.9 W., Lewis and Clark County, at State Highway 200, 2 miles west of Lincoln.                                                                                | -                     |                                   | 10-20-70     | c4              |
| Blackfoot River                     | Clark Fork      | NW $\frac{1}{4}$ NE $\frac{1}{4}$ sec.28, T.14 N., R.9 W., Lewis and Clark County, at bridge on county road to Dalton Mountain, 3.2 miles southwest of Lincoln.                                                  | -                     |                                   | 10-20-70     | 108             |
| Arrastra Creek                      | Blackfoot River | NE $\frac{1}{4}$ sec.30, T.14 N., R.10 W., Powell County, at State Highway 200, 6.2 miles northeast of Helmville.                                                                                                | -                     |                                   | 10-20-70     | 9.6             |

See footnotes at end of table, p. 266

Discharge measurements made at miscellaneous sites during water year 1971

| Stream                              | Tributary to               | Location                                                                                                                                                                                                                                       | Drainage area (sq mi) | Measured previously (water years) | Measurements |                 |
|-------------------------------------|----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-----------------------------------|--------------|-----------------|
|                                     |                            |                                                                                                                                                                                                                                                |                       |                                   | Date         | Discharge (cfs) |
| Pend Oreille River basin--Continued |                            |                                                                                                                                                                                                                                                |                       |                                   |              |                 |
| Blackfoot River<br>12335000         | Clark Fork                 | NW $\frac{1}{4}$ SW $\frac{1}{4}$ sec.25, T.14 N., R.11 W., Powell County, 50 ft downstream from highway bridge, 2 miles downstream from Armastra Creek, 5 miles northeast of Helmville, and at mile 76.4 at site of former gaging station.    | 481                   | 1940-53*, 1970                    | 10-20-70     | 150             |
| Douglas Creek                       | Nevada Creek               | SW $\frac{1}{4}$ SW $\frac{1}{4}$ sec.21, T.13 N., R.11 W., Powell County, at bridge on county road, 2 miles west of Helmville.                                                                                                                | -                     |                                   | 10-20-70     | c3              |
| Cottonwood Creek                    | Douglas Creek              | SE $\frac{1}{4}$ sec.21, T.13 N., R.11 W., Powell County, at county bridge, 1.2 miles west of Helmville.                                                                                                                                       | -                     |                                   | 10-20-70     | 0               |
| McElwain Creek                      | Nevada Creek               | SW $\frac{1}{4}$ sec.18, T.13 N., R.11 W., Powell County, at county bridge, 4 miles northwest of Helmville.                                                                                                                                    | -                     |                                   | 10-20-70     | c.5             |
| Nevada Creek                        | Blackfoot River            | NE $\frac{1}{4}$ SW $\frac{1}{4}$ sec.7, T.13 N., R.11 W., Powell County, 100 ft upstream from mouth, 4.2 miles northwest of Helmville.                                                                                                        | -                     |                                   | 10-20-70     | 52.5            |
| North Fork Blackfoot River          | Blackfoot River            | NE $\frac{1}{4}$ SE $\frac{1}{4}$ SE $\frac{1}{4}$ sec.10, T.14 N., R.12 W., Powell County, at county bridge, 0.9 mile upstream from Dry Gulch, 3 miles southeast of Ovando.                                                                   | -                     | 1940, 1970                        | 10-20-70     | 162             |
| Blackfoot River<br>12338500         | Clark Fork                 | SE $\frac{1}{4}$ NW $\frac{1}{4}$ sec.34, T.15 N., R.13 W., Powell County, 0.3 mile upstream from Monture Creek, 5 miles west of Ovando, and at mile 44.4 at site of former gaging station.                                                    | 1,274                 | 1940-63*, 1970                    | 10-20-70     | 384             |
| Monture Creek                       | Blackfoot River            | SE $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$ sec.27, T.15 N., R.13 W., Powell County, at mouth, 5 miles west of Ovando.                                                                                                                  | -                     |                                   | 10-20-70     | 46.1            |
| Cottonwood Creek                    | Blackfoot River            | NE $\frac{1}{4}$ SE $\frac{1}{4}$ NW $\frac{1}{4}$ sec.29, T.15 N., R.13 W., Powell County, 20 ft upstream from bridge on State Highway 200, 5 miles northeast of Clearwater.                                                                  | -                     |                                   | 10-20-70     | 31.6            |
| Blackfoot River<br>12339000         | Clark Fork                 | SE $\frac{1}{4}$ NW $\frac{1}{4}$ SW $\frac{1}{4}$ sec.16, T.14 N., R.14 W., Missoula County, 200 ft upstream from bridge, 300 ft upstream from Clearwater River, 2.5 miles southwest of Clearwater Junction at site of former gaging station. | 1,550                 | 1921-23*, 1970                    | 10-28-70     | 485             |
| Clearwater River<br>12339500        | Blackfoot River            | NE $\frac{1}{4}$ SW $\frac{1}{4}$ sec.16, T.14 N., R.14 W., Missoula County, 100 ft upstream from mouth, 2.5 miles southwest of Clearwater Junction near site of former gaging station.                                                        | 391                   | 1921-23*, 1948, 1970              | 10-20-70     | 79.7            |
| Blackfoot River<br>12339800         | Clark Fork                 | NW $\frac{1}{4}$ NW $\frac{1}{4}$ NE $\frac{1}{4}$ sec.25, T.14 N., R.16 W., Missoula County, 5 miles north of Potomac and about 0.5 mile upstream from former gaging station.                                                                 | 2,046                 | 1956-65*                          | 10-20-70     | 567             |
| Union Creek                         | Blackfoot River            | NE $\frac{1}{4}$ SW $\frac{1}{4}$ sec.6, T.13 N., R.16 W., Missoula County, at mouth, 5 miles northwest of Potomac.                                                                                                                            | -                     |                                   | 10-20-70     | c9              |
| Rattlesnake Creek<br>12341000       | Clark Fork                 | SW $\frac{1}{4}$ NE $\frac{1}{4}$ sec.22, T.13 N., R.19 W., Missoula County, at Vine Street Bridge in Missoula, 0.5 mile upstream from mouth, at site of former gaging station.                                                                | 79.7                  | 1899*, 1958-67*                   | 10-19-70     | c15             |
| Rombo Creek                         | West Fork Bitterroot River | NE $\frac{1}{4}$ SW $\frac{1}{4}$ NE $\frac{1}{4}$ sec.11, T.1 S., R.22 W., Ravalli County, on bridge on FAS Route 473, 13.5 miles southwest of Conner.                                                                                        | -                     |                                   | 10-21-70     | c2              |
| Nez Perce Fork                      | West Fork Bitterroot River | NW $\frac{1}{4}$ SW $\frac{1}{4}$ SE $\frac{1}{4}$ sec.25, T.1 N., R.22 W., Ravalli County, 0.2 mile upstream from mouth, 11.5 miles southwest of Conner.                                                                                      | -                     |                                   | 10-21-70     | 45.3            |

See footnotes at end of table, p. 266

## DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Discharge measurements made at miscellaneous sites during water year 1971

| Stream                                 | Tributary to               | Location                                                                                                                                                                                                            | Drainage area (sq mi) | Measured previously (water years) | Measurements |                 |
|----------------------------------------|----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-----------------------------------|--------------|-----------------|
|                                        |                            |                                                                                                                                                                                                                     |                       |                                   | Date         | Discharge (cfs) |
| Pend Oreille River basin--Continued    |                            |                                                                                                                                                                                                                     |                       |                                   |              |                 |
| Boulder Creek                          | West Fork Bitterroot River | NE $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$ sec.20, T.1 N., R.21 W., Ravalli County, 300 ft upstream from bridge on county road, 9.8 miles southwest of Conner.                                              | -                     |                                   | 10-21-70     | 18.1            |
| Piquett Creek                          | West Fork Bitterroot River | SW $\frac{1}{4}$ NW $\frac{1}{4}$ sec.3, T.1 N., R.21 W., Ravalli County, 0.3 mile upstream from FAS Route 473, 6 miles southwest of Conner.                                                                        | -                     |                                   | 10-21-70     | 7.58            |
| Trapper Creek                          | West Fork Bitterroot River | SW $\frac{1}{4}$ NW $\frac{1}{4}$ SE $\frac{1}{4}$ sec.27, T.2 N., R.21 W., Ravalli County, 300 ft upstream from FAS Route 473, 3.8 miles southwest of Conner.                                                      | -                     |                                   | 10-21-70     | 14.7            |
| West Fork Bitterroot River             | Clark Fork                 | NE $\frac{1}{4}$ NW $\frac{1}{4}$ NW $\frac{1}{4}$ sec.18, T.2 N., R.20 W., Ravalli County, 100 ft downstream from bridge on cutoff to Conner, 0.3 mile southwest of Conner.                                        | -                     | 1940-42, 1949                     | 10-20-70     | 207             |
| East Fork Bitterroot River<br>12343500 | Bitterroot River           | SE $\frac{1}{4}$ SE $\frac{1}{4}$ sec.7, T.2 N., R.20 W., Ravalli County, 200 ft downstream from highway bridge at Conner, 0.5 mile upstream from confluence with West Fork at site of former gaging station.       | 405                   | 1910-16, 1937-57                  | 10-20-70     | 106             |
| Rye Creek                              | Bitterroot River           | NE $\frac{1}{4}$ NW $\frac{1}{4}$ SW $\frac{1}{4}$ sec.31, T.3 N., R.20 W., Ravalli County, at bridge on U.S. Highway 93, 2.6 miles northwest of Conner.                                                            | -                     |                                   | 10-21-70     | 3.98            |
| Chaffin Creek                          | Bitterroot River           | NW $\frac{1}{4}$ NE $\frac{1}{4}$ SE $\frac{1}{4}$ sec.36, T.3 N., R.21 W., Ravalli County, at bridge on FAS Route 473, 3 miles northwest of Conner.                                                                | -                     |                                   | 10-21-70     | c4              |
| Tin Cup Creek                          | Bitterroot River           | NE $\frac{1}{4}$ SE $\frac{1}{4}$ SW $\frac{1}{4}$ sec.14, T.3 N., R.21 W., Ravalli County, at bridge on U.S. Highway 93, 0.7 mile south of Darby.                                                                  | -                     |                                   | 10-21-70     | 33.1            |
| Rock Creek                             | Bitterroot River           | SE $\frac{1}{4}$ SE $\frac{1}{4}$ SW $\frac{1}{4}$ sec.23, T.4 N., R.21 W., Ravalli County, at bridge on U.S. Highway 93, 0.6 mile southeast of Como.                                                               | -                     |                                   | 10-21-70     | 8.34            |
| Lost Horse Creek                       | Bitterroot River           | NW $\frac{1}{4}$ NW $\frac{1}{4}$ SW $\frac{1}{4}$ sec.11, T.4 N., R.21 W., Ravalli County, at bridge on U.S. Highway 93, 0.8 mile south of Charlos Heights.                                                        | -                     |                                   | 10-21-70     | 51.6            |
| Sleeping Child Creek                   | Bitterroot River           | SW $\frac{1}{4}$ SE $\frac{1}{4}$ NE $\frac{1}{4}$ sec.25, T.5 N., R.21 W., Ravalli County, at bridge on east side road, 2.6 miles northeast of Charlos Heights.                                                    | -                     |                                   | 10-21-70     | 11.4            |
| Bitterroot River<br>12346000           | Clark Fork                 | N $\frac{1}{2}$ SE $\frac{1}{4}$ SW $\frac{1}{4}$ sec.12, T.5 N., R.21 W., Ravalli County, 0.1 mile downstream from bridge on U.S. Highway 93, 1.2 miles southwest of Grantsdale, at site of former gaging station. | 1,414                 | 1902-7                            | 10-20-70     | 496             |
| Skalkaho Creek                         | Bitterroot River           | NE $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$ sec.6, T.5 N., R.20 W., Ravalli County, at bridge on U.S. Highway 93, 1 mile northwest of Grantsdale.                                                            | -                     |                                   | 10-21-70     | 37.6            |
| Blodgett Creek<br>12348000             | Bitterroot River           | NW $\frac{1}{4}$ SE $\frac{1}{4}$ sec.12, T.6 N., R.21 W., Ravalli County, at bridge on U.S. Highway 93, 1.5 miles upstream from mouth, 2.5 miles north of Hamilton at site of former gaging station.               | 29.2                  | 1938-43                           | 10-20-70     | 5.09            |
| Willow Creek                           | Bitterroot River           | NW $\frac{1}{4}$ NW $\frac{1}{4}$ sec.4, T.6 N., R.20 W., Ravalli County, at bridge on FAS Route 269, at Corvallis.                                                                                                 | -                     |                                   | 10-21-70     | c4              |
| Fred Burr Creek                        | Bitterroot River           | SW $\frac{1}{4}$ SE $\frac{1}{4}$ NW $\frac{1}{4}$ sec.19, T.7 N., R.20 W., Ravalli County, at bridge on U.S. Highway 93, 3 miles northwest of Corvallis.                                                           | -                     |                                   | 10-20-70     | 13.0            |
| North Channel Bear Creek               | Bitterroot River           | SW $\frac{1}{4}$ NW $\frac{1}{4}$ SE $\frac{1}{4}$ sec.31, T.8 N., R.20 W., Ravalli County, at bridge on U.S. Highway 93, 0.8 mile south of Victor.                                                                 | -                     |                                   | 10-19-70     | c.1             |

See footnotes at end of table, p. 266

Discharge measurements made at miscellaneous sites during water year 1971

| Stream                              | Tributary to     | Location                                                                                                                                                                                             | Drainage area (sq mi) | Measured previously (water years) | Measurements |                 |
|-------------------------------------|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-----------------------------------|--------------|-----------------|
|                                     |                  |                                                                                                                                                                                                      |                       |                                   | Date         | Discharge (cfs) |
| Pend Oreille River basin--Continued |                  |                                                                                                                                                                                                      |                       |                                   |              |                 |
| South Channel Bear Creek            | Bitterroot River | SW $\frac{1}{4}$ SE $\frac{1}{4}$ sec.6, T.7 N., R.20 W., Ravalli County, at bridge on U.S. Highway 93, 2.2 miles south of Victor.                                                                   | -                     |                                   | 10-19-70     | c.3             |
| Sweathouse Creek                    | Bitterroot River | NW $\frac{1}{4}$ SW $\frac{1}{4}$ NE $\frac{1}{4}$ sec.30, T.8 N., R.20 W., Ravalli County, at bridge on U.S. Highway 93, 0.7 mile north of Victor.                                                  | -                     |                                   | 10-20-70     | 5.15            |
| Unnamed Creek                       | Bitterroot River | SE $\frac{1}{4}$ SE $\frac{1}{4}$ NE $\frac{1}{4}$ sec.19, T.8 N., R.20 W., Ravalli County, at bridge on U.S. Highway 93, 1.4 miles north of Victor.                                                 | -                     |                                   | 10-20-70     | 4.15            |
| Bitterroot River                    | Clark Fork       | SE $\frac{1}{4}$ sec.17, T.8 N., R.20 W., Ravalli County, at bridge on State Secondary Road 447, at Bell Crossing, 2.5 miles northeast of Victor.                                                    | 1,963                 | 1969                              | 10-21-70     | 701             |
| Big Creek                           | Bitterroot River | NW $\frac{1}{4}$ NW $\frac{1}{4}$ SW $\frac{1}{4}$ sec.17, T.8 N., R.20 W., Ravalli County, at bridge on U.S. Highway 93, 2.3 miles northeast of Victor.                                             | -                     |                                   | 10-20-70     | 6.21            |
| Kootenai Creek                      | Bitterroot River | SW $\frac{1}{4}$ SW $\frac{1}{4}$ SE $\frac{1}{4}$ sec.21, T.9 N., R.20 W., Ravalli County, at bridge on U.S. Highway 93, 1.5 miles northwest of Stevensville.                                       | -                     |                                   | 10-20-70     | 10.9            |
| McCalla Creek                       | Kootenai Creek   | NW $\frac{1}{4}$ NW $\frac{1}{4}$ NE $\frac{1}{4}$ sec.28, T.9 N., R.20 W., Ravalli County, at bridge on U.S. Highway 93, 1.5 miles northwest of Stevensville.                                       | -                     |                                   | 10-20-70     | 7.94            |
| Bass Creek                          | Bitterroot River | SE $\frac{1}{4}$ SW $\frac{1}{4}$ SE $\frac{1}{4}$ sec.34, T.10 N., R.20 W., Ravalli County, at bridge on U.S. Highway 93, 4 miles south of Florence.                                                | -                     |                                   | 10-20-70     | c2              |
| Threemile Creek                     | Bitterroot River | NE $\frac{1}{4}$ SW $\frac{1}{4}$ sec.1, T.9 N., R.20 W., Ravalli County, at bridge on FAS Route 269, 4.6 miles southeast of Florence.                                                               | -                     |                                   | 10-20-70     | c26             |
| One Horse Creek                     | Bitterroot River | NE $\frac{1}{4}$ SE $\frac{1}{4}$ sec.22, T.10 N., R.20 W., Ravalli County, at bridge on U.S. Highway 93, 0.5 mile south of Florence.                                                                | -                     |                                   | 10-19-70     | c.2             |
| Bitterroot River<br>12351200        | Clark Fork       | South line of SE $\frac{1}{4}$ sec.12, T.10 N., R.20 W., Ravalli County, at bridge on FAS Route 269, 1.3 miles east of Florence, at mile 24.6, 1,000 ft upstream from site of former gaging station. | 2,354                 | 1957-65+                          | 10-20-70     | 993             |
| Lolo Creek                          | Bitterroot River | SW $\frac{1}{4}$ SW $\frac{1}{4}$ sec.35, T.12 N., R.20 W., Missoula County, at bridge on U.S. Highway 93, 0.5 mile south of Lolo.                                                                   | -                     |                                   | 10-20-70     | 53.0            |
| Bitterroot River<br>12352980        | Clark Fork       | SE $\frac{1}{4}$ SE $\frac{1}{4}$ sec.27, T.13 N., R.20 W., Missoula County, 0.2 mile upstream from MacLay Bridge, 5.2 miles west of Missoula.                                                       | 2,850                 | 1960                              | 10-20-70     | 1,130           |
| Mill Creek                          | Clark Fork       | NE $\frac{1}{4}$ SW $\frac{1}{4}$ sec.35, T.15 N., R.21 W., Missoula County, at culvert in old U.S. Highway 10, at Frenchtown.                                                                       | -                     |                                   | 10-19-70     | c9              |
| Ninemile Creek                      | Clark Fork       | NW $\frac{1}{4}$ SW $\frac{1}{4}$ sec.28, T.15 N., R.22 W., Missoula County, 0.2 mile upstream from mouth, 1.2 miles northeast of Ninemile.                                                          | -                     |                                   | 10-19-70     | 34.2            |
| Clark Fork<br>12353300              | Columbia River   | Near southeast corner of sec.1, T.14 N., R.23 W., Missoula County, 0.3 mile upstream from Petty Creek, and 1.8 miles east of Alberton.                                                               | 9,272                 | 1959-63+                          | 10-19-70     | 3,270           |
| Petty Creek                         | Clark Fork       | NW $\frac{1}{4}$ NE $\frac{1}{4}$ sec.12, T.14 N., R.23 W., Missoula County, 300 ft upstream from mouth, 1.3 miles southeast of Alberton.                                                            | -                     |                                   | 10-19-70     | 18.4            |
| Fish Creek                          | Clark Fork       | NE $\frac{1}{4}$ NE $\frac{1}{4}$ sec.1, T.14 N., R.25 W., Mineral County, 200 ft downstream from Fish Creek Road, 3 miles east of Tarkio.                                                           | 258                   | 1948, 1954                        | 10-19-70     | 111             |

See footnotes at end of table, p. 266



## DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Discharge measurements made at miscellaneous sites during water year 1971

| Stream                              | Tributary to                     | Location                                                                                                                                                                                                            | Drainage area (sq mi) | Measured previously (water years) | Measurements                                                    |                                           |
|-------------------------------------|----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-----------------------------------|-----------------------------------------------------------------|-------------------------------------------|
|                                     |                                  |                                                                                                                                                                                                                     |                       |                                   | Date                                                            | Discharge (cfs)                           |
| Pend Oreille River basin--Continued |                                  |                                                                                                                                                                                                                     |                       |                                   |                                                                 |                                           |
| Nemote Creek                        | Clark Fork                       | SE $\frac{1}{4}$ SE $\frac{1}{4}$ sec.16, T.15 N., R.25 W., Mineral County, at Interstate Highway 90, 2.5 miles northwest of Tarkio.                                                                                | -                     |                                   | 10-22-70                                                        | c.2                                       |
| Trout Creek                         | Clark Fork                       | SW $\frac{1}{4}$ SE $\frac{1}{4}$ sec.14, T.16 N., R.26 W., Mineral County, at old highway bridge, 4.3 miles southeast of Superior.                                                                                 | -                     |                                   | 10-19-70                                                        | 30.1                                      |
| Cedar Creek                         | Clark Fork                       | SW $\frac{1}{4}$ NE $\frac{1}{4}$ sec.3, T.16 N., R.26 W., Mineral County, 75 ft downstream from Burlington-Northern railroad bridge, 1.6 miles southeast of Superior.                                              | -                     |                                   | 10-19-70                                                        | 5.78                                      |
| Clark Fork                          | Columbia River                   | NW $\frac{1}{4}$ NE $\frac{1}{4}$ sec.34, T.17 N., R.26 W., Mineral County, at bridge at Superior.                                                                                                                  | -                     | 1968                              | 10-19-70                                                        | 3,550                                     |
| Bowman Creek                        | Flathead River                   | NE $\frac{1}{4}$ NE $\frac{1}{4}$ sec.22, T.35 N., R.21 W., Flathead County, Glacier National Park, at bridge on Glacier Route 7, 800 ft north of Polebridge ranger station, 1.4 miles north of Polebridge.         | -                     | 1970                              | 11- 5-70<br>1-29-71<br>5- 7-71<br>6-16-71<br>7-28-71<br>9- 8-71 | 25.4<br>31.1<br>489<br>479<br>330<br>84.7 |
| Quartz Creek                        | Flathead River                   | NE $\frac{1}{4}$ NE $\frac{1}{4}$ SW $\frac{1}{4}$ sec.7, T.34 N., R.20 W., Flathead County, Glacier National Park, at bridge on Glacier Route 7, at Quartz Creek campground, 3.9 miles southeast of Polebridge.    | -                     | 1970                              | 11- 3-70<br>5- 7-71<br>6-16-71<br>7-28-71<br>9- 8-71            | 15.6<br>511<br>335<br>225<br>63.8         |
| McDonald Creek<br>12358000          | Middle Fork<br>Flathead<br>River | NE $\frac{1}{4}$ SE $\frac{1}{4}$ NW $\frac{1}{4}$ sec.23, T.32 N., R.19 W., Flathead County, Glacier National Park, at bridge on Glacier Route 7, at Apgar at about site of former gaging station.                 | 175                   | 1912-14;<br>1970                  | 11- 5-70<br>1- 8-71<br>5-17-71<br>7-30-71<br>9- 8-71            | 112<br>124<br>2,680<br>1,170<br>285       |
| Bull River<br>12391500              | Clark Fork                       | NE $\frac{1}{4}$ NW $\frac{1}{4}$ sec.21, T.28 N., R.33 W., Sanders County, at downstream side of road bridge, 0.4 mile upstream from Berray Creek, 9.7 miles northwest of Heron, and 16 miles upstream from mouth. | -                     |                                   | 11-17-70<br>5- 4-71                                             | 56.8<br>686                               |

\* Operated as a continuous-record gaging station.

++ Operated as crest-stage gaging station.

a Measured in two channels.

b Approximately.

c Estimate.

d Slope-area measurement.

e Previously published as Sand Creek Coulee.

f Not measured every year and published only for 1940, 1943-44.

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| Absarokee, Stillwater River near . . . . .                         | 145     | Big Sheep Creek below Muddy Creek, near Dell . . . . .            | 238        |
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| Augusta, Gibson Reservoir near . . . . .                           | 182,186 | at Clearwater . . . . .                                           | 263        |
| Nilan Reservoir near . . . . .                                     | 182,186 | at Dalton Mountain Road, near Lincoln . . . . .                   | 262        |
| Pishkun Reservoir near . . . . .                                   | 182,186 | at Lincoln . . . . .                                              | 262        |
| Sun River near . . . . .                                           | 49,50   | below Alice Creek, near Lincoln . . . . .                         | 205        |
| Willow Creek Reservoir near . . . . .                              | 182,186 | below First Gulch, near Lincoln . . . . .                         | 262        |
| Babb, St. Mary Canal near . . . . .                                | 20      | near Bonner . . . . .                                             | 207        |
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| Badger Creek near Browning . . . . .                               | 59      | near Potomac . . . . .                                            | 263        |
| Bair Reservoir near Delpine . . . . .                              | 183,186 | North Fork, above Dry Gulch, near Ovando . . . . .                | 263        |
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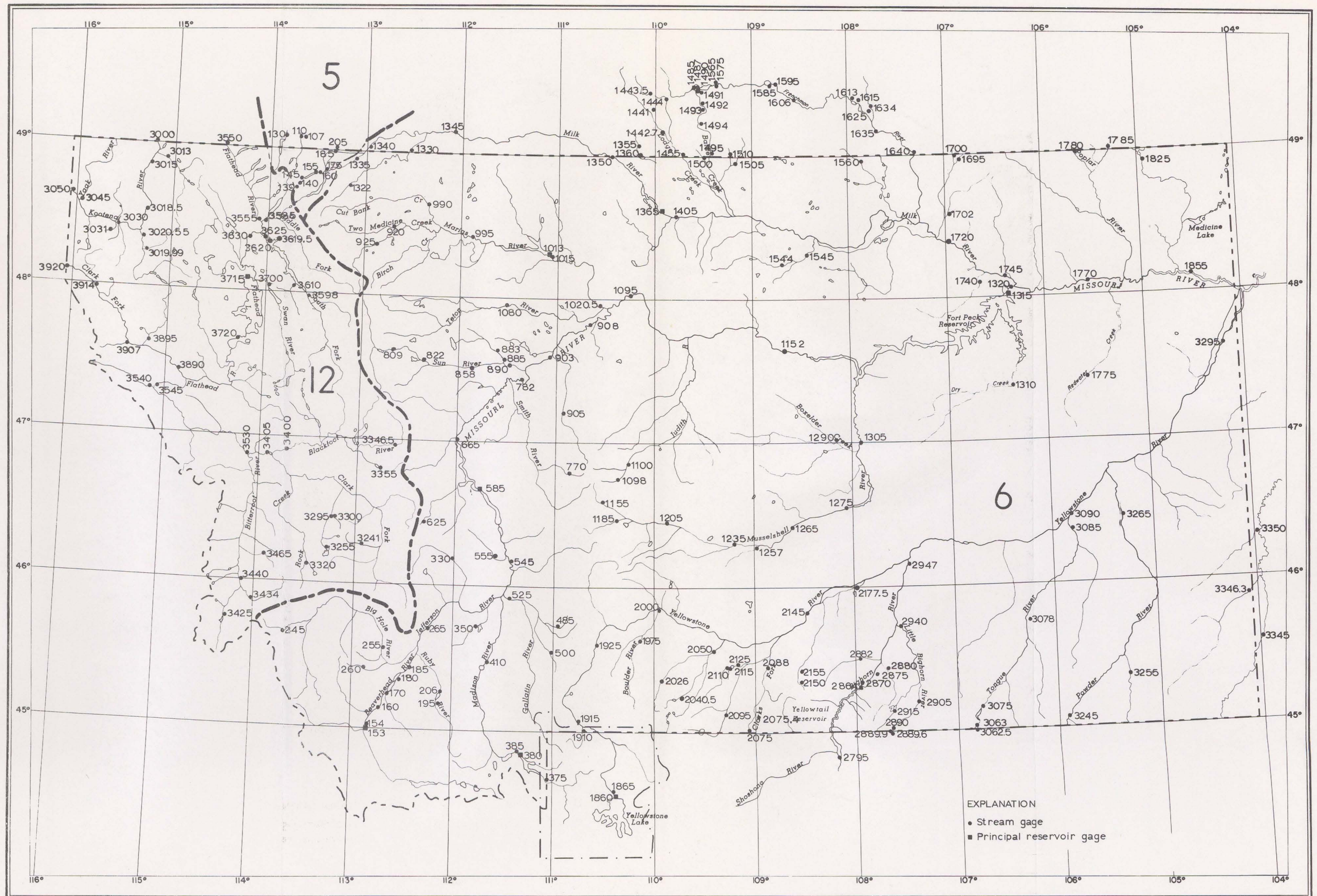


Figure 2.-- Map of Montana showing location of gaging stations.





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