

# **Water Resources Data Montana Water Year 2003**

## **Volume 1. Hudson Bay and Upper Missouri River Basins**

By Wayne R. Berkas, Melvin K. White, Patricia B. Ladd, Fred A. Bailey, and Kent A. Dodge

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## PREFACE

In the act that established the U.S. Geological Survey more than a century ago, the agency was charged by Congress with the responsibility for "...classification of the public lands, and examination of the geologic structure, mineral resources, and products of the national domain." This charge was simple recognition of the principle that factual information is essential to sound development and management decisions involving natural resources. In keeping with this principle, the Water Resources Division of the Survey publishes annually, by district, hydrologic records for water resources thought to be of particular usefulness to the public and to the scientific community.

This report is the culmination of a concerted effort by dedicated personnel of the U.S. Geological Survey, who collected, compiled, analyzed, verified, and organized the data, and who typed, edited, and assembled the report. In addition to the authors, who had primary responsibility for assuring that the information contained herein is accurate, complete, and adheres to Geological Survey policy and established guidelines, the following individuals contributed significantly to the collection, processing, and tabulation of the data:

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## INTRODUCTION

The U.S. Geological Survey (USGS), in cooperation with other Federal, State, and local agencies and Tribal governments, collects a large amount of data pertaining to the water resources of Montana each water year. These data, accumulated over many years, constitute a valuable data base for developing an improved understanding of the water resources of the State. To make these data readily available to interested parties outside the USGS, the data are published annually, by water year, in this report series entitled, "Water Resources Data, Montana."

This report, volumes 1 and 2, includes records on both surface and ground water from stations within the State and selected stations near the Montana border in adjacent states and Canada. Specifically, it contains (1) discharge records for 246 streamflow-gaging stations; (2) stage or content records for 9 lakes and large reservoirs and content records for 31 smaller reservoirs; (3) water-quality records for 143 stream sites (45 unaged), 7 ground-water wells, and 3 lake sites; (4) water-level records for 53 observation wells; and (5) precipitation and water-quality records for 2 atmospheric-deposition stations

Volume 1 contains discharge records for 132 streamflow-gaging stations; stage or content records for 5 lakes and large reservoirs and content records for 5 smaller reservoirs; and water-quality records for 66 stream sites (34 unaged) and 7 wells.

Volume 2 contains discharge records for 114 streamflow-gaging stations; stage or content records for 4 lakes and large reservoirs and content records for 26 smaller reservoirs; water-quality records for 77 stream sites (11 unaged) and 3 lake sites; water-level records for 53 observation wells; and precipitation and water-quality records for 2 atmospheric-deposition stations.

Additional data for water year 2003 were collected at crest-stage gage and miscellaneous-measurement sites but are not published in this report. These data are stored within files in the USGS office in Helena and are available on request. The locations of streamflow-gaging stations are shown later in the report in figure 6, locations of water-quality stations are shown in figure 7, and locations of observation wells are shown in figure 8.

Records of discharge or stage of streams and contents or stage of lakes and reservoirs were first published in a series of USGS Water-Supply Papers entitled "Surface Water Supply of the United States." These Water-Supply Papers were published in an annual series for water years 1899-1960 and then in a 5-year series for water years 1961-65 and 1966-70. Records of chemical quality, water temperatures, and suspended sediment were published from 1941 to 1970 in an annual series of Water-Supply Papers entitled "Quality of Surface Waters of the United States." Records of ground-water levels were published from 1935 to 1974 in a series of

Water-Supply Papers entitled "Ground-Water Levels in the United States." Water-Supply Papers may be reviewed in the libraries of the principal cities of the United States or may be purchased from USGS, Branch of Information Services, Box 25286, Denver, Colorado 80225. For water years 1961 through 1970, streamflow data were published by the USGS in annual reports for each State. Water-quality records for water years 1964 through 1970 were similarly published either in separate reports or in conjunction with streamflow records. Beginning with the 1971 water year, data for streamflow, water quality, and ground water are published as a single or multi-volume USGS annual water-data report for each State. These reports carry an identification number consisting of the two-letter State abbreviation, the last two digits of the water year, and the volume number. For example, this volume is identified as "U.S. Geological Survey Water-Data Report MT-03-1." These water-data reports are for sale, in paper copy or on microfiche, by the National Technical Information Service, U.S. Department of Commerce, Springfield, VA 22161, telephone 1-800-553-6847.

Water-resources information for Montana and the rest of the Nation are available through the World Wide Web as part of the USGS National Water-Information System (NWIS) at:

*<http://waterdata.usgs.gov/nwis>*

For Montana, this information includes surface-water, water-quality, and ground-water data. Surface-water information available from the USGS includes provisional real-time streamflow data for stations with satellite telemetry, provisional daily data for the previous 18 months, and daily data for the period of record at each site. Daily, monthly, and annual streamflow statistics also are available as well as annual peak streamflow data. In addition, flood-frequency and basin-characteristics information for selected sites in Montana is available at:

*<http://mt.water.usgs.gov/freq>*

Water-quality information available from the USGS includes provisional real-time specific-conductance and water-temperature data for selected sites with satellite telemetry and historical water-quality data for many surface- and ground-water sites in Montana. Ground-water information available from the USGS includes descriptive information for wells, springs, and test holes such as location (latitude and longitude), well depth, site use, water levels, and aquifer.

Additional information, including current prices, for ordering specific reports may be obtained from the District Chief at the address given on the back of the title page or by telephone at (406) 457-5900 or 1-888-ASK-USGS.

## COOPERATION

The USGS has had cooperative agreements with other agencies and organizations for the systematic collection of streamflow records since 1906, for water-quality records since 1946, and for ground-water levels since 1964. In water year 2003, agencies and organizations that supported data collection through cooperative agreements with the USGS are:

### Federal Agencies

- Bonneville Power Administration
- Bureau of Indian Affairs
- Bureau of Land Management
- Bureau of Reclamation
- Department of State, International Joint Commission
- National Park Service
- U.S. Army Corps of Engineers
- U.S.D.A. Forest Service
- U.S. Environmental Protection Agency
- U.S. Fish and Wildlife Service
- U.S. Geological Survey

### Tribal Governments

- Blackfeet Nation
- Chippewa Cree Tribe of the Rocky Boy's Reservation
- Confederated Salish and Kootenai Tribes of the Flathead Reservation
- Crow Tribe
- Fort Peck Tribes
- Northern Cheyenne Tribe

### State Agencies

- Montana Bureau of Mines and Geology
- Montana Department of Environmental Quality
- Montana Department of Fish, Wildlife and Parks
- Montana Department of Natural Resources and Conservation
- Montana Department of Transportation
- Montana School of Technology of the University of Montana
- Wyoming Department of Environmental Quality
- Wyoming State Engineer

### Federal Energy Regulatory Commission Licensees

- Avista Corporation
- Pacific Power and Light

### Local Agencies

- Cascade County Conservation District
- City of Bozeman
- East Bench Irrigation District
- Lewis and Clark County Water Quality Protection District
- Lower Musselshell Conservation District
- Lower Yellowstone Irrigation Project
- North Powell Conservation District
- Teton County Conservation District

## GENERAL HYDROLOGIC SETTING

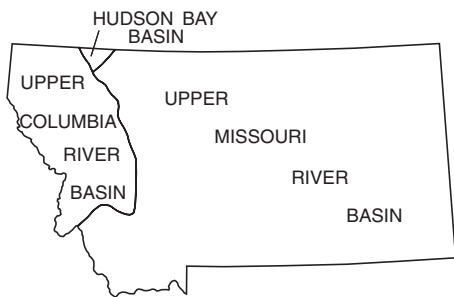
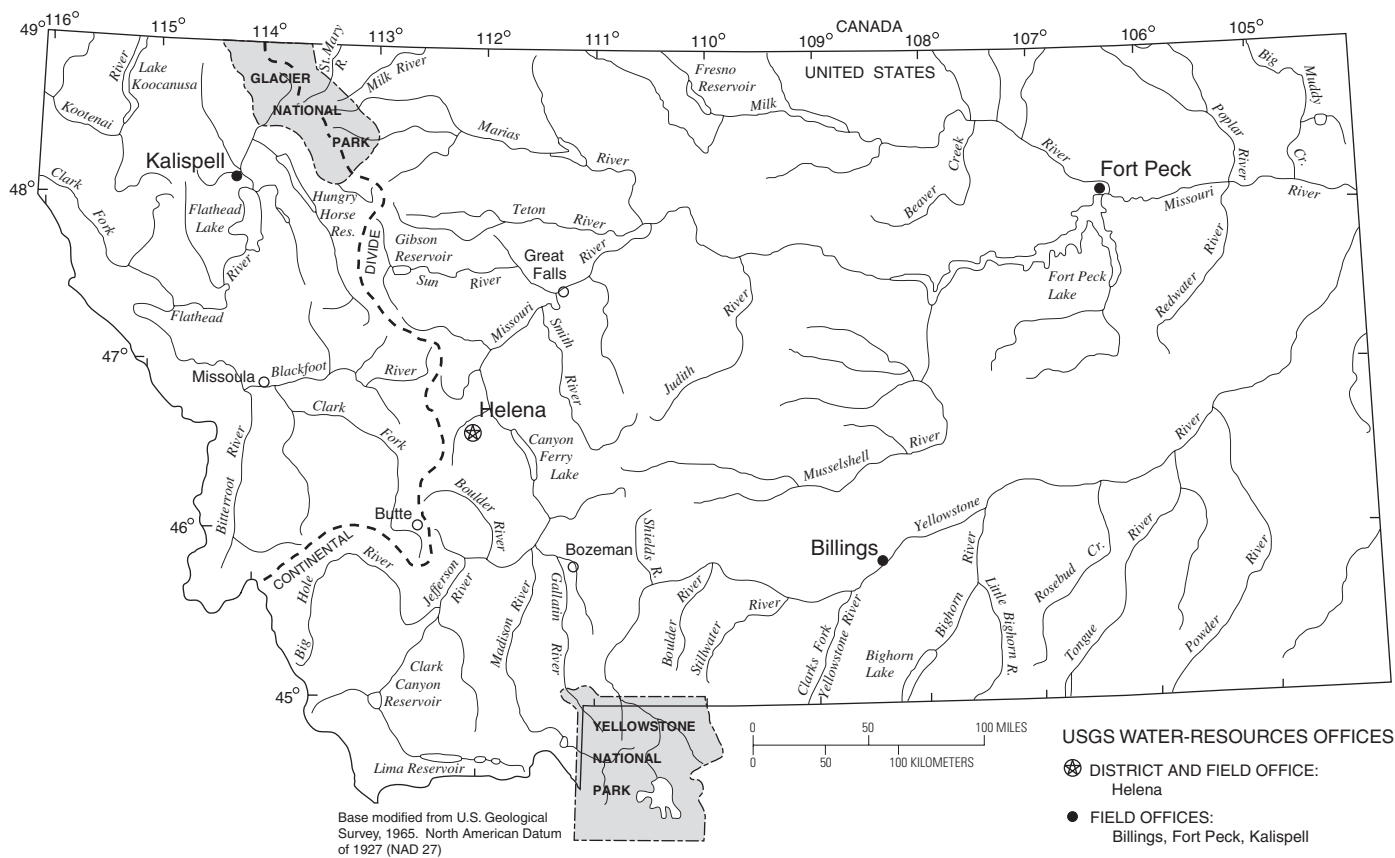
Montana, with an area of about 147,200 square miles ( $\text{mi}^2$ ), is the fourth largest State in the Union (fig. 1). The major drainage basins in the State are the Hudson Bay basin ( $465 \text{ mi}^2$ ) and the upper Missouri River basin ( $120,700 \text{ mi}^2$ ) east of the Continental Divide, and the upper Columbia River basin ( $26,000 \text{ mi}^2$ ) west of the divide. The Hudson Bay and upper Missouri River basins drain about 82 percent of the State and provide slightly less than 50 percent of the total streamflow. The upper Columbia River basin drains about 18 percent of the State and provides about 50 percent of the total streamflow.

The western and southwestern parts of the State are in the Northern and Middle Rocky Mountains physiographic provinces. The central and eastern parts are in the Great Plains physiographic province. The Northern and Middle Rocky Mountains are characterized by rugged mountains and intermontane valleys, whereas the Great Plains consists of rolling to dissected plains and small mountain ranges. Altitude in Montana ranges from more than 12,000 feet in the mountains northeast of Yellowstone National Park to about 1,850 feet where the Kootenai River flows from the northwestern part of the State.

Climate and hydrologic conditions differ substantially across the State. Annual precipitation varies considerably throughout the basins, from about 100-120 inches along the Continental Divide in Glacier National Park to about 6-12 inches in parts of eastern and south-central Montana and in some of the western intermontane valleys. The diverse precipitation patterns in Montana result from the effects of geographic and topographic features on warm, moist air from either the Gulf of Mexico or the Pacific Ocean. In mountainous areas, much of the annual precipitation falls as snow during the winter. Although much of the annual precipitation on the Great Plains also falls as snow during the winter, intense rainstorms during the summer can add substantial quantities of precipitation to the annual totals in a short time. In areas east of the mountains, generally one-half of the annual precipitation falls from May through July.

Peak runoff from the basins can result from spring snowmelt, snowmelt mixed with rain, or intense rainfall. In addition, backwater from ice jams commonly creates flooding in many rivers throughout the State. The record flood of April 1952 in northeastern Montana is an example of spring snowmelt flooding. The flood in May 1981 in west-central Montana is an example of flooding caused by snowmelt mixed with rain. The floods of June 1964, June 1975, and May 1978 are examples of flooding predominantly caused by intense rainfall. Flash floods, although restricted in areal extent, are at times numerous in the north-central and eastern parts of the State. In many areas, peak runoff is stored in reservoirs to decrease flooding. The stored water is used for irrigation (the predominant consumptive use of water statewide), power generation, and recreation.

WATER RESOURCES DATA FOR MONTANA, 2003



DRAINAGE BASINS



PHYSIOGRAPHIC PROVINCES

Figure 1. General geographic features of Montana.

Surface water throughout the State generally is suitable for most uses except in parts of eastern Montana where, because of large concentrations of dissolved solids and some individual constituents, recommended standards or criteria for domestic and agricultural uses may be exceeded. The ionic composition of surface water is largely influenced by geology and can vary markedly between the western mountains and the eastern plains. In the western mountains, where the rocks generally are older and resistant to weathering, the streamflow characteristically is a calcium bicarbonate type. The dissolved-solids concentrations in mountain streams seldom exceed 500 milligrams per liter (mg/L), even during base-flow conditions. In the eastern plains, where sedimentary rocks are less resistant to weathering, streamflow commonly is a sodium sulfate type, with dissolved-solids concentrations ranging from about 100 to 8,000 mg/L. In the northeastern part of the State, streamflow typically is a sodium bicarbonate type. Snowmelt and intense rainstorms sometimes produce large quantities of runoff that can dilute concentrations of dissolved solids, modify chemical compositions, and increase concentrations of suspended sediment.

The availability and quality of ground water in Montana are largely controlled by the hydraulic and geochemical properties of diverse rocks and sediments. In western Montana, ground water is available from alluvium along streams and rivers, from basin fill in intermontane valleys, from glacial deposits, and from fractured consolidated rocks. In eastern Montana, ground water is available from alluvial deposits along larger rivers and streams and from sedimentary rocks. Outside of the alluvial valleys, ground-water availability in sedimentary rock is variable. Throughout Montana, alluvial deposits along streams generally are the most productive aquifers, and yields to wells along the major streams may be several hundred gallons per minute. Alluvium can be readily recharged by precipitation, by streams during periods of high flow, and by applied irrigation water. The particle size distribution and sorting of glacial deposits largely determines their potential for yielding water to wells. Where coarse, well-sorted outwash gravels are present, the potential for developing large-yield wells is good, whereas yields from wells completed in poorly sorted glacial till generally are limited to a few gallons per minute. Many fractured consolidated-rock formations yield water but, because of the complexity of the geology, fractured rocks might not yield water in all areas. Wells completed in consolidated rocks generally yield only a few gallons per minute. However, several hundred gallons per minute can be obtained from highly fractured or cavernous formations in some areas. The well depth required to reach a given aquifer varies with location.

## HYDROLOGIC-MONITORING ACTIVITY

Nine streamflow-gaging stations were established or reestablished during water year 2003 to aid in the assessment of the State's water resources. The stations are:

06036905 Firehole River near West Yellowstone  
 06037100 Gibbon River at Madison Junction,  
 Yellowstone National Park  
 06119600 Musselshell River near Martinsdale  
 06190540 Boiling River at Mammoth, Yellowstone  
 National Park  
 06327500 Yellowstone River at Glendive  
 12323700 Mill Creek at Opportunity  
 12323720 Willow Creek at Opportunity  
 12323850 Lost Creek near Galen  
 12351200 Bitterroot River near Florence

Three water-quality stations were reestablished in the Tongue River and Rosebud Creek basins near the end of water year 2003 to supplement information in an area of potential coal-bed methane development. These stations are:

06295113 Rosebud Creek at reservation boundary, near Kirby  
 06307600 Hanging Woman Creek near Birney  
 06307740 Otter Creek at Ashland

Nine miscellaneous surface-water-quality stations were established during water year 2003 to obtain data to characterize the baseline water-quality in an area with the potential for development of coal-bed methane resources. These stations are:

445729106573501 Ash Creek above mouth, near Acme,  
 Wyo.  
 445832106551401 Youngs Creek above mouth, near  
 Decker  
 450047106514201 Squirrel Creek above mouth, at  
 Decker  
 450137106595101 Youngs Creek near reservation  
 boundary, near Decker  
 450124106585101 Tanner Creek near mouth, near  
 Decker  
 451302106583201 Rosebud Creek near Battlefield, near  
 Kirby  
 451618106590001 Indian Creek at mouth, near Kirby  
 452800107001101 Thompson Creek near Busby  
 453021107000001 Davis Creek near Busby

Water-quality sampling continued at surface-water sites and ground-water wells that were established in 2002 in the headwaters of Tenmile Creek and Basin Creek near a repository (Luttrell Repository) where mine wastes and mill tailings from nearby abandoned-mine sites are being placed for long-term storage. The sampling of streams and ground water in the area surrounding the repository is intended to detect potential migration of contaminants from the disposal area. Ten surface-water stations and seven ground-water wells were sampled for this study during water year 2003. Seven new surface-water stations were established for the study in 2003:

462442112174601 Grub Creek above confluence with unnamed tributary, near Rimini  
 462442112174602 Unnamed Tributary to Grub Creek at mouth, SS No. 6, near Rimini  
 462458112173201 Unnamed Tributary to Grub Creek, SS No. 5, near Rimini  
 462542112173101 Monitor Creek, SS No. 12 (below SS No. 1), near Rimini  
 462544112162001 Ruby Creek, RC2A, above Scott Reservoir, near Rimini  
 462720112165101 Tenmile Creek above confluence with Monitor Creek, near Rimini  
 462721112164801 Monitor Creek at mouth, near Rimini

462520112165601 Ruby Creek No. 1A above Scott Reservoir, near Rimini  
 462527112175201 Tenmile Creek at headwaters, near Rimini  
 462529112173301 Monitor Creek, SS No. 8, near Rimini  
 462531112172901 Monitor Creek, SS MS, near Rimini  
 462535112173601 Monitor Creek, SS No. 11, near Rimini  
 462537112173301 Monitor Creek, SS No. 10, near Rimini  
 462538112163301 Ruby Creek No. 2 above Scott Reservoir, near Rimini  
 462541112172001 Monitor Creek Adit near Rimini  
 462542112173301 Monitor Creek, 5-MC, near Rimini  
 462549112161401 Ruby Creek No. 3 above Scott Reservoir, near Rimini

Three new water-quality stations were established in the Clark Fork basin to gain additional information on metal sources. These stations are:

12323700 Mill Creek at Opportunity  
 12323720 Willow Creek at Opportunity  
 12323850 Lost Creek near Galen

Water-quality sampling was reestablished at station 12335500, Nevada Creek above Reservoir, near Helmsville, to supplement data collected at several other sites in the Blackfoot River basin for the purpose of watershed characterization.

Five streamflow-gaging stations were discontinued during or at the end of water year 2003:

06139800 West Fork Beaver Creek near Rocky Boy  
 06139850 Beaver Creek above Elk Creek, near Rocky Boy  
 06212500 Red Lodge Creek below Cooney Reservoir, near Boyd  
 12323248 Silver Bow Creek above Wastewater Plant outflow, at Butte  
 12346500 Skalkaho Creek near Hamilton

Twenty-one water-quality stations were discontinued:

06032300 High Ore Creek near Basin  
 06038800 Madison River at Kirby Ranch, near Cameron  
 06043500 Gallatin River near Gallatin Gateway  
 06048700 East Gallatin River below Bridge Creek, near Bozeman  
 06071300 Little Prickly Pear Creek at Wolf Creek  
 06154410 Little Peoples Creek near Hays  
 06191500 Yellowstone River at Corwin Springs  
 462508112173601 Unnamed Tributary of Grub Creek, SS No. 3, near Rimini  
 462505112173601 Unnamed Tributary of Grub Creek, SS No. 2, near Rimini  
 462503112173001 Unnamed Tributary of Grub Creek, SS No. 4A, near Rimini  
 462442112174901 Grub Creek near Rimini

## SUMMARY OF HYDROLOGIC CONDITIONS

### Temperature and Precipitation

For most of Montana, temperatures from October through January were warmer than normal. During the end of February, below-average temperatures moved across Montana, but during March, temperatures generally rose to above normal. The above-normal temperatures in March caused valley and prairie snow to melt in some areas resulting in high flows in some of the streams. Early in May, record low temperatures were recorded in southwest Montana, but by the end of the month, record high temperatures were noted across the State. Temperatures generally remained above average across the State for the rest of the water year.

Precipitation, departure from normal precipitation, and percentage of normal precipitation for seven climatological divisions of the State are listed in table 1. The precipitation data listed in table 1 are averages of the total monthly precipitation for the National Weather Service (NWS) reporting stations within each of the climatological divisions. No attempt was made to area-weight the division totals. As shown in table 1, for October 2002 through March 2003, precipitation ranged from 69 percent of normal in the southwestern division to 109 percent of normal in the southeastern division. For April 2003 through September 2003, precipitation ranged from 71 percent of normal in the western and southwestern divisions to 86 percent of normal in the northeastern division. Total precipitation for water year 2003 varied across the State from 70 percent of normal in southwestern Montana to 89 percent of normal in southeastern Montana. Overall, all climatological divisions received less-than-normal precipitation through water year 2003. Total average precipitation amounts for climatological division for water year 2003 ranged from 10.45 inches for the north-central division to 15.45 inches for the western division.

## WATER RESOURCES DATA FOR MONTANA, 2003

Most NWS stations in Montana measure precipitation in valley or non-mountainous locations. Data for precipitation falling as snow in the mountainous parts of the State during the winter are published by the U.S. Department of Agriculture, Natural Resources Conservation Service, in the report "Montana Water Supply Outlook." Percentages of normal water content of snowpack, by drainage basin, are listed in table 2.

By March 1, 2003, the percentage-of-normal water content of mountain snowpack ranged from 54 to 94 percent.

By April 1, the percentage-of-normal water content increased in most basins from the previous month and ranged from 34 to 115 percent. By May 1, the percentage-of-normal water content ranged from 0 to 99 percent. Overall, the percentage-of-normal water content in snowpack on May 1, 2003, was below normal in the Sun-Teton-Marias (62 percent), Milk (0 percent) and Powder (69 percent) River basins, and near normal ( $\pm 20$  percent of average) in the remaining basins.

**Table 1.** Precipitation and departure from normal, in inches, and percentage of normal, Montana, water year 2003<sup>1</sup>

Climatological division (number of stations)	October 2002 through March 2003			April through September 2003			Water year 2003		
	Total monthly precipitation	Departure from normal, 1971-2000	Percentage of normal	Total monthly precipitation	Departure from normal, 1971-2000	Percentage of normal	Total average precipitation	Departure from normal, 1971-2000	Percentage of normal
Western (45)	8.59	-1.74	83	6.86	-2.77	71	15.45	-4.51	77
Southwestern (22)	3.75	-1.71	69	7.40	-3.10	71	11.15	-4.81	70
North Central (42)	2.56	-0.75	77	7.89	-2.13	79	10.45	-2.88	78
Central (35)	3.72	-0.52	88	8.60	-2.20	80	12.32	-2.72	82
South Central (26)	5.41	-0.02	100	7.78	-3.24	70	13.19	-3.26	79
Northeastern (27)	2.29	-0.35	87	8.77	-1.52	86	11.06	-1.87	86
Southeastern (22)	3.87	0.32	109	8.57	-1.89	82	12.44	-1.57	89

<sup>1</sup>Data from U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service, 2003, Climatological Data, Montana, v. 105, no. 10 through v. 106, no. 8; Gina Loss, National Oceanic and Atmospheric Administration, written commun., 2003. Normals of precipitation are determined from the base period 1971-2000.

**Table 2.** Percentage-of-normal water content of mountain snowpack in Montana, 2003<sup>1</sup>

Drainage basin	Jan. 1	Feb. 1	Mar. 1	Apr. 1	May 1
<b>Hudson Bay</b>					
St. Mary	70	73	71	88	82
<b>Missouri</b>					
Upper Missouri	62	74	86	93	95
Sun-Teton-Marias	46	52	54	82	62
Smith-Judith-Musselshell	68	74	94	98	94
Milk	9	17	66	34	0
Upper Yellowstone	69	85	92	103	96
Bighorn	70	77	87	103	86
Tongue	77	79	94	115	94
Powder	67	66	82	104	69
<b>Upper Columbia</b>					
Kootenai	73	71	69	86	86
Clark Fork	60	72	79	100	99
Flathead	59	69	69	86	81

<sup>1</sup>Data from J. L. Ward, U.S. Department of Agriculture, Natural Resources Conservation Service, written commun., 2003. Normals for snowpack are determined from the base period 1971-2000.



## SURFACE WATER

### Streamflow

Streamflow data for water year 2003 can be compared to long-term data for water years 1971-2000 and maximum and minimum monthly mean discharge for the period of record at seven streamflow-gaging stations (fig. 2). Compared to the mean annual discharge (average of the annual mean discharges) for water years 1971-2000, the annual mean discharge shown in figure 2 during water year 2003 was 78 percent of average at Middle Fork Flathead River near West Glacier (station 12358500); 90 percent of average at Clark Fork at St. Regis (station 12354500); 66 percent of average at Missouri River at Toston (station 06054500); 86 percent of average at Yellowstone River at Corwin Springs (station 06191500); 75 percent of average at Yellowstone River at Billings (station 06214500); 64 percent of average at Rock Creek below Horse Creek, near international boundary (station 06169500); and 71 percent of average at Marias River near Shelby (station 06099500).

The annual departure from mean annual discharge at two streamflow-gaging stations on unregulated streams is shown in figure 3. At both Yellowstone River at Corwin Springs and Middle Fork Flathead River near West Glacier, the annual mean discharge during water year 2003 was less than the long-term average for the period of record.

Extraordinary flooding did not occur in any major river basins in Montana during water year 2003. However, flash flooding did occur in March in several small, ungaged drainages during a rapid snowmelt period across the northern and eastern plains and in west-central intermontane valleys in Montana. A comparison of peak discharges at 25 selected streamflow-gaging stations for water year 2003 to peak discharges for the period of record is presented in table 3. Record peak discharges were not recorded for any of these stations, although peak discharge could not be determined at three of the stations in water year 2003. The recurrence intervals for peaks during water year 2003 were less than 2 years at 10 stations, 2-5 years at 10 stations, 5-10 years at 1 station, and 20-50 years at 1 station.

A comparison of minimum daily mean discharge for 24 selected long-term streamflow-gaging stations for water year 2003 to minimum daily mean discharge for the period of record is presented in table 4. Record minimum daily mean discharges were not recorded during water year 2003, although below-normal streamflow conditions prevailed through the year in Montana. Minimum daily discharges had recurrence intervals of less than 2 years at 10 sites, recurrence intervals of 2-5 years at 8 sites, recurrence intervals of 5-10 years at 5 sites, and recurrence intervals of 20-50 years at 1 site.

The percentage-of-normal storage (based on water years 1971-2000), by month, for major reservoirs is listed in table 5.

At the end of water year 2003, storage was normal or within 20 percent of normal in five of the six major reservoirs used to supply water primarily for hydroelectric-power generation, but storage was well below normal in all four reservoirs used to supply water primarily for irrigation.

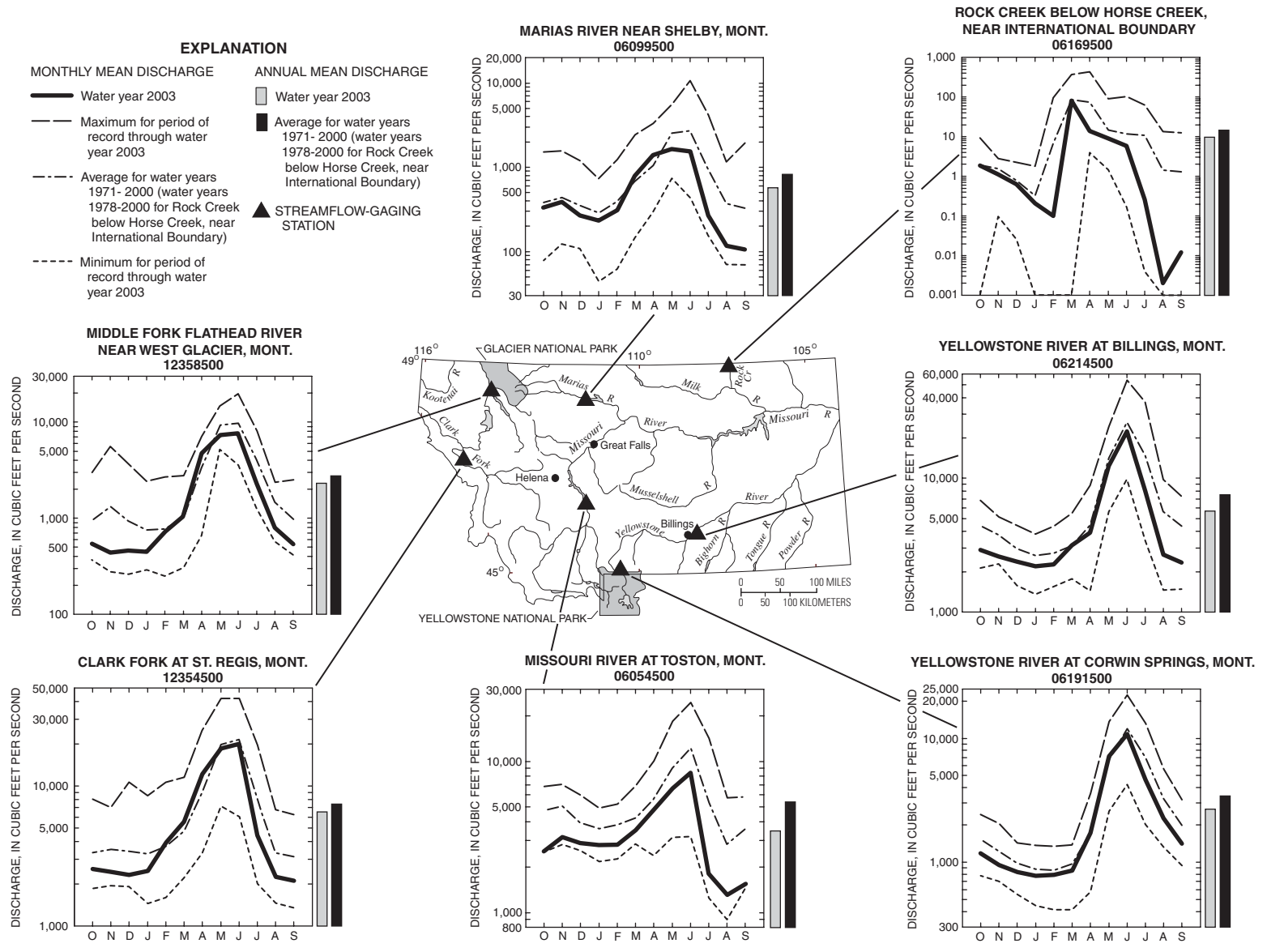
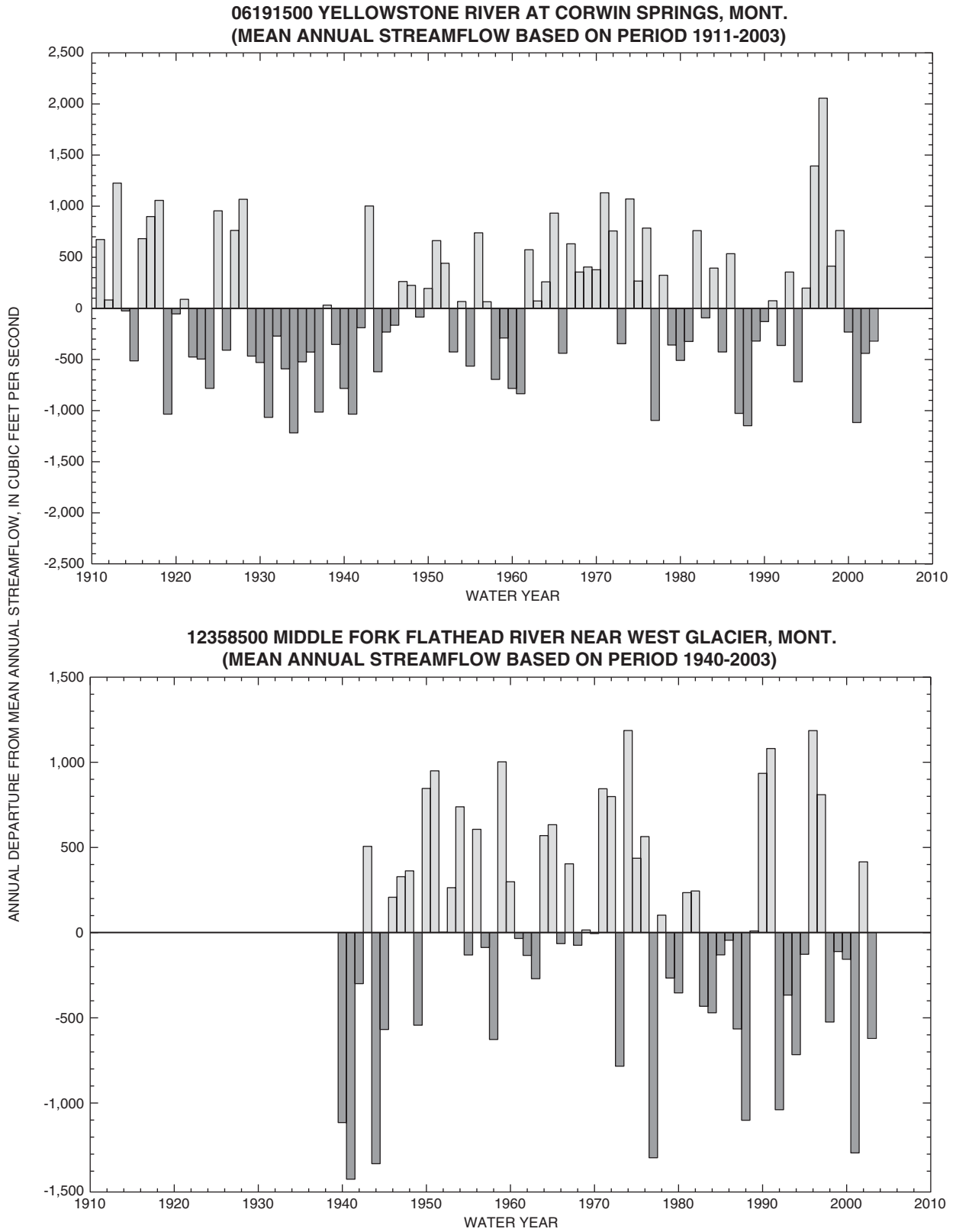


Figure 2. Streamflow data for water year 2003 compared to long-term data at selected streamflow-gaging stations, Montana.



**Figure 3.** Annual departure from mean annual discharge at two streamflow-gaging stations on unregulated streams in Montana.

## WATER RESOURCES DATA FOR MONTANA, 2003

**Table 3.** Comparisons of instantaneous peak discharge for water year 2003 with instantaneous peak discharge for period of record at selected stations in Montana

[Symbols: &lt;, less than; --, not determined; \*, outside period of record]

Station number	Station name	Drainage area (square miles)	Peak discharge, water year 2003			Peak discharge, period of record through water year 2002	
			Date	Cubic feet per second	Recurrence interval (years)	Date	Cubic feet per second
05014500	Swiftcurrent Creek at Many Glacier	30.9	05/27	1,180	2-5	06/08/64	6,700
05017500	St. Mary River near Babb	276	05/31	2,960	<2	06/09/64	16,500
06025500	Big Hole River near Melrose	2,476	05/31	9,520	2-5	06/10/72	14,300
06054500	Missouri River at Toston	14,669	06/02	20,200	2-5	06/12/97	34,000
06089000	Sun River near Vaughn	1,854	05/27	3,620	<2	06/09/64	53,500
06099500	Marias River near Shelby	3,242	03/15	4,180	<2	06/09/64	241,000
06115200	Missouri River near Landusky	40,987	03/16	unknown	--	06/03/53	137,000
06120500	Musselshell River at Harlowton	1,125	04/27	411	<2	06/20/75	7,270
06154400	Peoples Creek near Hays	220	03/14	391	2-5	06/08/72	8,460
06174500	Milk River at Nashua	22,332	03/25	4,760	<2	04/18/52	45,300
06181000	Poplar River near Poplar	3,174	unknown	unknown	--	04/06/54	37,400
06191500	Yellowstone River at Corwin Springs	2,623	06/01	23,800	5-10	06/10/96 06/06/97	32,200 32,200
06200000	Boulder River at Big Timber	523	05/30	5,290	2-5	06/05/97	9,940
06214500	Yellowstone River at Billings	11,795	06/02	46,500	2-5	06/12/97	82,000
06289000	Little Bighorn River at State Line, near Wyola	193	05/31	1,460	2-5	06/03/44	2,730
06308500	Tongue River at Miles City	5,397	03/15	4,000	2-5	06/15/62	13,300
06329500	Yellowstone River near Sidney	69,103	06/05	49,100	<2	06/21/21	159,000
12301300	Tobacco River near Eureka	440	05/30	908	<2	05/13/91	3,180
12304500	Yaak River near Troy	766	05/26	3,440	<2	05/17/97 * 05/54	12,600 *13,400
12332000	Middle Fork Rock Creek near Philipsburg	123	05/31	1,670	20-50	06/16/74	1,680
12335500	Nevada Creek above Reservoir, near Helmville	116	unknown	unknown	--	06/02/53	1,800
12340000	Blackfoot River near Bonner	2,290	05/30	8,100	<2	06/10/64	19,200
12354500	Clark Fork at St. Regis	10,709	06/02	44,300	2-5	05/24/48 05/18/97	68,900 68,900
12358500	Middle Fork Flathead River near West Glacier	1,128	05/26	19,800	<2	06/09/64	140,000
12370000	Swan River near Bigfork	671	06/02	5,290	2-5	06/20/74	8,890

**Table 4.** Comparisons of minimum daily mean discharge for water year 2003 to minimum daily mean discharge for period of record at selected stations in Montana

[Symbol: &lt;, less than]

Station number	Station name	Drainage area (square miles)	Minimum daily mean discharge, water year 2003			Minimum daily mean discharge, period of record through water year 2002	
			Date	Cubic feet per second	Recurrence interval (years)	Date	Cubic feet per second
05014500	Swiftcurrent Creek at Many Glacier	30.9	01/19	17	<2	11/14,16/76	0
05017500	St. Mary River near Babb	276	12/25	59	<2	01/03/53	27
06025500	Big Hole River near Melrose	2,476	09/06	177	2-5	08/17/31	49
06054500	Missouri River at Toston	14,669	08/24	1,180	2-5	01/12/63	700
06089000	Sun River near Vaughn	1,854	09/07	173	<2	05/26/41	23
06099500	Marias River near Shelby	3,242	09/04	70	2-5	08/20/19	10
06115200	Missouri River near Landusky	40,987	09/09	3,650	2-5	12/13/36	1,220
06120500	Musselshell River at Harlowton	1,125	09/08	1.9	5-10	( <sup>1</sup> )	0
06174500	Milk River at Nashua	22,332	07/05	44	<2	( <sup>1</sup> )	0
06181000	Poplar River near Poplar	3,174	08/28	2.8	<2	( <sup>1</sup> )	0
06191500	Yellowstone River at Corwin Springs	2,623	12/24	656	<2	02/05/89	380
06200000	Boulder River at Big Timber	523	02/24	55	2-5	08/26/61	12
06214500	Yellowstone River at Billings	11,795	02/24	1,500	<2	12/12/32	450
06289000	Little Bighorn River at State line, near Wyola	193	02/24	20	20-50	02/02/89	18
06308500	Tongue River at Miles City	5,397	10/01	35	<2	07/09/40	0
06329500	Yellowstone River near Sidney	69,103	08/30	1,720	5-10	05/17/61	570
12301300	Tobacco River near Eureka	440	12/28	35	5-10	01/11/63	20
12304500	Yaak River near Troy	766	09/07	33	5-10	09/19/01	49
12332000	Middle Fork Rock Creek near Philipsburg	123	02/24	25	<2	02/09/53	5.3
12335500	Nevada Creek above Reservoir, near Helmville	116	08/03	3.6	2-5	01/11/44	2.0
12340000	Blackfoot River near Bonner	2,290	01/10	300	2-5	01/04/50	200
12354500	Clark Fork at St. Regis	10,709	01/12	1,800	<2	02/03/89	800
12358500	Middle Fork Flathead River near West Glacier	1,128	01/11	299	2-5	11/27/52	189
12370000	Swan River near Bigfork	671	09/08	287	5-10	01/26-29/30	193

<sup>1</sup>At various dates.

**Table 5.** Percentage-of-normal storage, by month, during water year 2003 for selected major reservoirs in Montana

Reservoir	Usable capacity (acre-feet)	Percentage-of-normal storage based on 1971-2000 period of record											
		2002			2003								
		Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
<b>Hydroelectric-power generation</b>													
Canyon Ferry Lake	2,043,000	97	96	98	102	105	108	112	106	101	96	95	92
Fort Peck Lake	18,910,000	72	73	72	70	70	73	71	68	67	65	64	64
Bighorn Lake	1,356,000	64	68	70	72	72	75	77	78	81	77	81	80
Lake Koocanusa	5,748,000	109	122	119	149	178	167	160	145	120	103	92	92
Hungry Horse Reservoir	3,451,000	103	103	105	110	115	125	136	115	108	100	97	100
Flathead Lake	1,791,000	109	111	100	125	143	155	129	103	100	99	99	100
<b>Irrigation</b>													
Lima Reservoir	84,050	20	25	31	34	39	43	49	49	9	9	12	16
Clark Canyon Reservoir	255,600	19	25	31	36	39	43	44	40	25	11	9	13
Gibson Reservoir	99,050	93	92	89	87	86	91	132	107	92	31	13	21
Fresno Reservoir	103,000	88	94	98	98	93	101	96	101	63	61	41	53

## Water Quality

The USGS operates a network of water-quality stations throughout Montana in cooperation with numerous Federal, State, and local agencies and Tribal governments. The network changes from year to year as objectives are achieved or modified, or funding levels change. Some stations are operated for only a few years and commonly are part of a short-term investigation to examine water quality related to a specific condition. Other stations have been in operation for many years and provide a basis for description of long-term water-quality conditions or trends that represent a wide range of hydrologic or land-use variability. Long-term stations typically are located on major streams that represent an important water resource in the area and require data on an ongoing basis for various management concerns. A statewide network of 37 water-quality stations established in 1999 continued in operation through 2003. The network supplements the long-term record of water quality across the State and provides a reference for trends over time. Water-quality sampling that was started in 2001 at four sites in southeastern Montana (Tongue and Powder River basins) continued in 2003 and was subsequently expanded to seven sites (including the Rosebud Creek basin) to assist the States of Montana and Wyoming with assessing the potential effects of coal-bed methane development on water resources in these basins.

Various water-quality measurements are made, either onsite or by laboratory analysis of samples, depending on the objective of the investigation. Several types of water-quality data that describe physical and chemical characteristics are routinely obtained in many sampling programs. Examples of commonly measured water-quality characteristics are dissolved solids, dissolved oxygen, dissolved nitrite plus nitrate, total phosphorus, and suspended sediment. Guideline

concentrations established by the State of Montana<sup>1</sup> serve to illustrate the general range of values protective of human health and aquatic organisms.

The concentration of dissolved solids, which represents the mass (milligrams) of all constituents dissolved in a unit volume (liter) of water, can be determined either from the weight of dry residue that remains after evaporation of a known volume of water that has been filtered to remove particulate material, or estimated from the sum of the individual dissolved major-ion concentrations. An excessive concentration of dissolved solids can render the water unsuitable for certain uses such as human consumption, irrigation of crops, or livestock watering. Water-quality criteria established by the State of Montana<sup>2</sup> indicate that water might not be suitable when dissolved-solids concentrations exceed 500 mg/L if used for human consumption, 1,200 mg/L if used for crop irrigation, and 10,000 mg/L if used for livestock watering.

Dissolved oxygen in surface water is essential for most aquatic organisms and is an indicator of the biochemical condition of the stream or lake. The solubility of oxygen in water is a function of water temperature and barometric pressure; therefore, the oxygen content in surface water is subject to considerable daily and seasonal change. Biological activities such as photosynthesis and decomposition also can cause rapid and large changes in dissolved-oxygen concentration. Dissolved-oxygen concentrations less than 5.0

<sup>1</sup>Montana Department of Health and Environmental Sciences, 1986, Montana water quality, 1986: Helena, Montana Department of Health and Environmental Sciences, 1986 Montana 305(b) Report, 198 p.

<sup>2</sup>Montana Department of Environmental Quality, 2002, Montana numeric water quality standards: Helena, Mont., Water Quality Division, Circular WBQ-7, 37 p.

mg/L for warm-water fish or 8.0 mg/L for cold-water fish may be detrimental if sustained for extended periods of time.<sup>2</sup>

Nitrogen (N) is an essential plant nutrient that occurs in several forms in surface water. Common sources of nitrogen are atmospheric deposition, soils, plant fertilizers, animal waste, and sewage or septic effluent. Nitrite and nitrate are forms of nitrogen that can occur in surface water, although nitrite is seldom present in large amounts in oxygenated water. Dissolved nitrate is a major nutrient for plants; consequently, large concentrations of nitrate in streams and lakes can cause rapid growth of aquatic plants. Nitrate concentrations in excess of 0.3 mg/L as N have the potential to cause nuisance growths of algae and other aquatic plants (Ivalou O'Dell, U.S. Geological Survey, written communication, 1994). In addition, human health can be adversely affected if the nitrate concentration exceeds 10 mg/L as N in drinking water.<sup>3</sup>

Phosphorus (P) is an essential plant nutrient that can stimulate excessive growth of aquatic plants. Total phosphorus includes the inorganic and organic forms of dissolved and suspended phosphorus and is commonly analyzed as an indicator of eutrophication potential. Although phosphorus can originate naturally from igneous and sedimentary rock formations, more common sources include sewage, detergents, fertilizer, and livestock waste. Total phosphorus in streams should not exceed 0.1 mg/L as P to prevent nuisance plant growth according to water-quality criteria established by the State of Montana.<sup>2</sup> Water-quality criteria established by the EPA<sup>4</sup> also indicate that total phosphorus should not exceed 0.05 mg/L as P in streams discharging directly to lakes or 0.025 mg/L as P within lakes.

Suspended sediment is particulate material eroded from the land surface by either wind or water and maintained in suspension in streams by hydraulic energy. The quantity of suspended sediment in streams typically increases during periods of increased runoff, when large amounts of rainfall or snowmelt can rapidly erode soil and the increased streamflow can scour channel sediments. Although large suspended-sediment concentrations can occur naturally in areas underlain by easily erodible geologic materials, land use that disturbs soils also can contribute substantial quantities of sediment to streams and lakes. The quantity of sediment in suspension has important physical and chemical implications for aquatic life. Sediment in suspension during high flow may be deposited in stream channels or lakes where water velocities decrease. In areas of sediment deposition, aquatic insects or fish eggs can be smothered, thereby rendering the bottom habitat unsuitable for their survival. Many chemical constituents such as some

metals, phosphorus, and some pesticides tend to sorb strongly to sediment. As a result, chemicals may be readily transported from land sources into river systems where aquatic organisms could be exposed to toxic concentrations.

Statistical summaries of selected water-quality measurements made at eight long-term water-quality stations in Montana are presented in table 6. The range of values for each type of measurement is described by the minimum and maximum values. To compare current and long-term water-quality conditions, the range of values are summarized for both water year 2003 and the period of record through water year 2002. In addition, the central tendency of data collected over the period of record is described by the median (50th percentile).

## GROUND WATER

### Ground-Water Levels

Water levels were measured in 53 observation wells during water year 2003. Water levels in most of these wells primarily reflect the response of the ground-water system in the area to natural climatic conditions. However, several wells are within the zone of influence of human activities, and water levels in these wells can be affected by pumping or infiltration of applied irrigation water. Seventeen of the observation wells are equipped with continuous water-level recorders and have varying lengths of record. One of the continuous recorders was converted to near real-time data delivery, with water-level data collected hourly and transmitted every 4 hours via satellite for display as part of the USGS National Water Information System program web site:

*<http://waterdata.usgs.gov/nwis>*

Individual data values from the continuous recorders are not presented in this report but are available at the Montana District Office in Helena. Hydrographs are included for the 17 wells equipped with recorders, and periodic water-level data for all 53 wells are presented in this report. Water levels commonly fluctuate throughout the year and from year to year as a result of changes in climatic conditions or human activities. Some of the hydrographs show the effects of the below-normal precipitation in many climatological divisions across Montana during water year 2003.

<sup>3</sup>U.S. Environmental Protection Agency, 1991, Maximum Contaminant Levels (section 141.62 of subpart G of part 141, National Revised Primary Drinking Water Regulations): U.S. Code of Federal Regulations Title 40, Parts 100 to 149, revised as of July 1, 1991, p. 673.

<sup>4</sup>U.S. Environmental Protection Agency, 1986, Quality criteria for water, 1986: Washington, D.C., Office of Water Regulations and Standards, EPA 440/5-86-001, unpagged.

**Table 6.** Statistical summaries of selected water-quality measurements for long-term water-quality stations in Montana for water year 2003 and the period of record through water year 2002

[Symbols: &lt;, less than; --, no data]

Station number	Station name	Water year 2003			Period of record through water year 2002			
		Number of samples	Minimum	Maximum	Number of samples	Minimum	Maximum	Median
<b>Dissolved solids, in milligrams per liter</b>								
06054500	Missouri River near Toston	2	176	197	167	123	299	238
06178500	East Poplar River at International Boundary	4	896	991	263	97	1,480	940
06185500	Missouri River near Culbertson	8	330	429	231	221	579	403
06192500	Yellowstone River near Livingston	2	96	109	260	55	251	154
06326500	Powder River near Locate	12	591	2,230	206	408	3,450	1,460
06329500	Yellowstone River near Sidney	2	158	465	295	142	863	469
12301933	Kootenai River below Libby Dam, near Libby	2	122	143	240	55	211	139
12388700	Flathead River at Perma	2	95	102	69	89	106	96
<b>Dissolved oxygen, in milligrams per liter</b>								
06054500	Missouri River near Toston	0	--	--	321	6.2	13.8	9.6
06178500	East Poplar River at International Boundary	4	6.1	8.7	259	.9	17.2	9.2
06185500	Missouri River near Culbertson	8	7.8	12.8	277	6.0	14.2	9.3
06192500	Yellowstone River near Livingston	0	--	--	198	7.0	14.6	9.5
06326500	Powder River near Locate	9	6.7	11.7	311	2.7	15.7	8.6
06329500	Yellowstone River near Sidney	11	6.3	14.0	490	4.4	15.0	8.7
12301933	Kootenai River below Libby Dam, near Libby	8	9.3	11.4	440	6.9	18.3	10.8
12388700	Flathead River at Perma	0	--	--	99	7.4	18.1	10.5
<b>Dissolved nitrite plus nitrate, in milligrams per liter as nitrogen</b>								
06054500	Missouri River near Toston	4	.015	.172	97	<.05	.38	.08
06178500	East Poplar River at International Boundary	4	<.022	.149	61	<.01	.29	.07
06185500	Missouri River near Culbertson	8	<.022	.099	157	<.005	.38	.007
06192500	Yellowstone River near Livingston	4	.017	.238	239	<.05	1.2	.10
06326500	Powder River near Locate	12	<.022	.814	144	<.01	1.8	.27
06329500	Yellowstone River near Sidney	11	<.060	.660	235	<.005	.73	.20
12301933	Kootenai River below Libby Dam, near Libby	8	.036	.121	302	<.05	.79	.10
12388700	Flathead River at Perma	4	<.022	.020	36	<.005	.21	.02
<b>Total phosphorus, in milligrams per liter as phosphorus</b>								
06054500	Missouri River near Toston	4	.04	.20	177	<.01	.44	.04
06178500	East Poplar River at International Boundary	4	.05	.12	265	<.01	.40	.03
06185500	Missouri River near Culbertson	8	.08	.35	217	.01	.93	.08
06192500	Yellowstone River near Livingston	4	.02	.23	117	<.01	1.2	.03
06326500	Powder River near Locate	12	.01	6.0	207	.008	26	.17
06329500	Yellowstone River near Sidney	11	.02	1.4	366	<.01	2.7	.09
12301933	Kootenai River below Libby Dam, near Libby	8	<.004	.012	515	<.001	.26	.008
12388700	Flathead River at Perma	4	.002	.047	83	<.008	.24	.005
<b>Suspended sediment, in milligrams per liter</b>								
06054500	Missouri River near Toston	4	13	146	231	4	491	18
06178500	East Poplar River at International Boundary	4	75	121	229	4	322	54
06185500	Missouri River near Culbertson	8	156	477	178	19	2,370	238
06192500	Yellowstone River near Livingston	4	8	290	160	2	1,090	10
06326500	Powder River near Locate	11	32	16,000	279	8	41,400	745
06329500	Yellowstone River near Sidney	17	30	3,220	398	10	15,500	312
12301933	Kootenai River below Libby Dam, near Libby	6	1	2	17	1	3	2
12388700	Flathead River at Perma	4	2	70	72	1	65	4



## EXPLANATION OF THE RECORDS

The surface-water and ground-water records published in this report are for water year 2003 that began October 1, 2002, and ended September 30, 2003. A calendar of the water year is provided on the inside of the front cover. The records contain streamflow data, stage and content data for lakes and reservoirs, water-quality data for surface and ground water, and ground-water-level data. The locations of the stations and wells where the data were collected are shown in figures 6 through 8. The following sections of the introductory text are presented to provide users with a more detailed explanation of how the hydrologic data published in this report were collected, analyzed, computed, and arranged for presentation.

## DOWNSTREAM ORDER AND STATION NUMBER

Since October 1, 1950, hydrologic-station records in USGS reports have been listed in order of downstream direction along the main stream. All stations on a tributary entering upstream from a main-stream station are listed before that station. A station on a tributary entering between two main-stream stations is listed between those stations. A similar order is followed in listing stations on first rank, second rank, and other ranks of tributaries. The rank of any tributary on which a station is located with respect to the stream to which it is immediately tributary is indicated by an indentation in that list of stations in the front of this report. Each indentation represents one rank. This downstream order and system of indentation indicates which stations are on tributaries between any two stations and the rank of the tributary on which each station is located.

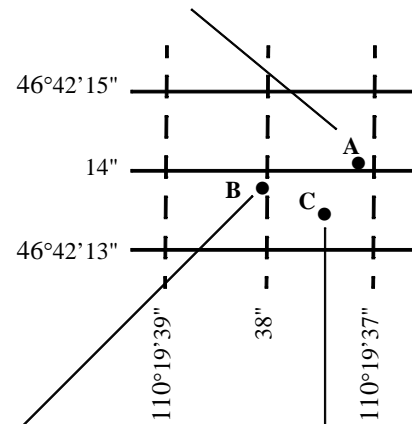
As an added means of identification, each hydrologic station and partial-record station has been assigned a station number. These station numbers are in the same downstream order used in this report. In assigning a station number, no distinction is made between partial-record stations and other stations; therefore, the station number for a partial-record station indicates downstream-order position in a list composed of both types of stations. Gaps are consecutive. The complete 8-digit (or 10-digit) number for each station such as 06090300, which appears just to the left of the station name, includes a 2-digit part number "06" plus the 6-digit (or 8-digit) downstream order number "090300." In areas of high station density, an additional two digits may be added to the station identification number to yield a 10-digit number. The stations are numbered in downstream order as described above between stations of consecutive 8-digit numbers.

## NUMBERING SYSTEM FOR WELLS AND MISCELLANEOUS SITES

The USGS well and miscellaneous site-numbering system is based on the grid system of latitude and longitude. The

system provides the geographic location of the well or miscellaneous site and a unique number for each site. The number consists of 15 digits. The first 6 digits denote the degrees, minutes, and seconds of latitude, and the next 7 digits denote degrees, minutes, and seconds of longitude; the last 2 digits are a sequential number for wells within a 1-second grid. In the event that the latitude-longitude coordinates for a well and miscellaneous site are the same, a sequential number such as "01," "02," and so forth, would be assigned as one would for wells (see fig. 4). The 8-digit, downstream order station numbers are not assigned to wells and miscellaneous sites where only random water-quality samples or discharge measurements are taken.

Coordinates for site A (464214110193701)



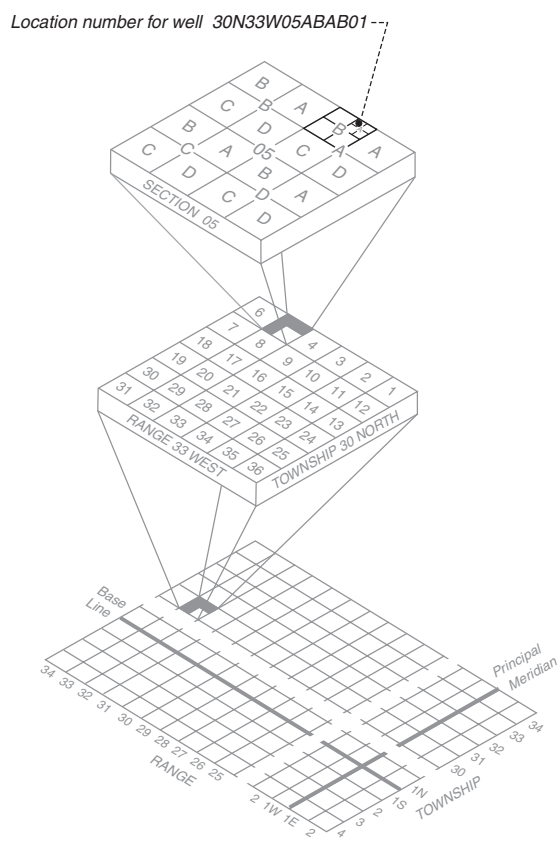
Coordinates for site C (464213110193701)

Coordinates for site B (464213110193801)

**Figure 4.** System for numbering wells and miscellaneous sites (latitude and longitude).

In addition to the well number that is based on latitude and longitude given for each well, another well number is given that is based on the Bureau of Land Management's system of land subdivision. This well number is familiar to the water users of Montana and shows the location of the well by quadrant, township, range, section, and position within the section (see fig. 5). The capital letter at the beginning of the location number indicates the quadrant in which the well is located. Four quadrants are formed by the intersection of the base line and the principal meridian—A indicates the northeast quadrant, B the northwest, C the southwest, and D the southeast. The first numeral indicates the township, the second the range, and the third the section in which the well is located. Letters following the section number locate the well within the section. The first letter denotes the quarter section, the second the quarter-quarter section, and the third the quarter-quarter-quarter section. The letters are assigned within the section in a counter-clockwise direction beginning with (a) in the northeast quarter of the section. Letters are assigned within each quarter section and quarter-quarter section in the same manner. Where two or more wells are located within the

smallest subdivision, consecutive numbers beginning with 01 are added to the letters in the order in which the wells are inventoried. For example, 30N33W05ABAB01 is the first well inventoried in NW<sup>1</sup>/<sub>4</sub>NE<sup>1</sup>/<sub>4</sub>NW<sup>1</sup>/<sub>4</sub>NE<sup>1</sup>/<sub>4</sub> sec. 5, T.30N.,R.33W (northwest quarter of the northeast quarter of the northwest quarter of the northeast quarter of section 5, in township 30 north, range 33 west).



**Figure 5.** System for numbering wells and miscellaneous sites (township and range).

## SPECIAL NETWORKS AND PROGRAMS

**Hydrologic Benchmark Network** is a network of 61 sites in small drainage basins in 39 States that was established in 1963 to provide consistent streamflow data representative of undeveloped watersheds nationwide, and from which data could be analyzed on a continuing basis for use in comparison and contrast with conditions observed in basins more obviously affected by human activities. At selected sites, water-quality information is being gathered on major ions and nutrients, primarily to assess the effects of acid deposition on stream chemistry. Additional information on the Hydrologic Benchmark Program may be accessed from:

<http://water.usgs.gov/hbn/>

**National Stream-Quality Accounting Network (NASQAN)** is a network of sites used to monitor the water

quality of large rivers within the Nation's largest river basins. From 1995 through 1999, a network of approximately 40 stations was operated in the Mississippi, Columbia, Colorado, and Rio Grande River basins. For the period 2000 through 2004, sampling was reduced to a few index stations on the Colorado and Columbia Rivers so that a network of 5 stations could be implemented on the Yukon River. Samples are collected with sufficient frequency that the flux of a wide range of constituents can be estimated. The objective of NASQAN is to characterize the water quality of these large rivers by measuring concentration and mass transport of a wide range of dissolved and suspended constituents, including nutrients, major ions, dissolved and sediment-bound heavy metals, common pesticides, and inorganic and organic forms of carbon. This information will be used (1) to describe the long-term trends and changes in concentration and transport of these constituents; (2) to test findings of the National Water-Quality Assessment (NAWQA) Program; (3) to characterize processes unique to large-river systems such as storage and remobilization of sediments and associated contaminants; and (4) to refine existing estimates of off-continent transport of water, sediment, and chemicals for assessing human effects on the world's oceans and for determining global cycles of carbon, nutrients, and other chemicals. Additional information about the NASQAN Program may be accessed from:

<http://water.usgs.gov/nasqan/>

**The National Atmospheric Deposition Program/ National Trends Network (NADP/NTN)** is a network of monitoring sites that provide continuous measurement and assessment of the chemical constituents in precipitation throughout the United States. As the lead Federal agency, the USGS works together with over 100 organizations to provide a long-term, spatial and temporal record of atmospheric deposition generated from this network of 250 precipitation-chemistry monitoring sites. The USGS supports 74 of these 250 sites. This long-term, nationally consistent monitoring program, coupled with ecosystem research, provides critical information toward a national scorecard to evaluate the effectiveness of ongoing and future regulations intended to reduce atmospheric emissions and subsequent impacts to the Nation's land and water resources. Reports and other information on the NADP/NTN Program, as well as data from the individual sites, may be accessed from:

<http://bqs.usgs.gov/acidrain/>

**The USGS National Water-Quality Assessment (NAWQA) Program** is a long-term program with goals to describe the status and trends of water-quality conditions for a large, representative part of the Nation's ground- and surface-water resources; to provide an improved understanding of the primary natural and human factors affecting these observed conditions and trends; and to provide information that supports development and evaluation of management, regulatory, and monitoring decisions by other agencies.

Assessment activities are being conducted in 42 study units (major watersheds and aquifer systems) that represent a wide range of environmental settings nationwide and that account for a large percentage of the Nation's water use. A wide array of chemical constituents is measured in ground water, surface water, streambed sediments, and fish tissues. The coordinated application of comparative hydrologic studies at a wide range of spatial and temporal scales will provide information for water-resources managers to use in making decisions and a foundation for aggregation and comparison of findings to address water-quality issues of regional and national interest.

Communication and coordination between USGS personnel and other local, State, and Federal interests are critical components of the NAWQA Program. Each study unit has a local liaison committee consisting of representatives from key Federal, State, and local water-resources agencies, Indian nations, and universities in the study unit. Liaison committees typically meet semiannually to discuss their information needs, monitoring plans and progress, desired information products, and opportunities to collaborate efforts among the agencies. Additional information about the NAWQA Program may be accessed from:

*<http://water.usgs.gov/nawqa/>*

**The USGS National Streamflow Information Program (NSIP)** is a long-term program with goals to provide framework streamflow data across the Nation. Included in the program are creation of a permanent Federally funded streamflow network, research on the nature of streamflow, regional assessments of streamflow data and databases, and upgrades in the streamflow information delivery systems. Additional information about NSIP may be accessed from:

*<http://water.usgs.gov/nsip/>*

## **EXPLANATION OF STAGE- AND WATER-DISCHARGE RECORDS**

### **Data Collection and Computation**

The base data collected at gaging stations (fig. 6) consist of records of stage and measurements of discharge of streams or canals, and stage, surface area, and volume of lakes or reservoirs. In addition, observations of factors affecting the stage-discharge relation or the stage-capacity relation, weather records, and other information are used to supplement base data in determining the daily flow or volume of water in storage. Records of stage are obtained from a water-stage recorder that is either downloaded electronically in the field to a laptop computer or similar device or is transmitted using telemetry such as GOES satellite, land-line or cellular-phone modems, or by radio transmission. Measurements of discharge are made with a current meter or acoustic Doppler current profiler, using the general methods adopted by the USGS. These methods are described in standard textbooks, USGS

Water-Supply Paper 2175, and the Techniques of Water-Resources Investigations of the United States Geological Survey (TWRIs), Book 3, Chapters A1 through A19 and Book 8, Chapters A2 and B2. The methods are consistent with the American Society for Testing and Materials (ASTM) standards and generally follow the standards of the International Organization for Standards (ISO).

For stream-gaging stations, discharge-rating tables for any stage are prepared from stage-discharge curves. If extensions to the rating curves are necessary to express discharge greater than measured, the extensions are made on the basis of indirect measurements of peak discharge (such as slope-area or contracted-opening measurements, or computation of flow over dams and weirs), step-backwater techniques, velocity-area studies, and logarithmic plotting. The daily mean discharge is computed from gage heights and rating tables, then the monthly and yearly mean discharges are computed from the daily values. If the stage-discharge relation is subject to change because of frequent or continual change in the physical features of the stream channel, the daily mean discharge is computed by the shifting-control method in which correction factors based on individual discharge measurements and notes by engineers and observers are used when applying the gage heights to the rating tables. If the stage-discharge relation for a station is temporarily changed by the presence of aquatic growth or debris on the controlling section, the daily mean discharge is computed by the shifting-control method.

At some stations, stage-discharge relation is affected by changing stage. At these stations, the rate of change in stage is used as a factor in computing discharge.

At some stream-gaging stations in the northern United States, the stage-discharge relation is affected by ice in the winter; therefore, computation of the discharge in the usual manner is impossible. Discharge for periods of ice effect is computed on the basis of gage-height record and occasional winter-discharge measurements. Consideration is given to the available information on temperature and precipitation, notes by gage observers and hydrologists, and comparable records of discharge from other stations in the same or nearby basins.

For a lake or reservoir station, capacity tables giving the volume or contents for any stage are prepared from stage-area relation curves defined by surveys. The application of the stage to the capacity table gives the contents, from which the daily, monthly, or yearly changes are 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.

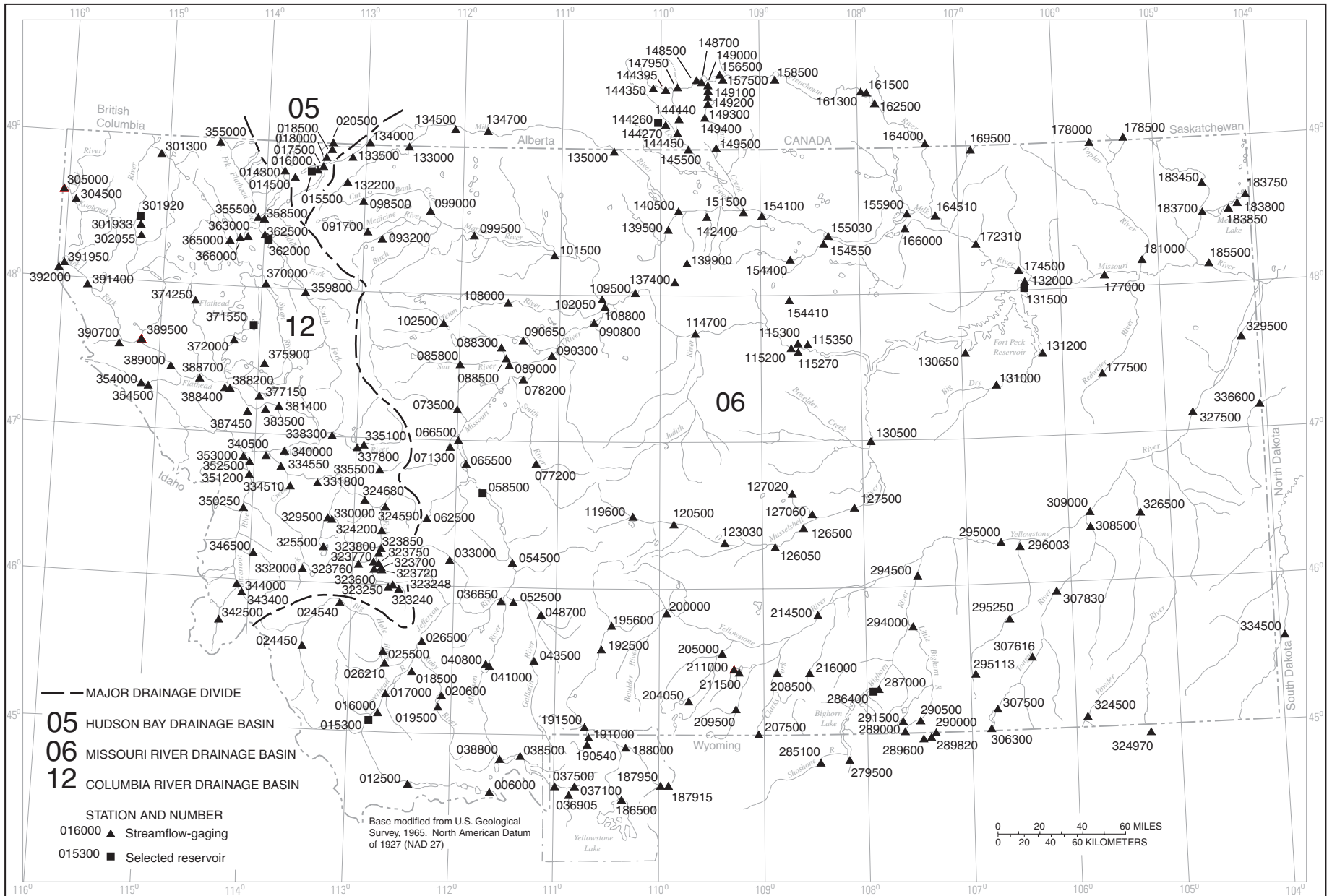


Figure 6. Location of streamflow-gaging and selected reservoir stations in Montana and adjacent areas, water year 2003.

For some stream-gaging stations, periods of time occur when no gage-height record is obtained or the recorded gage height is faulty and cannot be used to compute daily discharge or contents. Such a situation can happen when the recorder stops or otherwise fails to operate properly, the intakes are plugged, the float is frozen in the well, or for various other reasons. For such periods, the daily discharges are estimated on the basis of recorded range in stage, prior and subsequent records, discharge measurements, weather records, and comparison with records from other stations in the same or nearby basins. Likewise, lake or reservoir volumes may be estimated on the basis of operator's log, prior and subsequent records, inflow-outflow studies, and other information.

## Data Presentation

The records published for each continuous-record surface-water discharge station (stream-gaging station) consist of four parts: (1) the station manuscript or description; (2) the data table of daily mean values of discharge for the current water year with summary data; (3) a tabular statistical summary of monthly mean flow data for a designated period, by water year; and (4) a summary statistics table that includes statistical data of annual, daily, and instantaneous flows as well as data pertaining to annual runoff, 7-day low-flow minimums, and flow duration.

### Station Manuscript

The manuscript provides, under various headings, descriptive information, such as station location; period of record; historical extremes outside the period of record; record accuracy; and other remarks pertinent to station operation and regulation. The following information, as appropriate, is provided with each continuous record of discharge or lake content. Comments follow that clarify information presented under the various headings of the station description.

**LOCATION.**—Location information is obtained from the most accurate maps available. The location of the gaging station with respect to the cultural and physical features in the vicinity and with respect to the reference place mentioned in the station name is given. River mileages, given for most stations, were determined by methods given in Montana Department of Natural Resources and Conservation River Mile Index<sup>5,6,7</sup>.

**DRAINAGE AREA.**—Drainage areas are measured using the most accurate maps available. Because the type of maps available varies from one drainage basin to another, the

accuracy of drainage areas likewise varies. Drainage areas are updated as better maps become available.

**PERIOD OF RECORD.**—This term indicates the time period for which records have been published for the station or for an equivalent station. An equivalent station is one that was in operation at a time that the present station was not and whose location was such that its flow reasonably can be considered equivalent to flow at the present station.

**REVISED RECORDS.**—If a critical error in published records is discovered, a revision is included in the first report published following discovery of the error.

**GAGE.**—The type of gage in current use, the elevation of the current gage referred to a standard datum, and a condensed history of the types, locations, and elevations of previous gages are given under this heading.

**REMARKS.**—All periods of estimated daily discharge are flagged in the daily discharge table. (See section titled Identifying Estimated Daily Discharge.) Information is presented relative to the accuracy of the records, to special methods of computation, and to conditions that affect natural flow at the station. In addition, information may be presented pertaining to average discharge data for the period of record; to extremes data for the period of record and the current year; and, possibly, to other pertinent items. For reservoir stations, information is given on the dam forming the reservoir, the capacity, the outlet works and spillway, and the purpose and use of the reservoir.

**COOPERATION.**—Records provided by a cooperating organization or obtained for the USGS by a cooperating organization are identified here.

**EXTREMES OUTSIDE PERIOD OF RECORD.**—Information here documents major floods or unusually low flows that occurred outside the stated period of record. The information may or may not have been obtained by the USGS.

**REVISIONS.**—Records are revised if errors in published records are discovered. Appropriate updates are made in the USGS distributed data system, NWIS, and subsequently to its Web-based National data system, NWISWeb:

*<http://water.usgs.gov/nwis/nwis>*

Users are encouraged to obtain all required data from NWIS or NWISWeb to ensure that they have the most recent data updates. Updates to NWISWeb are made on an annual basis.

Although rare, occasionally the records of a discontinued gaging station may need revision. Because no current or, possibly, future station manuscript would be published for these stations to document the revision in a REVISED RECORDS entry, users of data for these stations who obtained the record from previously published data reports may wish to contact the District Office (address given on the back of the title page of this report) to determine if the published records were revised after the station was discontinued. If, however, the data for a discontinued station were obtained by computer

<sup>5</sup>Montana Department of Natural Resources and Conservation, 1976, River mile index of the Yellowstone River: Helena, Mont., 61 p.

<sup>6</sup>Montana Department of Natural Resources and Conservation, 1979, River mile index of the Missouri River: Helena, Mont., 142 p.

<sup>7</sup>Montana Department of Natural Resources and Conservation, 1984, River mile index of the Columbia River basin: Helena, Mont., p. 1-76.

retrieval, the data would be current. Any published revision of data is always accompanied by revision of the corresponding data in computer storage.

Manuscript information for lake or reservoir stations differs from that for stream stations in the nature of the REMARKS and in the inclusion of a stage-capacity table when daily volumes are given.

### Data Table of Daily Mean Values

The daily table of discharge records for stream-gaging stations gives mean discharge for each day of the water year. In the monthly summary for the table, the line headed TOTAL gives the sum of the daily figures for each month; the line headed MEAN gives the arithmetic average flow in cubic feet per second for the month; and the lines headed MAX and MIN give the maximum and minimum daily mean discharges, respectively, for each month. Discharge for the month is 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). Values for cubic feet per second per square mile and runoff in inches or in acre-feet may be omitted if extensive regulation or diversion is in effect or if the drainage area includes large noncontributing areas. At some stations, monthly and (or) yearly observed discharges are adjusted for reservoir storage or diversion, or diversion data or reservoir volumes are given. These values are identified by a symbol and a corresponding footnote.

### Statistics of Monthly Mean Data

A tabular summary of the mean (line headed MEAN), maximum (MAX), and minimum (MIN) of monthly mean flows for each month for a designated period is provided below the mean values table. The water years of the first occurrence of the maximum and minimum monthly flows are provided immediately below those values. The designated period will be expressed as FOR WATER YEARS \_\_-\_\_, BY WATER YEAR (WY), and will list the first and last water years of the range of years selected from the PERIOD OF RECORD paragraph in the station manuscript. The designated period will consist of all of the station record within the specified water years, including complete months of record for partial water years, and may coincide with the period of record for the station. The water years for which the statistics are computed are consecutive, unless a break in the station record is indicated in the manuscript.

### Summary Statistics

A table titled SUMMARY STATISTICS follows the statistics of monthly mean data tabulation. This table consists of four columns with the first column containing the line headings of the statistics being reported. The table provides a statistical summary of yearly, daily, and instantaneous flows, not only for the current water year but also for the previous calendar year and for a designated period, as appropriate. The

designated period selected, WATER YEARS \_\_-\_\_, will consist of all of the station records within the specified water years, including complete months of record for partial water years, and may coincide with the period of record for the station. The water years for which the statistics are computed are consecutive, unless a break in the station record is indicated in the manuscript. All of the calculations for the statistical characteristics designated ANNUAL (see line headings below), except for the ANNUAL 7-DAY MINIMUM statistic, are calculated for the designated period using complete water years. The other statistical characteristics may be calculated using partial water years.

The date or water year, as appropriate, of the first occurrence of each statistic reporting extreme values of discharge is provided adjacent to the statistic. Repeated occurrences may be noted in the REMARKS paragraph of the manuscript or in footnotes. Because the designated period may not be the same as the station period of record published in the manuscript, occasionally the dates of occurrence listed for the daily and instantaneous extremes in the designated-period column may not be within the selected water years listed in the heading. When the dates of occurrence do not fall within the selected water years listed in the heading, it will be noted in the REMARKS paragraph or in footnotes. Selected streamflow duration-curve statistics and runoff data also are given. Runoff data may be omitted if extensive regulation or diversion of flow is in effect in the drainage basin.

The following summary statistics data are provided with each continuous record of discharge. Comments that follow clarify information presented under the various line headings of the SUMMARY STATISTICS table.

ANNUAL TOTAL.—The sum of the daily mean values of discharge for the year.

ANNUAL MEAN.—The arithmetic mean for the individual daily mean discharges for the year noted or for the designated period.

HIGHEST ANNUAL MEAN.—The maximum annual mean discharge occurring for the designated period.

LOWEST ANNUAL MEAN.—The minimum annual mean discharge occurring for the designated period.

HIGHEST DAILY MEAN.—The maximum daily mean discharge for the year or for the designated period.

LOWEST DAILY MEAN.—The minimum daily mean discharge for the year or for the designated period.

ANNUAL 7-DAY MINIMUM.—The lowest mean discharge for 7 consecutive days for a calendar year or a water year. Note that most low-flow frequency analyses of annual 7-day minimum flows use a climatic year (April 1-March 31). The date shown in the summary statistics table is the initial date of the 7-day period. This value should not be confused with the 7-day 10-year low-flow statistic.

**MAXIMUM PEAK FLOW.**—The maximum instantaneous peak discharge occurring for the water year or designated period. Occasionally the maximum flow for a year may occur at midnight at the beginning or end of the year, on a recession from or rise toward a higher peak in the adjoining year. In this case, the maximum peak flow is given in the table and the maximum flow may be reported in a footnote or in the REMARKS paragraph in the manuscript.

**MAXIMUM PEAK STAGE.**—The maximum instantaneous peak stage occurring for the water year or designated period. Occasionally the maximum stage for a year may occur at midnight at the beginning or end of the year, on a recession from or rise toward a higher peak in the adjoining year. In this case, the maximum peak stage is given in the table and the maximum stage may be reported in the REMARKS paragraph in the manuscript or in a footnote. If the dates of occurrence of the maximum peak stage and maximum peak flow are different, the REMARKS paragraph in the manuscript or a footnote may be used to provide further information.

**INSTANTANEOUS LOW FLOW.**—The minimum instantaneous discharge occurring for the water year or for the designated period.

**ANNUAL RUNOFF.**—Indicates the total quantity of water in runoff for a drainage area for the year. Data reports may use any of the following units of measurement in presenting annual runoff data:

Acre-foot (AC-FT) is the quantity of water required to cover 1 acre to a depth of 1 foot and is equivalent to 43,560 cubic feet or about 326,000 gallons or 1,233 cubic meters.

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

Inches (INCHES) indicate the depth to which the drainage area would be covered if all of the runoff for a given time period were uniformly distributed on it.

**10 PERCENT EXCEEDS.**—The discharge that has been exceeded 10 percent of the time for the designated period.

**50 PERCENT EXCEEDS.**—The discharge that has been exceeded 50 percent of the time for the designated period.

**90 PERCENT EXCEEDS.**—The discharge that has been exceeded 90 percent of the time for the designated period.

### Identifying Estimated Daily Discharge

Estimated daily-discharge values published in the water-discharge tables of annual State data reports are identified. This identification is shown either by flagging individual daily values with the letter “e” and noting in a table footnote, “e—Estimated,” or by listing the dates of the estimated record in the REMARKS paragraph of the station description.

### Accuracy of Field Data and Computed Results

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

The degree of accuracy of the records is stated in the REMARKS in the station description. “Excellent” indicates that about 95 percent of the daily discharges are within 5 percent of the true value; “good” within 10 percent; and “fair,” within 15 percent. “Poor” indicates that daily discharges have less than “fair” accuracy. Different accuracies may be attributed to different parts of a given record.

Values 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 ft<sup>3</sup>/s; to the nearest tenths between 1.0 and 10 ft<sup>3</sup>/s; to whole numbers between 10 and 1,000 ft<sup>3</sup>/s; and to 3 significant figures above 1,000 ft<sup>3</sup>/s. The number of significant figures used is based solely on the magnitude of the discharge value. The same rounding rules apply to discharge values listed for partial-record stations.

Discharge at many stations, as indicated by the monthly mean, may not reflect natural runoff due to the effects of diversion, consumption, regulation by storage, increase or decrease in evaporation due to artificial causes, or to other factors. For such stations, values of cubic feet per second per square mile and of runoff in inches are not published unless satisfactory adjustments can be made for diversions, for changes in contents of reservoirs, or for other changes incident to use and control. Evaporation from a reservoir is not included in the adjustments for changes in reservoir contents, unless it is so stated. Even at those stations where adjustments are made, large errors in computed runoff may occur if adjustments or losses are large in comparison with the observed discharge.

### Other Data Records Available

Information of a more detailed nature than that published for most of the stream-gaging stations such as discharge measurements, gage-height records, and rating tables is available from the District office. Also, most stream-gaging station records are available in computer-usable form and many statistical analyses have been made.

Information on the availability of unpublished data or statistical analyses may be obtained from the District office (see address on the back of the title page of this report).

## Publications

The annual series of Water-Supply Papers that give information on quantity of surface waters in Montana are given in table 7. Data for the Hudson Bay basin is given in Part 5, for the Missouri River basin in Part 6, and for the Columbia River basin in Part 12.

**Table 7.** Water-Supply Paper numbers and parts for surface-water stations, 1899-1970

Year	Part 5	Part 6	Part 12	Year	Part 5	Part 6	Part 12
1899		36,37	38				
1900	49	49	51,52				
1901	66,75	66,75	66,75	1936	805	806	812
1902	83,85	84	85	1937	825	826	832
1903	98,99,100	99	100	1938	855	856	862
1904	130	130	135	1939	875	876	882
1905	171	172	178	1940	895	896	902
1906	207	208	214	1941	925	926	932
1907	245	246	252	1942	955	956	962
1908	245	246	252	1943	975	976	982
1909	265	266	272	1944	1005	1006	1012
1910	285	286	292	1945	1035	1036	1042
1911	305	306	312	1946	1055	1056	1062
1912	325	326	332A	1947	1085	1086	1092
1913	355	356	362A	1948	1115	1116	1122
1914	385	386	392	1949	1145	1146	1152
1915	405	406	412	1950	1175	1176	1182
1916	435	436	442	1951	1208	1209	1216
1917	455	456	462	1952	1238	1239	1246
1918	475	476	482	1953	1278	1279	1286
1919	505	506	512	1954	1338	1339	1346
1920	505	506	512	1955	1388	1389	1396
1921	525	526	532	1956	1438	1439	1446
1922	545	546	552	1957	1508	1509	1516
1923	565	566	572	1958	1558	1559	1566
1924	585	586	592	1959	1628	1629	1636
1925	605	606	612	1960	1708	1709	1716
1926	625	626	632	1961-65	1913	1916	1933
1927	645	646	652	1966-70	2113	2116	2133
1928	665	666	672				
1929	685	686	692	1950	1308	1309	1316
1930	700	701	707	Compilation			
1931	715	716	722	1960	1728	1729	1736
1932	730	731	737	Compilation			
1933	745	746	752				
1934	760	761	767				
1935	785	786	792				



## EXPLANATION OF PRECIPITATION RECORDS

### Data Collection and Computation

Rainfall data generally are collected using electronic data loggers that measure the rainfall in 0.01-inch increments every 15 minutes using either a tipping-bucket rain gage or a collection well gage. Twenty-four hour rainfall totals are tabulated and presented. A 24-hour period extends from just past midnight of the previous day to midnight of the current day. Snowfall-affected data can result during cold weather when snow fills the rain-gage funnel and then melts as temperatures rise. Snowfall-affected data are subject to errors. Missing values are indicated by this symbol “---” in the table.

### Data Presentation

Precipitation records collected at surface-water gaging stations are identified with the same station number and name as the stream-gaging station. Where a surface-water daily-record station is not available, the precipitation record is published with its own name and latitude-longitude identification number.

Information pertinent to the history of a precipitation station is provided in descriptive headings preceding the tabular data. These descriptive headings give details regarding location, period of record, and general remarks.

The following information is provided with each precipitation station. Comments that follow clarify information presented under the various headings of the station description.

**LOCATION.**—See Data Presentation in the EXPLANATION OF STAGE- AND WATER-DISCHARGE RECORDS section of this report (same comments apply).

**PERIOD OF RECORD.**—See Data Presentation in the EXPLANATION OF STAGE- AND WATER-DISCHARGE RECORDS section of this report (same comments apply).

**INSTRUMENTATION.**—Information on the type of rainfall collection system is given.

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

## EXPLANATION OF WATER-QUALITY RECORDS

### Collection and Examination of Data

Surface-water samples for analysis usually are collected at or near stream-gaging stations. The quality-of-water records are given immediately following the discharge records at these stations.

The descriptive heading for water-quality records gives the period of record for all water-quality data; the period of daily record for parameters that are measured on a daily basis (specific conductance, water temperature, sediment discharge, and so forth); extremes for the current year; and general remarks.

For ground-water records, no descriptive statements are given; however, the well number, depth of well, sampling date, or other pertinent data are given in the table containing the chemical analyses of the ground water.

### Water Analysis

Most of the methods used for collecting and analyzing water samples are described in the TWRIs. A list of TWRIs is provided in this report.

One sample can define adequately the water quality at a given time if the mixture of solutes throughout the stream cross-section is homogeneous. However, the concentration of solutes at different locations in the cross section may vary widely with different rates of water discharge, depending on the source of material and the turbulence and mixing of the stream. Some streams must be sampled at several verticals to obtain a representative sample needed for an accurate mean concentration and for use in calculating load.

Chemical-quality data published in this report are considered to be the most representative values available for the stations listed. The values reported represent water-quality conditions at the time of sampling as much as possible, consistent with available sampling techniques and methods of analysis. In the rare case where an apparent inconsistency exists between a reported pH value and the relative abundance of carbon dioxide species (carbonate and bicarbonate), the inconsistency is the result of a slight uptake of carbon dioxide from the air by the sample between measurement of pH in the field and determination of carbonate and bicarbonate in the laboratory.

For chemical-quality stations equipped with digital monitors, the records consist of daily maximum and minimum values (and sometimes mean or median values) for each constituent measured, and are based on 15-minute or 1-hour intervals of recorded data beginning at 0000 hours and ending at 2400 hours for the day of record.

## SURFACE-WATER-QUALITY RECORDS

Records of surface-water quality ordinarily are obtained at or near stream-gaging stations because discharge data is useful in the interpretation of surface-water quality. Records of surface-water quality in this report involve a variety of types of data and measurement frequencies.

## Classification of Records

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

A careful distinction needs to be made between *continuous records* as used in this report and *continuous recordings* that refer to a continuous graph or a series of discrete values recorded at short intervals. Some records of water quality, such as temperature and specific conductance, may be obtained through continuous recordings; however, because of costs, most data are obtained only monthly or less frequently. Locations of stations for which records on the quality of surface water appear in this report are shown in figure 7.

## Accuracy of the Records

One of four accuracy classifications is applied for measured physical properties at continuous-record stations on a scale ranging from poor to excellent. The accuracy rating is based on data values recorded before any shifts or corrections are made. Additional consideration also is given to the amount of publishable record and to the amount of data that have been corrected or shifted.

Rating classifications for continuous water-quality records

[≤, less than or equal to; ±, plus or minus value shown; °C, degree Celsius; >, greater than; %, percent; mg/L, milligram per liter; pH unit, standard pH unit]

Measured physical property	Rating			
	Excellent	Good	Fair	Poor
Water temperature	≤ ±0.2 °C	> ±0.2 to 0.5 °C	> ±0.5 to 0.8 °C	> ±0.8 °C
Specific conductance	≤ ±3%	> ±3 to 10%	> ±10 to 15%	> ±15%
Dissolved oxygen	≤ ±0.3 mg/L	> ±0.3 to 0.5 mg/L	> ±0.5 to 0.8 mg/L	> ±0.8 mg/L
pH	≤ ±0.2 unit	> ±0.2 to 0.5 unit	> ±0.5 to 0.8 unit	> ±0.8 unit
Turbidity	≤ ±5%	> ±5 to 10%	> ±10 to 15%	> ±15%

## Arrangement of Records

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

## On-Site Measurements and Sample Collection

In obtaining water-quality data, a major concern is assuring that the data obtained represent the naturally occurring quality of the water. To ensure this, certain measurements, such as water temperature, pH, and dissolved oxygen, must be made on site when the samples are taken. To assure that measurements made in the laboratory also represent the naturally occurring water, carefully prescribed procedures must be followed in collecting the samples, in treating the samples to prevent changes in quality pending analysis, and in shipping the samples to the laboratory. Procedures for on-site measurements and for collecting, treating, and shipping samples are given in TWRI's Book 1, Chapter D2; Book 3, Chapters A1, A3, and A4; and Book 9, Chapters A1-A9. These TWRI's are listed in this report. Also, detailed information on collecting, treating, and shipping samples can be obtained from the USGS District office (see address that is shown on the back of title page in this report).

## Water Temperature

Water temperatures are measured at most of the water-quality stations. In addition, water temperatures are taken at the time of discharge measurements for water-discharge stations. For stations where water temperatures are taken manually once or twice daily, the water temperatures are taken at about the same time each day. Large streams have a small diurnal temperature change; shallow streams may have a daily range of several degrees and may follow closely the changes in air temperature. Some streams may be affected by waste-heat discharges.

At stations where recording instruments are used, either mean temperatures or maximum and minimum temperatures for each day are published. Water temperatures measured at the time of water-discharge measurements are on file in the District office.

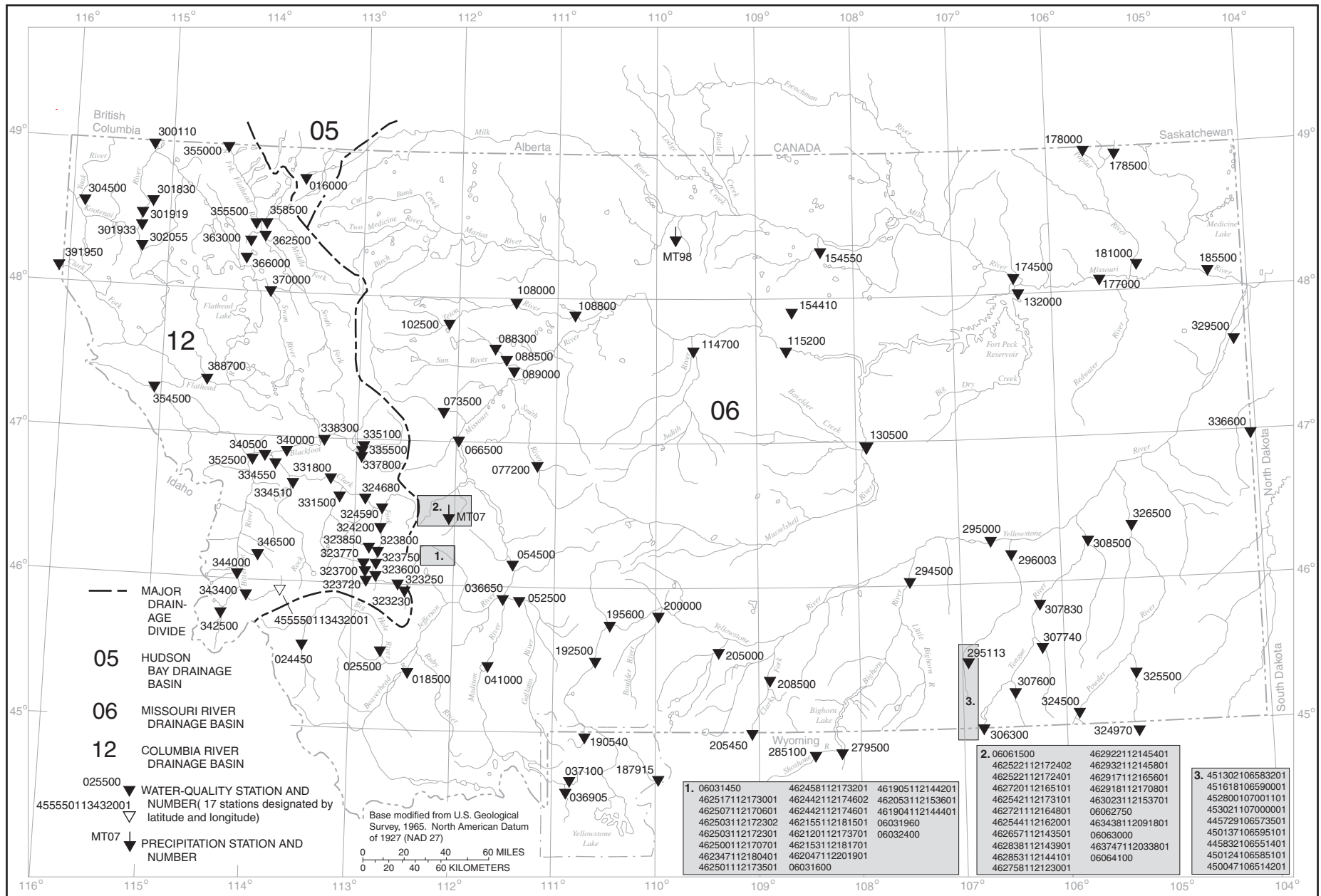


Figure 7. Location of surface-water-quality stations in Montana and adjacent areas, water year 2003.

## Sediment

Suspended-sediment concentrations are determined from samples collected by using depth-integrating samplers. Samples usually are obtained at several verticals in the cross section, or a single sample may be obtained at a fixed point and a coefficient applied to determine the mean concentration in the cross section.

During periods of rapidly changing flow or rapidly changing concentration, samples may be collected more frequently (twice daily or, in some instances, hourly). The published sediment discharges for days of rapidly changing flow or concentration were computed by the subdivided-day method (time-discharge weighted average). Therefore, for those days when the published sediment discharge value differs from the value computed as the product of discharge times mean concentration times 0.0027, the reader can assume that the sediment discharge for that day was computed by the subdivided-day method. For periods when no samples were collected, daily discharges of suspended sediment were estimated on the basis of water discharge, sediment concentrations observed immediately before and after the periods, and suspended-sediment loads for other periods of similar discharge.

At other stations, suspended-sediment samples are collected periodically at many verticals in the stream cross section. Although data collected periodically may represent conditions only at the time of observation, such data are useful in establishing seasonal relations between quality and streamflow and in predicting long-term sediment-discharge characteristics of the stream.

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

## Laboratory Measurements

Samples for biochemical oxygen demand (BOD) and indicator bacteria are analyzed locally. All other samples are analyzed in the USGS laboratory in Lakewood, Colorado, unless otherwise noted. Methods used in analyzing sediment samples and computing sediment records are given in TWRI, Book 5, Chapter C1. Methods used by the USGS laboratories are given in the TWRI, Book 1, Chapter D2; Book 3, Chapter C2; and Book 5, Chapters A1, A3, and A4. These methods are consistent with ASTM standards and generally follow ISO standards.

## Data Presentation

For continuing-record stations, information pertinent to the history of station operation is provided in descriptive headings preceding the tabular data. These descriptive headings give details regarding location, drainage area, period

of record, type of data available, instrumentation, general remarks, cooperation, and extremes for parameters currently measured daily. Tables of chemical, physical, biological, radiochemical data, and so forth, obtained at a frequency less than daily are presented first. Tables of "daily values" of specific conductance, pH, water temperature, dissolved oxygen, and suspended sediment then follow in sequence.

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

**LOCATION.**—See Data Presentation information in the EXPLANATION OF STAGE- AND WATER-DISCHARGE RECORDS section of this report (same comments apply).

**DRAINAGE AREA.**—See Data Presentation information in the EXPLANATION OF STAGE- AND WATER-DISCHARGE RECORDS section of this report (same comments apply).

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

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

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

**COOPERATION.**—Records provided by a cooperating organization or obtained for the USGS by a cooperating organization are identified here.

**EXTREMES.**—Maximums and minimums are given only for parameters measured daily or more frequently. For parameters measured weekly or less frequently, true maximums or minimums may not have been obtained. Extremes, when given, are provided for both the period of record and for the current water year.

**REVISIONS.**—Records are revised if errors in published water-quality records are discovered. Appropriate updates are made in the USGS distributed data system, NWIS, and subsequently to its Web-based National data system, NWISWeb:

*<http://waterdata.usgs.gov/nwis>*

Users of USGS water-quality data are encouraged to obtain all required data from NWIS or NWISWeb to ensure that they

have the most recent updates. Updates to the NWISWeb are made on an annual basis.

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

### Remark Codes

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

Printed Output	Remark
E	Estimated value.
>	Actual value is known to be greater than the value shown.
<	Actual value is known to be less than the value shown.
K	Results based on colony count outside the acceptance range (non-ideal colony count).
L	Biological organism count less than 0.5 percent (organism may be observed rather than counted).
D	Biological organism count equal to or greater than 15 percent (dominant).
S	Most probable value.
V	Analyte was detected in both the environmental sample and the associated blanks.
&	Biological organism estimated as dominant.

### Water-Quality Control Data

The USGS National Water Quality Laboratory collects quality-control data on a continuing basis to evaluate selected analytical methods to determine long-term method detection levels (LT-MDLs) and laboratory reporting levels (LRLs). These values are re-evaluated each year on the basis of the most recent quality-control data and, consequently, may change from year to year.

This reporting procedure limits the occurrence of false positive error. Falsely reporting a concentration greater than the LT-MDL for a sample in which the analyte is not present is 1 percent or less. Application of the LRL limits the occurrence of false negative error. The chance of falsely reporting a non-detection for a sample in which the analyte is present at a concentration equal to or greater than the LRL is 1 percent or less.

Accordingly, concentrations are reported as less than LRL for samples in which the analyte was either not detected or did not pass identification. Analytes detected at concentrations between the LT-MDL and the LRL and that pass identification

criteria are estimated. Estimated concentrations will be noted with a remark code of "E." These data should be used with the understanding that their uncertainty is greater than that of data reported without the E remark code.

Data generated from quality-control (QC) samples are a requisite for evaluating the quality of the sampling and processing techniques as well as data from the actual samples themselves. Without QC data, environmental sample data cannot be adequately interpreted because the errors associated with the sample data are unknown. The various types of QC samples collected by this District office are described in the following section. Procedures have been established for the storage of water-quality-control data within the USGS. These procedures allow for storage of all derived QC data and are identified so that they can be related to corresponding environmental samples. These data are not presented in this report but are available from the District office.

### Blank Samples

Blank samples are collected and analyzed to ensure that environmental samples have not been contaminated in the overall data-collection process. The blank solution used to develop specific types of blank samples is a solution that is free of the analytes of interest. Any measured value signal in a blank sample for an analyte (a specific component measured in a chemical analysis) that was absent in the blank solution is believed to be due to contamination. Many types of blank samples are possible; each is designed to segregate a different part of the overall data-collection process. The types of blank samples collected in this district are:

**Field blank**—A blank solution that is subjected to all aspects of sample collection, field processing preservation, transportation, and laboratory handling as an environmental sample.

**Trip blank**—A blank solution that is put in the same type of bottle used for an environmental sample and kept with the set of sample bottles before and after sample collection.

**Equipment blank**—A blank solution that is processed through all equipment used for collecting and processing an environmental sample (similar to a field blank but normally done in the more controlled conditions of the office).

**Sampler blank**—A blank solution that is poured or pumped through the same field sampler used for collecting an environmental sample.

**Filter blank**—A blank solution that is filtered in the same manner and through the same filter apparatus used for an environmental sample.

**Splitter blank**—A blank solution that is mixed and separated using a field splitter in the same manner and through the same apparatus used for an environmental sample.

**Preservation blank**—A blank solution that is treated with the sampler preservatives used for an environmental sample.

## Reference Samples

Reference material is a solution or material prepared by a laboratory. The reference material composition is certified for one or more properties so that it can be used to assess a measurement method. Samples of reference material are submitted for analysis to ensure that an analytical method is accurate for the known properties of the reference material. Generally, the selected reference material properties are similar to the environmental sample properties.

## Replicate Samples

Replicate samples are a set of environmental samples collected in a manner such that the samples are thought to be essentially identical in composition. Replicate is the general case for which a duplicate is the special case consisting of two samples. Replicate samples are collected and analyzed to establish the amount of variability in the data contributed by some part of the collection and analytical process. Many types of replicate samples are possible, each of which may yield slightly different results in a dynamic hydrologic setting, such as a flowing stream. The types of replicate samples collected in this district are:

**Concurrent samples**—A type of replicate sample in which the samples are collected simultaneously with two or more samplers or by using one sampler and alternating the collection of samples into two or more compositing containers.

**Sequential samples**—A type of replicate sample in which the samples are collected one after the other, typically over a short time.

**Split sample**—A type of replicate sample in which a sample is split into subsamples, each subsample contemporaneous in time and space.

## Spike Samples

Spike samples are samples to which known quantities of a solution with one or more well-established analyte concentrations have been added. These samples are analyzed to determine the extent of matrix interference or degradation on the analyte concentration during sample processing and analysis.

## Publications

The annual series of Water-Supply Papers that give information on quality of surface waters in Montana are shown in the following table. Data for Hudson Bay and Missouri

River basins are given in parts 5-6 and data for Upper Columbia River basin are given in part 12.

**Table 8.** Water-Supply Paper numbers and parts for water-quality stations, 1947-70

Year	Parts 5-6	Part 12	Year	Parts 5-6	Part 12
1946	1050	---	1961	1883	1885
1947	1102	---	1962	1943	1945
1948	1132	---	1963	1949	1951
1949	1162	1163	1964	1956	1959
1950	1187	1189	1965	1963	1966
1951	1198	1200	1966	1993	1996
1952	1251	1253	1967	2013	2016
1953	1291	1293	1968	2094, 2095	2100
1954	1351	1353	1969	2145	2150
1955	1401	1403	1970	2155	2160
1956	1451	1453			
1957	1521	1523			
1958	1572	1574			
1959	1643	1645			
1960	1743	1745			

## EXPLANATION OF GROUND-WATER-LEVEL RECORDS

Generally, only ground-water-level data from selected wells with continuous recorders from a basic network of observation wells are published in this report (volume 2). This basic network contains observation wells located so that the most significant data are obtained from the fewest wells in the most important aquifers.

### Site Identification Numbers

Each well is identified by means of (1) a 15-digit number that is based on latitude and longitude and (2) a local number that is produced for local needs.

### Data Collection and Computation

Measurements are made in many types of wells, under varying conditions of access and at different temperatures; hence, neither the method of measurement nor the equipment can be standardized. At each observation well, however, the equipment and techniques used are those that will ensure that measurements at each well are consistent.

Most methods for collecting and analyzing water samples are described in the TWRI's referred to in the On-site Measurements and Sample Collection and the Laboratory Measurements sections in this report. In addition, TWRI Book 1, Chapter D2, describes guidelines for the collection and field analysis of ground-water samples for selected unstable constituents. Procedures for on-site measurements and for collecting, treating, and shipping samples are given in TWRI's

Book 1, Chapter D2; Book 3, Chapters A1, A3, and A4; and Book 9, Chapters A1 through A9. The values in this report represent water-quality conditions at the time of sampling, as much as possible, and that are consistent with available sampling techniques and methods of analysis. These methods are consistent with ASTM standards and generally follow ISO standards. Trained personnel collected all samples. The wells sampled were pumped long enough to ensure that the water collected came directly from the aquifer and had not stood for a long time in the well casing where it would have been exposed to the atmosphere and to the material, possibly metal, comprising the casings.

Water-level measurements in this report are given in feet with reference to land-surface datum (lsd). Land-surface datum is a datum plane that is approximately at land surface at each well. If known, the elevation of the land-surface datum above sea level is given in the well description. The height of the measuring point (MP) above or below land-surface datum is given in each well description. Water levels in wells equipped with recording gages are reported for every fifth day and the end of each month (EOM).

Water levels are reported to as many significant figures as can be justified by the local conditions. For example, in a measurement of a depth of water of several hundred feet, the error in determining the absolute value of the total depth to water may be a few tenths of a foot, whereas the error in determining the net change of water level between successive measurements may be only a hundredth or a few hundredths of a foot. For lesser depths to water the accuracy is greater. Accordingly, most measurements are reported to a hundredth of a foot, but some are given only to a tenth of a foot or a larger unit.

### Data Presentation

Water-level data are presented in alphabetical order by county. The primary identification number for a given well is the 15-digit site identification number that appears in the upper left corner of the table. The secondary identification number is the local or county well number. Well locations are shown in figure 8; each well is identified on the map by its local well or county well number.

Each well record consists of three parts: the well description, the data table of water levels observed during the water year, and, for most wells, a hydrograph following the data table. Well descriptions are presented in the headings preceding the tabular data.

The following comments clarify information presented in these various headings.

**LOCATION.**—This paragraph follows the well-identification number and reports the hydrologic-unit number and a geographic point of reference. Latitudes and longitudes used in this report are reported as North American Datum of 1927 unless otherwise specified.

**HYDROGEOLOGIC UNIT.**—This entry designates by name and geologic age the aquifer that the well taps.

**WELL CHARACTERISTICS.**—This entry describes the well in terms of depth, casing diameter and depth or screened interval, method of construction, use, and changes since construction.

**INSTRUMENTATION.**—This paragraph provides information on both the frequency of measurement and the collection method used, allowing the user to better evaluate the reported water-level extremes by knowing whether they are based on continuous, monthly, or some other frequency of measurement.

**DATUM.**—This entry describes both the measuring point and the land-surface elevation at the well. The altitude of the land-surface datum is described in feet above the altitude datum; it is reported with a precision depending on the method of determination. The measuring point is described physically (such as top of casing, top of instrument shelf, and so forth), and in relation to land surface (such as 1.3 ft above land-surface datum). The elevation of the land-surface datum is described in feet above National Geodetic Vertical Datum of 1929 (NGVD 29); it is reported with a precision depending on the method of determination.

**REMARKS.**—This entry describes factors that may influence the water level in a well or the measurement of the water level, when various methods of measurement were begun, and the network (climatic, terrain, local, or areal effects) or the special project to which the well belongs.

**PERIOD OF RECORD.**—This entry indicates the time period for which records are published for the well, the month and year at the start of publication of water-level records by the USGS, and the words “to current year” if the records are to be continued into the following year. Time periods for which water-level records are available, but are not published by the USGS, may be noted.

**EXTREMES FOR PERIOD OF RECORD.**—This entry contains the highest and lowest instantaneously recorded or measured water levels of the period of published record, with respect to land-surface datum or sea level, and the dates of occurrence.

### Water-Level Tables

A table of water levels follows the well description for each well. Water-level measurements in this report are given in feet with reference to either sea level or land-surface datum (lsd). Missing records are indicated by dashes in place of the water-level value.

For wells not equipped with recorders, water-level measurements were obtained periodically by steel or electric tape. Tables of periodic water-level measurements in these wells show the date of measurement and the measured water-level value.

## Hydrographs

Hydrographs are a graphic display of water-level fluctuations over a period of time. In this report, current water year and, when appropriate, period-of-record hydrographs are shown. Hydrographs that display periodic water-level measurements show points that may be connected with a dashed line from one measurement to the next. Hydrographs that display recorder data show a solid line representing the mean water level recorded for each day. Missing data are indicated by a blank space or break in a hydrograph. Missing data may occur as a result of recorder malfunctions, battery failures, or mechanical problems related to the response of the recorder's float mechanism to water-level fluctuations in a well.

## GROUND-WATER-QUALITY DATA

### Data Collection and Computation

The ground-water-quality data in this report were obtained as a part of special studies in specific areas. Consequently, a number of chemical analyses are presented for some wells within a county but not for others. As a result, the records for this year, by themselves, do not provide a balanced view of ground-water quality Statewide.

Most methods for collecting and analyzing water samples are described in the TWRI. Procedures for on-site measurements and for collecting, treating, and shipping samples are given in TWRI, Book 1, Chapter D2; Book 3, Chapter C2; and Book 5, Chapters A1, A3, and A4. Also, detailed information on collecting, treating, and shipping samples may be obtained from the USGS District office (see address shown on back of title page in this report).

### Laboratory Measurements

Analysis for sulfide and measurement of alkalinity, pH, water temperature, specific conductance, and dissolved oxygen are performed on site. All other sample analyses are performed at the USGS laboratory in Lakewood, Colorado, unless otherwise noted. Methods used by the USGS laboratory are given in TWRI, Book 1, Chapter D2; Book 3, Chapter C2; and Book 5, Chapters A1, A3, and A4.

### Publications

Publication of ground-water level data for the United States in Water-Supply Papers was begun by the USGS in 1935. From 1935 through 1939, a single Water-Supply Paper for each year covering the entire nation was issued (Water-Supply Papers 777, 817, 840, 845, and 886). From 1940 through 1974, separate Water-Supply Papers were issued for 6 sections of the United States. Water-level data for Montana are in the Water-Supply Papers listed in the following table,

each report containing one or more calendar years (January-December) of data. Data in this report are for the 12-month water year ending September 30. Information about reports and other data on ground water in Montana may be obtained from the District office, at the address given on the back of the title page.

**Table 9.** Water-Supply Paper numbers and parts for ground-water stations, 1940-74

Year	WSP No. Pt. 5	Year	WSP No. Pt. 5	Year	WSP No. Pt.5
1940	910	1947	1100	1954	1325
1941	940	1948	1130	1955	1408
1942	948	1949	1160	1956-60	1760
1943	990	1950	1169	1961-65	1845
1944	1020	1951	1195	1966-70	1980
1945	1027	1952	1225	1971-74	2161
1946	1075	1953	1269		

## ACCESS TO USGS WATER DATA

The USGS provides near real-time stage and discharge data for many of the gaging stations equipped with the necessary telemetry and historic daily-mean and peak-flow discharge data for most current or discontinued gaging stations through the World Wide Web (WWW). These data may be accessed from:

*<http://water.usgs.gov>*

Water-quality data and ground-water data also are available through the WWW. In addition, data can be provided in various machine-readable formats on various media. Information about the availability of specific types of data or products, and user charges, can be obtained locally from each Water Discipline District Office (See address that is shown on the back of the title page of this report.)



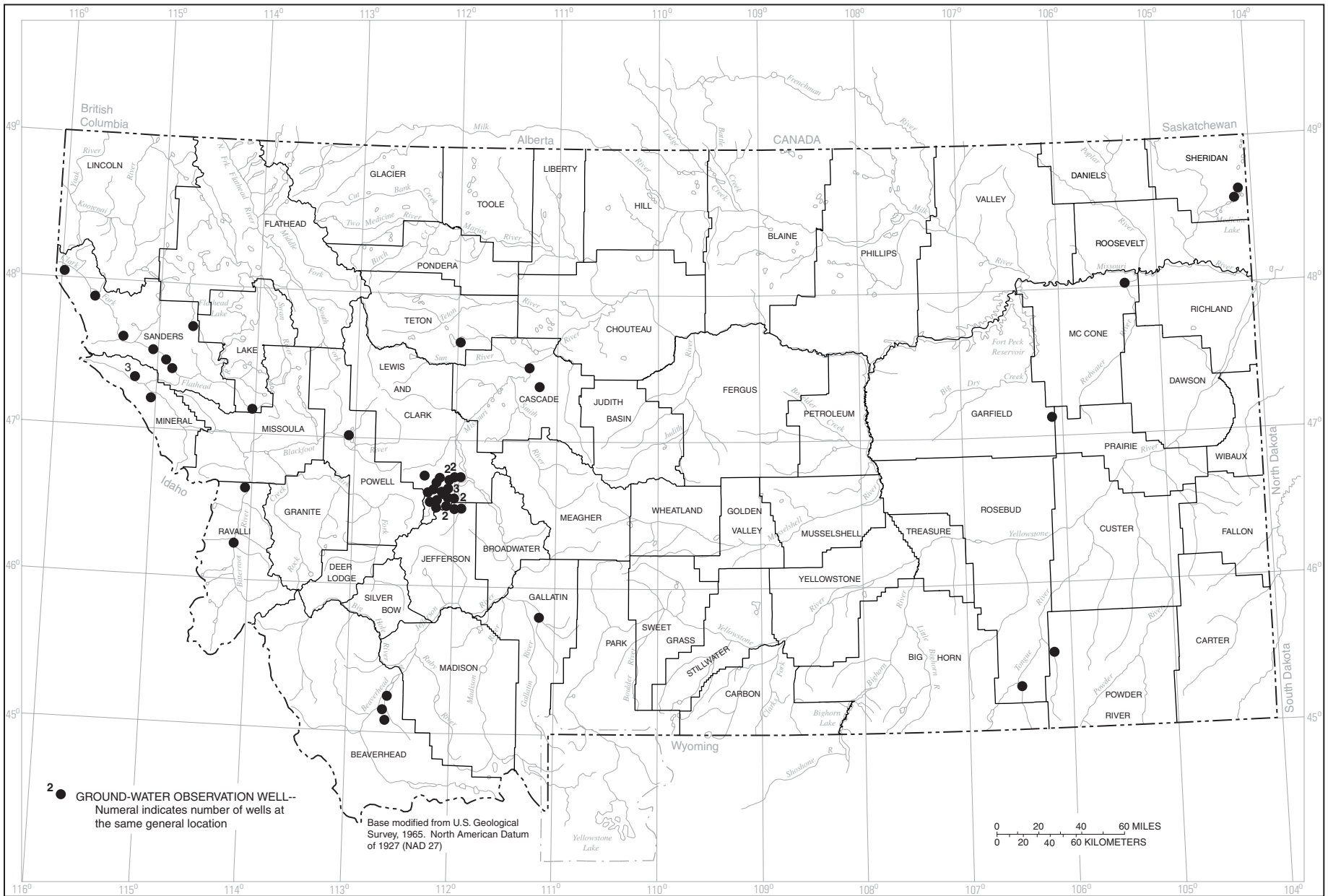


Figure 8. Location of ground-water observation wells in Montana, water year 2003.

## DEFINITION OF TERMS

Specialized technical terms related to streamflow, water-quality, and other hydrologic data, as used in this report, are defined below. Terms such as algae, water level, and precipitation are used in their common everyday meanings, definitions of which are given in standard dictionaries. Not all terms defined in this alphabetical list apply to every State. See also table for converting English units to International System (SI) Units. Other glossaries that also define water-related terms are accessible from:

<http://water.usgs.gov/glossaries.html>

**Acid neutralizing capacity** (ANC) is the equivalent sum of all bases or base-producing materials, solutes plus particulates, in an aqueous system that can be titrated with acid to an equivalence point. This term designates titration of an “unfiltered” sample (formerly reported as alkalinity).

**Acre-foot** (AC-FT, acre-ft) is a unit of volume, commonly used to measure quantities of water used or stored, equivalent to the volume of water required to cover 1 acre to a depth of 1 foot and equivalent to 43,560 cubic feet, 325,851 gallons, or 1,233 cubic meters. (See also “Annual runoff”)

**Adenosine triphosphate** (ATP) is an organic, phosphate-rich compound important in the transfer of energy in organisms. Its central role in living cells makes ATP an excellent indicator of the presence of living material in water. A measurement of ATP therefore provides a sensitive and rapid estimate of biomass. ATP is reported in micrograms per liter.

**Adjusted discharge** is discharge data that have been mathematically adjusted (for example, to remove the effects of a daily tide cycle or reservoir storage).

**Algal growth potential** (AGP) is the maximum algal dry weight biomass that can be produced in a natural water sample under standardized laboratory conditions. The growth potential is the algal biomass present at stationary phase and is expressed as milligrams dry weight of algae produced per liter of sample. (See also “Biomass” and “Dry weight”)

**Alkalinity** is the capacity of solutes in an aqueous system to neutralize acid. This term designates titration of a “filtered” sample.

**Annual runoff** is the total quantity of water that is discharged (“runs off”) from a drainage basin in a year. Data reports may present annual runoff data as volumes in acre-feet, as discharges per unit of drainage area in cubic feet per second per square mile, or as depths of water on the drainage basin in inches.

**Annual 7-day minimum** is the lowest mean value for any 7-consecutive-day period in a year. Annual 7-day minimum values are reported herein for the calendar year and the

water year (October 1 through September 30). Most low-flow frequency analyses use a climatic year (April 1-March 31), which tends to prevent the low-flow period from being artificially split between adjacent years. The date shown in the summary statistics table is the initial date of the 7-day period. (This value should not be confused with the 7-day, 10-year low-flow statistic.)

**Aroclor** is the registered trademark for a group of polychlorinated biphenyls that were manufactured by the Monsanto Company prior to 1976. Aroclors are assigned specific 4-digit reference numbers dependent upon molecular type and degree of substitution of the biphenyl ring hydrogen atoms by chlorine atoms. The first two digits of a numbered aroclor represent the molecular type, and the last two digits represent the percentage weight of the hydrogen-substituted chlorine.

**Artificial substrate** is a device that is purposely placed in a stream or lake for colonization of organisms. The artificial substrate simplifies the community structure by standardizing the substrate from which each sample is collected. Examples of artificial substrates are basket samplers (made of wire cages filled with clean streamside rocks) and multiplate samplers (made of hardboard) for benthic organism collection, and plexiglass strips for periphyton collection. (See also “Substrate”)

**Ash mass** is the mass or amount of residue present after the residue from the dry mass determination has been ashed in a muffle furnace at a temperature of 500°C for 1 hour. Ash mass of zooplankton and phytoplankton is expressed in grams per cubic meter ( $\text{g}/\text{m}^3$ ), and periphyton and benthic organisms in grams per square meter ( $\text{g}/\text{m}^2$ ). (See also “Biomass” and “Dry mass”)

**Aspect** is the direction toward which a slope faces with respect to the compass.

**Bacteria** are microscopic unicellular organisms, typically spherical, rodlike, or spiral and threadlike in shape, often clumped into colonies. Some bacteria cause disease, whereas others perform an essential role in nature in the recycling of materials; for example, by decomposing organic matter into a form available for reuse by plants.

**Bankfull stage**, as used in this report, is the stage at which a stream first overflows its natural banks formed by floods with 1- to 3-year recurrence intervals.

**Base discharge** (for peak discharge) is a discharge value, determined for selected stations, above which peak discharge data are published. The base discharge at each station is selected so that an average of about three peak flows per year will be published. (See also “Peak flow”)

**Base flow** is sustained flow of a stream in the absence of direct runoff. It includes natural and human-induced streamflows. Natural base flow is sustained largely by ground-water discharge.

**Bed material** is the sediment mixture of which a streambed, lake, pond, reservoir, or estuary bottom is composed. (See also “Bedload” and “Sediment”)

**Bedload** is material in transport that is supported primarily by the streambed. In this report, bedload is considered to consist of particles in transit from the bed to an elevation equal to the top of the bedload sampler nozzle (ranging from 0.25 to 0.5 foot) that are retained in the bedload sampler. A sample collected with a pressure-differential bedload sampler also may contain a component of the suspended load.

**Bedload discharge** (tons per day) is the rate of sediment moving as bedload, reported as dry weight, that passes through a cross section in a given time. NOTE: Bedload discharge values in this report may include a component of the suspended-sediment discharge. A correction may be necessary when computing the total sediment discharge by summing the bedload discharge and the suspended-sediment discharge. (See also “Bedload,” “Dry weight,” “Sediment,” and “Suspended-sediment discharge”)

**Benthic organisms** are the group of organisms inhabiting the bottom of an aquatic environment. They include a number of types of organisms, such as bacteria, fungi, insect larvae and nymphs, snails, clams, and crayfish. They are useful as indicators of water quality.

**Biochemical oxygen demand (BOD)** is a measure of the quantity of dissolved oxygen, in milligrams per liter, necessary for the decomposition of organic matter by microorganisms, such as bacteria.

**Biomass** is the amount of living matter present at any given time, expressed as mass per unit area or volume of habitat.

**Biomass pigment ratio** is an indicator of the total proportion of periphyton that are autotrophic (plants). This is also called the Autotrophic Index.

**Blue-green algae** (*Cyanophyta*) are a group of phytoplankton and periphyton organisms with a blue pigment in addition to a green pigment called chlorophyll. Blue-green algae can cause nuisance water-quality conditions in lakes and slow-flowing rivers; however, they are found commonly in streams throughout the year. The abundance of blue-green algae in phytoplankton samples is expressed as the number of cells per milliliter (cells/mL) or biovolume in cubic micrometers per milliliter (mm<sup>3</sup>/mL). The abundance of blue-green algae in periphyton samples is given in cells per square centimeter (cells/cm<sup>2</sup>) or biovolume per square centimeter (mm<sup>3</sup>/cm<sup>2</sup>). (See also “Phytoplankton” and “Periphyton”)

**Bottom material** (See “Bed material”)

**Bulk electrical conductivity** is the combined electrical conductivity of all material within a doughnut-shaped volume surrounding an induction probe. Bulk conductivity is affected by different physical and chemical properties of

the material including the dissolved solids content of the pore water and lithology and porosity of the rock.

**Canadian Geodetic Vertical Datum 1928** is a geodetic datum derived from a general adjustment of Canada’s first order level network in 1928.

**Cell volume** (biovolume) determination is one of several common methods used to estimate biomass of algae in aquatic systems. Cell members of algae are frequently used in aquatic surveys as an indicator of algal production. However, cell numbers alone cannot represent true biomass because of considerable cell-size variation among the algal species. Cell volume (μm<sup>3</sup>) is determined by obtaining critical cell measurements or cell dimensions (for example, length, width, height, or radius) for 20 to 50 cells of each important species to obtain an average biovolume per cell. Cells are categorized according to the correspondence of their cellular shape to the nearest geometric solid or combinations of simple solids (for example, spheres, cones, or cylinders). Representative formulae used to compute biovolume are as follows:

$$\text{sphere } \frac{4}{3} \pi r^3 \quad \text{cone } \frac{1}{3} \pi r^2 h \quad \text{cylinder } \pi r^2 h.$$

pi (π) is the ratio of the circumference to the diameter of a circle; pi = 3.14159....

From cell volume, total algal biomass expressed as biovolume (μm<sup>3</sup>/mL) is thus determined by multiplying the number of cells of a given species by its average cell volume and then summing these volumes for all species.

**Cells/volume** refers to the number of cells of any organism that is counted by using a microscope and grid or counting cell. Many planktonic organisms are multicelled and are counted according to the number of contained cells per sample volume, and generally are reported as cells or units per milliliter (mL) or liter (L).

**Cfs-day** (See “Cubic foot per second-day”)

**Channel bars**, as used in this report, are the lowest prominent geomorphic features higher than the channel bed.

**Chemical oxygen demand (COD)** is a measure of the chemically oxidizable material in the water and furnishes an approximation of the amount of organic and reducing material present. The determined value may correlate with BOD or with carbonaceous organic pollution from sewage or industrial wastes. [See also “Biochemical oxygen demand (BOD)”]

***Clostridium perfringens* (*C. perfringens*)** is a spore-forming bacterium that is common in the feces of human and other warmblooded animals. Clostridial spores are being used experimentally as an indicator of past fecal contamination and presence of microorganisms that are resistant to disinfection and environmental stresses. (See also “Bacteria”)

**Coliphages** are viruses that infect and replicate in coliform bacteria. They are indicative of sewage contamination of water and of the survival and transport of viruses in the environment.

**Color unit** is produced by 1 milligram per liter of platinum in the form of the chloroplatinate ion. Color is expressed in units of the platinum-cobalt scale.

**Confined aquifer** is a term used to describe an aquifer containing water between two relatively impermeable boundaries. The water level in a well tapping a confined aquifer stands above the top of the confined aquifer and can be higher or lower than the water table that may be present in the material above it. In some cases, the water level can rise above the ground surface, yielding a flowing well.

**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.

**Continuous-record station** is a site where data are collected with sufficient frequency to define daily mean values and variations within a day.

**Control** designates a feature in the channel that physically affects the water-surface elevation and thereby determines the stage-discharge relation at the gage. This feature may be a constriction of the channel, a bedrock outcrop, a gravel bar, an artificial structure, or a uniform cross section over a long reach of the channel.

**Control structure**, as used in this report, is a structure on a stream or canal that is used to regulate the flow or stage of the stream or to prevent the intrusion of saltwater.

**Cubic foot per second** (CFS,  $\text{ft}^3/\text{s}$ ) is the rate of discharge representing a volume of 1 cubic foot passing a given point in 1 second. It is equivalent to approximately 7.48 gallons per second or approximately 449 gallons per minute, or 0.02832 cubic meters per second. The term "second-foot" sometimes is used synonymously with "cubic foot per second" but is now obsolete.

**Cubic foot per second-day** (CFS-DAY, Cfs-day,  $[(\text{ft}^3/\text{s})/\text{d}]$ ) 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, 1.98347 acre-feet, 646,317 gallons, or 2,446.6 cubic meters. The daily mean discharges reported in the daily value data tables are numerically equal to the daily volumes in cfs-days, and the totals also represent volumes in cfs-days.

**Cubic foot per second per square mile** [CFSM,  $(\text{ft}^3/\text{s})/\text{mi}^2$ ] is the average number of cubic feet of water flowing per second from each square mile of area drained, assuming the runoff is distributed uniformly in time and area. (See also "Annual runoff")

**Daily mean suspended-sediment concentration** is the time-weighted concentration of suspended sediment passing a

stream cross section during a 24-hour day. (See also "Sediment" and "Suspended-sediment concentration")

**Daily record station** is a site where data are collected with sufficient frequency to develop a record of one or more data values per day. The frequency of data collection can range from continuous recording to periodic sample or data collection on a daily or near-daily basis.

**Data collection platform** (DCP) is an electronic instrument that collects, processes, and stores data from various sensors, and transmits the data by satellite data relay, line-of-sight radio, and/or landline telemetry.

**Data logger** is a microprocessor-based data acquisition system designed specifically to acquire, process, and store data. Data are usually downloaded from onsite data loggers for entry into office data systems.

**Datum** is a surface or point relative to which measurements of height and/or horizontal position are reported. A vertical datum is a horizontal surface used as the zero point for measurements of gage height, stage, or elevation; a horizontal datum is a reference for positions given in terms of latitude-longitude, State Plane coordinates, or UTM coordinates. (See also "Gage datum," "Land-surface datum," "National Geodetic Vertical Datum of 1929," and "North American Vertical Datum of 1988")

**Diatoms** are the unicellular or colonial algae having a siliceous shell. Their concentrations are expressed as number of cells per milliliter (cells/mL) of sample. (See also "Phytoplankton")

**Diel** is of or pertaining to a 24-hour period of time; a regular daily cycle.

**Discharge**, or **flow**, is the rate that matter passes through a cross section of a stream channel or other water body per unit of time. The term commonly refers to the volume of water (including, unless otherwise stated, any sediment or other constituents suspended or dissolved in the water) that passes a cross section in a stream channel, canal, pipeline, etc., within a given period of time (cubic feet per second). Discharge also can apply to the rate at which constituents, such as suspended sediment, bedload, and dissolved or suspended chemicals, pass through a cross section, in which cases the quantity is expressed as the mass of constituent that passes the cross section in a given period of time (tons per day).

**Dissolved** refers to that material in a representative water sample that passes through a 0.45-micrometer membrane filter. This is a convenient operational definition used by Federal and State agencies that collect water-quality data. Determinations of "dissolved" constituent concentrations are made on sample water that has been filtered.

**Dissolved oxygen** (DO) is the molecular oxygen (oxygen gas) dissolved in water. The concentration in water is a function of atmospheric pressure, temperature, and dissolved-solids

concentration of the water. The ability of water to retain oxygen decreases with increasing temperature or dissolved-solids concentration. Photosynthesis and respiration by plants commonly cause diurnal variations in dissolved-oxygen concentration in water from some streams.

**Dissolved solids concentration** in water is the quantity of dissolved material in a sample of water. It is determined either analytically by the “residue-on-evaporation” method, or mathematically by totaling the concentrations of individual constituents reported in a comprehensive chemical analysis. During the analytical determination, the bicarbonate (generally a major dissolved component of water) is converted to carbonate. In the mathematical calculation, the bicarbonate value, in milligrams per liter, is multiplied by 0.4926 to convert it to carbonate. Alternatively, alkalinity concentration (as mg/L CaCO<sub>3</sub>) can be converted to carbonate concentration by multiplying by 0.60.

**Diversity index (H)** (Shannon index) is a numerical expression of evenness of distribution of aquatic organisms. The formula for diversity index is:

$$\bar{d} = - \sum_{i \approx 1}^s \frac{n_i}{n} \log_2 \frac{n_i}{n} ,$$

where  $n_i$  is the number of individuals per taxon,  $n$  is the total number of individuals, and  $s$  is the total number of taxa in the sample of the community. Index values range from zero, when all the organisms in the sample are the same, to some positive number, when some or all of the organisms in the sample are different.

**Drainage area** of a stream at a specific location is that area upstream from the location, measured in a horizontal plane, that has a common outlet at the site for its surface runoff from precipitation that normally drains by gravity into a stream. Drainage areas given herein include all closed basins, or noncontributing areas, within the area unless otherwise specified.

**Drainage basin** is a part of the Earth’s surface that contains a drainage system with a common outlet for its surface runoff. (See “Drainage area”)

**Dry mass** refers to the mass of residue present after drying in an oven at 105°C, until the mass remains unchanged. This mass represents the total organic matter, ash and sediment, in the sample. Dry-mass values are expressed in the same units as ash mass. (See also “Ash mass,” “Biomass,” and “Wet mass”)

**Dry weight** refers to the weight of animal tissue after it has been dried in an oven at 65°C until a constant weight is achieved. Dry weight represents total organic and inorganic matter in the tissue. (See also “Wet weight”)

**Embeddedness** is the degree to which gravel-sized and larger particles are surrounded or enclosed by finer-sized particles. (See also “Substrate embeddedness class”)

**Enterococcus bacteria** are commonly found in the feces of humans and other warmblooded animals. Although some strains are ubiquitous and not related to fecal pollution, the presence of enterococci in water is an indication of fecal pollution and the possible presence of enteric pathogens. Enterococcus bacteria are those bacteria that produce pink to red colonies with black or reddish-brown precipitate after incubation at 41°C on mE agar (nutrient medium for bacterial growth) and subsequent transfer to EIA medium. Enterococci include *Streptococcus feacalis*, *Streptococcus feacium*, *Streptococcus avium*, and their variants. (See also “Bacteria”)

**EPT Index** is the total number of distinct taxa within the insect orders Ephemeroptera, Plecoptera, and Trichoptera. This index summarizes the taxa richness within the aquatic insects that are generally considered pollution sensitive; the index usually decreases with pollution.

**Escherichia coli** (*E. coli*) are bacteria present in the intestine and feces of warmblooded animals. *E. coli* are a member species of the fecal coliform group of indicator bacteria. In the laboratory, they are defined as those bacteria that produce yellow or yellow-brown colonies on a filter pad saturated with urea substrate broth after primary culturing for 22 to 24 hours at 44.5°C on mTEC medium (nutrient medium for bacterial growth). Their concentrations are expressed as number of colonies per 100 mL of sample. (See also “Bacteria”)

**Estimated (E) value** of a concentration is reported when an analyte is detected and all criteria for a positive result are met. If the concentration is less than the method detection limit (MDL), an E code will be reported with the value. If the analyte is identified qualitatively as present, but the quantitative determination is substantially more uncertain, the National Water Quality Laboratory will identify the result with an E code even though the measured value is greater than the MDL. A value reported with an E code should be used with caution. When no analyte is detected in a sample, the default reporting value is the MDL preceded by a less than sign (<). For bacteriological data, concentrations are reported as estimated when results are based on non-ideal colony counts.

**Euglenoids** (*Euglenophyta*) are a group of algae that are usually free-swimming and rarely creeping. They have the ability to grow either photosynthetically in the light or heterotrophically in the dark. (See also “Phytoplankton”)

**Extractable organic halides** (EOX) are organic compounds that contain halogen atoms such as chlorine. These organic compounds are semivolatile and extractable by ethyl acetate from air-dried streambed sediment. The ethyl acetate extract is combusted, and the concentration is determined by microcoulometric determination of the halides formed. The

concentration is reported as micrograms of chlorine per gram of the dry weight of the streambed sediment.

**Fecal coliform bacteria** are present in the intestines or feces of warmblooded animals. They often are used as indicators of the sanitary quality of the water. In the laboratory, they are defined as all organisms that produce blue colonies within 24 hours when incubated at 44.5°C plus or minus 0.2°C on M-FC medium (nutrient medium for bacterial growth). Their concentrations are expressed as number of colonies per 100 mL of sample. (See also “Bacteria”)

**Fecal streptococcal bacteria** are present in the intestines of warmblooded animals and are ubiquitous in the environment. They are characterized as gram-positive, cocci bacteria that are capable of growth in brain-heart infusion broth. In the laboratory, they are defined as all the organisms that produce red or pink colonies within 48 hours at 35°C plus or minus 1.0°C on KF-streptococcus medium (nutrient medium for bacterial growth). Their concentrations are expressed as number of colonies per 100 mL of sample. (See also “Bacteria”)

**Fire algae** (*Pyrrhophyta*) are free-swimming unicells characterized by a red pigment spot. (See also “Phytoplankton”)

**Flow-duration percentiles** are values on a scale of 100 that indicate the percentage of time for which a flow is not exceeded. For example, the 90th percentile of river flow is greater than or equal to 90 percent of all recorded flow rates.

**Gage datum** is a horizontal surface used as a zero point for measurement of stage or gage height. This surface usually is located slightly below the lowest point of the stream bottom such that the gage height is usually slightly greater than the maximum depth of water. Because the gage datum itself is not an actual physical object, the datum usually is defined by specifying the elevations of permanent reference marks such as bridge abutments and survey monuments, and the gage is set to agree with the reference marks. Gage datum is a local datum that is maintained independently of any national geodetic datum. However, if the elevation of the gage datum relative to the national datum (North American Vertical Datum of 1988 or National Geodetic Vertical Datum of 1929) has been determined, then the gage readings can be converted to elevations above the national datum by adding the elevation of the gage datum to the gage reading.

**Gage height** (G.H.) is the water-surface elevation, in feet above the gage datum. If the water surface is below the gage datum, the gage height is negative. Gage height often is used interchangeably with the more general term “stage,” although gage height is more appropriate when used in reference to a reading on a gage.

**Gage values** are values that are recorded, transmitted, and/or computed from a gaging station. Gage values typically are collected at 5-, 15-, or 30-minute intervals.

**Gaging station** is a site on a stream, canal, lake, or reservoir where systematic observations of stage, discharge, or other hydrologic data are obtained.

**Gas chromatography/flame ionization detector** (GC/FID) is a laboratory analytical method used as a screening technique for semivolatile organic compounds that are extractable from water in methylene chloride.

**Geomorphic channel units**, as used in this report, are fluvial geomorphic descriptors of channel shape and stream velocity. Pools, riffles, and runs are types of geomorphic channel units considered for National Water-Quality Assessment (NAWQA) Program habitat sampling.

**Green algae** (*Chlorophyta*) are unicellular or colonial algae with chlorophyll pigments similar to those in terrestrial green plants. Some forms of green algae produce mats or floating “moss” in lakes. The abundance of green algae in phytoplankton samples is expressed as the number of cells per milliliter (cells/mL) or biovolume in cubic micrometers per milliliter (mm<sup>3</sup>/mL). The abundance of green algae in periphyton samples is given in cells per square centimeter (cells/cm<sup>2</sup>) or biovolume per square centimeter (mm<sup>3</sup>/cm<sup>2</sup>). (See also “Phytoplankton” and “Periphyton”)

**Habitat**, as used in this report, includes all nonliving (physical) aspects of the aquatic ecosystem, although living components like aquatic macrophytes and riparian vegetation also are usually included. Measurements of habitat are typically made over a wider geographic scale than are measurements of species distribution.

**Habitat quality index** is the qualitative description (level 1) of instream habitat and riparian conditions surrounding the reach sampled. Scores range from 0 to 100 percent with higher scores indicative of desirable habitat conditions for aquatic life. Index only applicable to wadable streams.

**Hardness** of water is a physical-chemical characteristic that commonly is recognized by the increased quantity of soap required to produce lather. It is computed as the sum of equivalents of polyvalent cations (primarily calcium and magnesium) and is expressed as the equivalent concentration of calcium carbonate (CaCO<sub>3</sub>).

**High tide** is the maximum height reached by each rising tide. The high-high and low-high tides are the higher and lower of the two high tides, respectively, of each tidal day. See NOAA web site:

<http://www.co-ops.nos.noaa.gov/tideglos.html>

**Hilsenhoff’s Biotic Index** (HBI) is an indicator of organic pollution that uses tolerance values to weight taxa abundances; usually increases with pollution. It is calculated as follows:

$$HBI = \frac{\text{sum}(n)(a)}{N}$$

where  $n$  is the number of individuals of each taxon,  $a$  is the tolerance value of each taxon, and  $N$  is the total number of organisms in the sample.

**Horizontal datum** (See “Datum”)

**Hydrologic index stations** referred to in this report are continuous-record gaging stations that have been selected as representative of streamflow patterns for their respective regions. Station locations are shown on index maps.

**Hydrologic unit** is a geographic area representing part or all of a surface drainage basin or distinct hydrologic feature as defined by the former Office of Water Data Coordination and delineated on the State Hydrologic Unit Maps by the USGS. Each hydrologic unit is identified by an 8-digit number.

**Inch** (IN., in.), as used in this report, refers to the depth to which the drainage area would be covered with water if all of the runoff for a given time period were uniformly distributed on it. (See also “Annual runoff”)

**Instantaneous discharge** is the discharge at a particular instant of time. (See also “Discharge”)

**International Boundary Commission Survey Datum** refers to a geodetic datum established at numerous monuments along the United States-Canada boundary by the International Boundary Commission.

**Island**, as used in this report, is a mid-channel bar that has permanent woody vegetation, is flooded once a year on average, and remains stable except during large flood events.

**Laboratory reporting level** (LRL) generally is equal to twice the yearly determined long-term method detection level (LT-MDL). The LRL controls false negative error. The probability of falsely reporting a nondetection for a sample that contained an analyte at a concentration equal to or greater than the LRL is predicted to be less than or equal to 1 percent. The value of the LRL will be reported with a “less than” (<) remark code for samples in which the analyte was not detected. The National Water Quality Laboratory (NWQL) collects quality-control data from selected analytical methods on a continuing basis to determine LT-MDLs and to establish LRLs. These values are reevaluated annually on the basis of the most current quality-control data and, therefore, may change. The LRL replaces the term ‘non-detection value’ (NDV).

**Land-surface datum** (lsd) is a datum plane that is approximately at land surface at each ground-water observation well.

**Latent heat flux** (often used interchangeably with latent heat-flux density) is the amount of heat energy that converts water from liquid to vapor (evaporation) or from vapor to liquid (condensation) across a specified cross-sectional area per unit time. Usually expressed in watts per square meter.

**Light-attenuation coefficient**, also known as the extinction coefficient, is a measure of water clarity. Light is attenuated according to the Lambert-Beer equation:

$$I = I_0 e^{-\lambda L},$$

where  $I_0$  is the source light intensity,  $I$  is the light intensity at length  $L$  (in meters) from the source,  $\lambda$  is the light-attenuation coefficient, and  $e$  is the base of the natural logarithm. The light-attenuation coefficient is defined as

$$\lambda = -\frac{1}{L} \log_e \frac{I}{I_0}.$$

**Lipid** is any one of a family of compounds that are insoluble in water and that make up one of the principal components of living cells. Lipids include fats, oils, waxes, and steroids. Many environmental contaminants such as organochlorine pesticides are lipophilic.

**Long-term method detection level** (LT-MDL) is a detection level derived by determining the standard deviation of a minimum of 24 method detection limit (MDL) spike sample measurements over an extended period of time. LT-MDL data are collected on a continuous basis to assess year-to-year variations in the LT-MDL. The LT-MDL controls false positive error. The chance of falsely reporting a concentration at or greater than the LT-MDL for a sample that did not contain the analyte is predicted to be less than or equal to 1 percent.

**Low tide** is the minimum height reached by each falling tide. The high-low and low-low tides are the higher and lower of the two low tides, respectively, of each tidal day. See NOAA web site:

<http://www.co-ops.nos.noaa.gov/tideglos.html>.

**Macrophytes** are the macroscopic plants in the aquatic environment. The most common macrophytes are the rooted vascular plants that usually are arranged in zones in aquatic ecosystems and restricted in the area by the extent of illumination through the water and sediment deposition along the shoreline.

**Mean concentration of suspended sediment** (Daily mean suspended-sediment concentration) is the time-weighted concentration of suspended sediment passing a stream cross section during a given time period. (See also “Daily mean suspended-sediment concentration” and “Suspended-sediment concentration”)

**Mean discharge** (MEAN) is the arithmetic mean of individual daily mean discharges during a specific period. (See also “Discharge”)

**Mean high or low tide** is the average of all high or low tides, respectively, over a specific period.

**Mean sea level** is a local tidal datum. It is the arithmetic mean of hourly heights observed over the National Tidal Datum Epoch. Shorter series are specified in the name; for

example, monthly mean sea level and yearly mean sea level. In order that they may be recovered when needed, such datums are referenced to fixed points known as benchmarks. (See also "Datum")

**Measuring point (MP)** is an arbitrary permanent reference point from which the distance to water surface in a well is measured to obtain water level.

**Megahertz** is a unit of frequency. One megahertz equals one million cycles per second.

**Membrane filter** is a thin microporous material of specific pore size used to filter bacteria, algae, and other very small particles from water.

**Metamorphic stage** refers to the stage of development that an organism exhibits during its transformation from an immature form to an adult form. This developmental process exists for most insects, and the degree of difference from the immature stage to the adult form varies from relatively slight to pronounced, with many intermediates. Examples of metamorphic stages of insects are egg-larva-adult or egg-nymph-adult.

**Method detection limit (MDL)** is the minimum concentration of a substance that can be measured and reported with 99-percent confidence that the analyte concentration is greater than zero. It is determined from the analysis of a sample in a given matrix containing the analyte. At the MDL concentration, the risk of a false positive is predicted to be less than or equal to 1 percent.

**Method of Cubatures** is a method of computing discharge in tidal estuaries based on the conservation of mass equation.

**Methylene blue active substances (MBAS)** are apparent detergents. The determination depends on the formation of a blue color when methylene blue dye reacts with synthetic anionic detergent compounds.

**Micrograms per gram (UG/G,  $\mu\text{g/g}$ )** is a unit expressing the concentration of a chemical constituent as the mass (micrograms) of the element per unit mass (gram) of material analyzed.

**Micrograms per kilogram (UG/KG,  $\mu\text{g/kg}$ )** is a unit expressing the concentration of a chemical constituent as the mass (micrograms) of the constituent per unit mass (kilogram) of the material analyzed. One microgram per kilogram is equivalent to 1 part per billion.

**Micrograms per liter (UG/L,  $\mu\text{g/L}$ )** is a unit expressing the concentration of chemical constituents in water as mass (micrograms) of constituent per unit volume (liter) of water. One thousand micrograms per liter is equivalent to 1 milligram per liter. One microgram per liter is equivalent to 1 part per billion.

**Microsiemens per centimeter (US/CM,  $\mu\text{S/cm}$ )** is a unit expressing the amount of electrical conductivity of a solution as measured between opposite faces of a centimeter

cube of solution at a specified temperature. Siemens is the International System of Units nomenclature. It is synonymous with mhos and is the reciprocal of resistance in ohms.

**Milligrams per liter (MG/L, mg/L)** is a unit for expressing the concentration of chemical constituents in water as the mass (milligrams) of constituent per unit volume (liter) of water. Concentration of suspended sediment also is expressed in milligrams per liter and is based on the mass of dry sediment per liter of water-sediment mixture.

**Minimum reporting level (MRL)** is the smallest measured concentration of a constituent that may be reliably reported by using a given analytical method.

**Miscellaneous site**, miscellaneous station, or miscellaneous sampling site is a site where streamflow, sediment, and/or water-quality data or water-quality or sediment samples are collected once, or more often on a random or discontinuous basis to provide better areal coverage for defining hydrologic and water-quality conditions over a broad area in a river basin.

**Most probable number (MPN)** is an index of the number of coliform bacteria that, more probably than any other number, would give the results shown by the laboratory examination; it is not an actual enumeration. MPN is determined from the distribution of gas-positive cultures among multiple inoculated tubes.

**Multiple-plate samplers** are artificial substrates of known surface area used for obtaining benthic invertebrate samples. They consist of a series of spaced, hardboard plates on an eyebolt.

**Nanograms per liter (NG/L, ng/L)** is a unit expressing the concentration of chemical constituents in solution as mass (nanograms) of solute per unit volume (liter) of water. One million nanograms per liter is equivalent to 1 milligram per liter.

**National Geodetic Vertical Datum of 1929 (NGVD 29)** is a fixed reference adopted as a standard geodetic datum for elevations determined by leveling. It was formerly called "Sea Level Datum of 1929" or "mean sea level." Although the datum was derived from the mean sea level at 26 tide stations, it does not necessarily represent local mean sea level at any particular place. See NOAA web site:

*<http://www.ngs.noaa.gov/faq.shtml#WhatVD29VD88>*.

(See "North American Vertical Datum of 1988")

**Natural substrate** refers to any naturally occurring immersed or submersed solid surface, such as a rock or tree, upon which an organism lives. (See also "Substrate")

**Nekton** are the consumers in the aquatic environment and consist of large free-swimming organisms that are capable of sustained, directed mobility.



**Nephelometric turbidity unit (NTU)** is the measurement for reporting turbidity that is based on use of a standard suspension of formazin. Turbidity measured in NTU uses nephelometric methods that depend on passing specific light of a specific wavelength through the sample.

**North American Datum of 1927 (NAD 27)** is the horizontal control datum for the United States that was defined by a location and azimuth on the Clarke spheroid of 1866.

**North American Datum of 1983 (NAD 83)** is the horizontal control datum for the United States, Canada, Mexico, and Central America that is based on the adjustment of 250,000 points including 600 satellite Doppler stations that constrain the system to a geocentric origin. NAD 83 has been officially adopted as the legal horizontal datum for the United States by the Federal government.

**North American Vertical Datum of 1988 (NAVD 88)** is a fixed reference adopted as the official civilian vertical datum for elevations determined by Federal surveying and mapping activities in the United States. This datum was established in 1991 by minimum-constraint adjustment of the Canadian, Mexican, and United States first-order terrestrial leveling networks.

**Open or screened interval** is the length of unscreened opening or of well screen through which water enters a well, in feet below land surface.

**Organic carbon (OC)** is a measure of organic matter present in aqueous solution, suspension, or bottom sediment. May be reported as dissolved organic carbon (DOC), particulate organic carbon (POC), or total organic carbon (TOC).

**Organic mass or volatile mass** of a living substance is the difference between the dry mass and ash mass and represents the actual mass of the living matter. Organic mass is expressed in the same units as for ash mass and dry mass. (See also "Ash mass," "Biomass," and "Dry mass")

**Organism count/area** refers to the number of organisms collected and enumerated in a sample and adjusted to the number per area habitat, usually square meter (m<sup>2</sup>), acre, or hectare. Periphyton, benthic organisms, and macrophytes are expressed in these terms.

**Organism count/volume** refers to the number of organisms collected and enumerated in a sample and adjusted to the number per sample volume, usually milliliter (mL) or liter (L). Numbers of planktonic organisms can be expressed in these terms.

**Organochlorine compounds** are any chemicals that contain carbon and chlorine. Organochlorine compounds that are important in investigations of water, sediment, and biological quality include certain pesticides and industrial compounds.

**Parameter code** is a 5-digit number used in the USGS computerized data system, National Water Information

System (NWIS), to uniquely identify a specific constituent or property.

**Partial-record station** is a site where discrete measurements of one or more hydrologic parameters are obtained over a period of time without continuous data being recorded or computed. A common example is a crest-stage gage partial-record station at which only peak stages and flows are recorded.

**Particle size** is the diameter, in millimeters (mm), of a particle determined by sieve or sedimentation methods. The sedimentation method utilizes the principle of Stokes law to calculate sediment particle sizes. Sedimentation methods (pipet, bottom-withdrawal tube, visual-accumulation tube, sedigraph) determine fall diameter of particles in either distilled water (chemically dispersed) or in native water (the river water at the time and point of sampling).

**Particle-size classification**, as used in this report, agrees with the recommendation made by the American Geophysical Union Subcommittee on Sediment Terminology. The classification is as follows:

Classification	Size (mm)	Method of analysis
Clay	>0.00024 - 0.004	Sedimentation
Silt	>0.004 - 0.062	Sedimentation
Sand	>0.062 - 2.0	Sedimentation/sieve
Gravel	>2.0 - 64.0	Sieve
Cobble	>64 - 256	Manual measurement
Boulder	>256	Manual measurement

The particle-size distributions given in this report are not necessarily representative of all particles in transport in the stream. For the sedimentation method, most of the organic matter is removed, and the sample is subjected to mechanical and chemical dispersion before analysis in distilled water. Chemical dispersion is not used for native water analysis.

**Peak flow (peak stage)** is an instantaneous local maximum value in the continuous time series of streamflows or stages, preceded by a period of increasing values and followed by a period of decreasing values. Several peak values ordinarily occur in a year. The maximum peak value in a year is called the annual peak; peaks lower than the annual peak are called secondary peaks. Occasionally, the annual peak may not be the maximum value for the year; in such cases, the maximum value occurs at midnight at the beginning or end of the year, on the recession from or rise toward a higher peak in the adjoining year. If values are recorded at a discrete series of times, the peak recorded value may be taken as an approximation of the true peak, which may occur between the recording instants. If the values are recorded with finite precision, a sequence of equal recorded values may occur at the peak; in this case, the first value is taken as the peak.

**Percent composition** or **percent of total** is a unit for expressing the ratio of a particular part of a sample or population to the total sample or population, in terms of types, numbers, weight, mass, or volume.

**Percent shading** is a measure of the amount of sunlight potentially reaching the stream. A clinometer is used to measure left and right bank canopy angles. These values are added together, divided by 180, and multiplied by 100 to compute percentage of shade.

**Periodic-record station** is a site where stage, discharge, sediment, chemical, physical, or other hydrologic measurements are made one or more times during a year but at a frequency insufficient to develop a daily record.

**Periphyton** is the assemblage of microorganisms attached to and living upon submerged solid surfaces. Although primarily consisting of algae, they also include bacteria, fungi, protozoa, rotifers, and other small organisms. Periphyton are useful indicators of water quality.

**Pesticides** are chemical compounds used to control undesirable organisms. Major categories of pesticides include insecticides, miticides, fungicides, herbicides, and rodenticides.

**pH** of water is the negative logarithm of the hydrogen-ion activity. Solutions with pH less than 7.0 standard units are termed "acidic," and solutions with a pH greater than 7.0 are termed "basic." Solutions with a pH of 7.0 are neutral. The presence and concentration of many dissolved chemical constituents found in water are affected, in part, by the hydrogen-ion activity of water. Biological processes including growth, distribution of organisms, and toxicity of the water to organisms also are affected, in part, by the hydrogen-ion activity of water.

**Phytoplankton** is the plant part of the plankton. They are usually microscopic, and their movement is subject to the water currents. Phytoplankton growth is dependent upon solar radiation and nutrient substances. Because they are able to incorporate as well as release materials to the surrounding water, the phytoplankton have a profound effect upon the quality of the water. They are the primary food producers in the aquatic environment and commonly are known as algae. (See also "Plankton")

**Picocurie** (PC, pCi) is one trillionth ( $1 \times 10^{-12}$ ) of the amount of radioactive nuclide represented by a curie (Ci). A curie is the quantity of radioactive nuclide that yields  $3.7 \times 10^{10}$  radioactive disintegrations per second (dps). A picocurie yields 0.037 dps, or 2.22 dpm (disintegrations per minute).

**Plankton** is the community of suspended, floating, or weakly swimming organisms that live in the open water of lakes and rivers. Concentrations are expressed as a number of cells per milliliter (cells/mL) of sample.

**Polychlorinated biphenyls** (PCBs) are industrial chemicals that are mixtures of chlorinated biphenyl compounds having

various percentages of chlorine. They are similar in structure to organochlorine insecticides.

**Polychlorinated naphthalenes** (PCNs) are industrial chemicals that are mixtures of chlorinated naphthalene compounds. They have properties and applications similar to polychlorinated biphenyls (PCBs) and have been identified in commercial PCB preparations.

**Pool**, as used in this report, is a small part of a stream reach with little velocity, commonly with water deeper than surrounding areas.

**Primary productivity** is a measure of the rate at which new organic matter is formed and accumulated through photosynthetic and chemosynthetic activity of producer organisms (chiefly, green plants). The rate of primary production is estimated by measuring the amount of oxygen released (oxygen method) or the amount of carbon assimilated (carbon method) by the plants.

**Primary productivity (carbon method)** is expressed as milligrams of carbon per area per unit time [ $\text{mg C}/(\text{m}^2/\text{time})$ ] for periphyton and macrophytes or per volume [ $\text{mg C}/(\text{m}^3/\text{time})$ ] for phytoplankton. The carbon method defines the amount of carbon dioxide consumed as measured by radioactive carbon (carbon-14). The carbon-14 method is of greater sensitivity than the oxygen light and dark bottle method and is preferred for use with unenriched water samples. Unit time may be either the hour or day, depending on the incubation period. (See also "Primary productivity")

**Primary productivity (oxygen method)** is expressed as milligrams of oxygen per area per unit time [ $\text{mg O}/(\text{m}^2/\text{time})$ ] for periphyton and macrophytes or per volume [ $\text{mg O}/(\text{m}^3/\text{time})$ ] for phytoplankton. The oxygen method defines production and respiration rates as estimated from changes in the measured dissolved-oxygen concentration. The oxygen light and dark bottle method is preferred if the rate of primary production is sufficient for accurate measurements to be made within 24 hours. Unit time may be either the hour or day, depending on the incubation period. (See also "Primary productivity")

**Radioisotopes** are isotopic forms of elements that exhibit radioactivity. Isotopes are varieties of a chemical element that differ in atomic weight but are very nearly alike in chemical properties. The difference arises because the atoms of the isotopic forms of an element differ in the number of neutrons in the nucleus; for example, ordinary chlorine is a mixture of isotopes having atomic weights of 35 and 37, and the natural mixture has an atomic weight of about 35.453. Many of the elements similarly exist as mixtures of isotopes, and a great many new isotopes have been produced in the operation of nuclear devices such as the cyclotron. There are 275 isotopes of the 81 stable elements, in addition to more than 800 radioactive isotopes.

**Reach**, as used in this report, is a length of stream that is chosen to represent a uniform set of physical, chemical, and

biological conditions within a segment. It is the principal sampling unit for collecting physical, chemical, and biological data.

**Recoverable from bed (bottom) material** is the amount of a given constituent that is in solution after a representative sample of bottom material has been digested by a method (usually using an acid or mixture of acids) that results in dissolution of readily soluble substances. Complete dissolution of all bottom material is not achieved by the digestion treatment and thus the determination represents less than the total amount (that is, less than 95 percent) of the constituent in the sample. To achieve comparability of analytical data, equivalent digestion procedures would be required of all laboratories performing such analyses because different digestion procedures are likely to produce different analytical results. (See also "Bed material")

**Recurrence interval**, also referred to as return period, is the average time, usually expressed in years, between occurrences of hydrologic events of a specified type (such as exceedances of a specified high flow or nonexceedance of a specified low flow). The terms "return period" and "recurrence interval" do not imply regular cyclic occurrence. The actual times between occurrences vary randomly, with most of the times being less than the average and a few being substantially greater than the average. For example, the 100-year flood is the flow rate that is exceeded by the annual maximum peak flow at intervals whose average length is 100 years (that is, once in 100 years, on average); almost two-thirds of all exceedances of the 100-year flood occur less than 100 years after the previous exceedance, half occur less than 70 years after the previous exceedance, and about one-eighth occur more than 200 years after the previous exceedance. Similarly, the 7-day, 10-year low flow ( $7Q_{10}$ ) is the flow rate below which the annual minimum 7-day-mean flow dips at intervals whose average length is 10 years (that is, once in 10 years, on average); almost two-thirds of the nonexceedances of the  $7Q_{10}$  occur less than 10 years after the previous nonexceedance, half occur less than 7 years after, and about one-eighth occur more than 20 years after the previous nonexceedance. The recurrence interval for annual events is the reciprocal of the annual probability of occurrence. Thus, the 100-year flood has a 1-percent chance of being exceeded by the maximum peak flow in any year, and there is a 10-percent chance in any year that the annual minimum 7-day-mean flow will be less than the  $7Q_{10}$ .

**Replicate samples** are a group of samples collected in a manner such that the samples are thought to be essentially identical in composition.

**Return period** (See "Recurrence interval")

**Riffle**, as used in this report, is a shallow part of the stream where water flows swiftly over completely or partially submerged obstructions to produce surface agitation.

**River mileage** is the curvilinear distance, in miles, measured upstream from the mouth along the meandering path of a stream channel in accordance with Bulletin No. 14 (October 1968) of the Water Resources Council and typically is used to denote location along a river.

**Run**, as used in this report, is a relatively shallow part of a stream with moderate velocity and little or no surface turbulence.

**Runoff** is the quantity of water that is discharged ("runs off") from a drainage basin during a given time period. Runoff data may be presented as volumes in acre-feet, as mean discharges per unit of drainage area in cubic feet per second per square mile, or as depths of water on the drainage basin in inches. (See also "Annual runoff")

**Sea level**, as used in this report, refers to one of the two commonly used national vertical datums (NGVD 1929 or NAVD 1988). See separate entries for definitions of these datums.

**Sediment** is solid material that originates mostly from disintegrated rocks; when transported by, suspended in, or deposited from water, it is referred to as "fluvial sediment." Sediment includes chemical and biochemical precipitates and decomposed organic material, such as humus. The quantity, characteristics, and cause of the occurrence of sediment in streams are affected by environmental and land-use factors. Some major factors are topography, soil characteristics, land cover, and depth and intensity of precipitation.

**Sensible heat flux** (often used interchangeably with latent sensible heat-flux density) is the amount of heat energy that moves by turbulent transport through the air across a specified cross-sectional area per unit time and goes to heating (cooling) the air. Usually expressed in watts per square meter.

**Seven-day, 10-year low flow ( $7Q_{10}$ )** is the discharge below which the annual 7-day minimum flow falls in 1 year out of 10 on the long-term average. The recurrence interval of the  $7Q_{10}$  is 10 years; the chance that the annual 7-day minimum flow will be less than the  $7Q_{10}$  is 10 percent in any given year. (See also "Annual 7-day minimum" and "Recurrence interval")

**Shelves**, as used in this report, are streambank features extending nearly horizontally from the flood plain to the lower limit of persistent woody vegetation.

**Sodium adsorption ratio (SAR)** is the expression of relative activity of sodium ions in exchange reactions within soil and is an index of sodium or alkali hazard to the soil. Sodium hazard in water is an index that can be used to evaluate the suitability of water for irrigating crops.

**Soil heat flux** (often used interchangeably with soil heat-flux density) is the amount of heat energy that moves by conduction across a specified cross-sectional area of soil per

unit time and goes to heating (or cooling) the soil. Usually expressed in watts per square meter.

**Soil-water content** is the water lost from the soil upon drying to constant mass at 105°C; expressed either as mass of water per unit mass of dry soil or as the volume of water per unit bulk volume of soil.

**Specific electrical conductance (conductivity)** is a measure of the capacity of water (or other media) to conduct an electrical current. It is expressed in microsiemens per centimeter at 25°C. Specific electrical conductance is a function of the types and quantity of dissolved substances in water and can be used for approximating the dissolved-solids content of the water. Commonly, the concentration of dissolved solids (in milligrams per liter) is from 55 to 75 percent of the specific conductance (in microsiemens). This relation is not constant from stream to stream, and it may vary in the same source with changes in the composition of the water.

**Stable isotope ratio** (per MIL) is a unit expressing the ratio of the abundance of two radioactive isotopes. Isotope ratios are used in hydrologic studies to determine the age or source of specific water, to evaluate mixing of different water, as an aid in determining reaction rates, and other chemical or hydrologic processes.

**Stage** (See “Gage height”)

**Stage-discharge relation** is the relation between the water-surface elevation, termed stage (gage height), and the volume of water flowing in a channel per unit time.

**Streamflow** is the discharge that occurs in a natural channel. Although the term “discharge” can be applied to the flow of a canal, the word “streamflow” uniquely describes the discharge in a surface stream course. The term “streamflow” is more general than “runoff” as streamflow may be applied to discharge whether or not it is affected by diversion or regulation.

**Substrate** is the physical surface upon which an organism lives.

**Substrate embeddedness class** is a visual estimate of riffle streambed substrate larger than gravel that is surrounded or covered by fine sediment (<2mm, sand or finer). Below are the class categories expressed as the percentage covered by fine sediment:

0	no gravel or larger substrate	3	26-50 percent
1	> 75 percent	4	5-25 percent
2	51-75 percent	5	< 5 percent

**Surface area of a lake** is that area (acres) encompassed by the boundary of the lake as shown on USGS topographic maps, or other available maps or photographs. Because surface area changes with lake stage, surface areas listed in this report represent those determined for the stage at the time the maps or photographs were obtained.

**Surficial bed material** is the upper surface (0.1 to 0.2 foot) of the bed material that is sampled using U.S. Series Bed-Material Samplers.

**Surrogate** is an analyte that behaves similarly to a target analyte, but that is highly unlikely to occur in a sample. A surrogate is added to a sample in known amounts before extraction and is measured with the same laboratory procedures used to measure the target analyte. Its purpose is to monitor method performance for an individual sample.

**Suspended** (as used in tables of chemical analyses) refers to the amount (concentration) of undissolved material in a water-sediment mixture. It is defined operationally as the material retained on a 0.45-micrometer filter.

**Suspended, recoverable** is the amount of a given constituent that is in solution after the part of a representative suspended water-sediment sample that is retained on a 0.45-micrometer membrane filter has been digested by a method (usually using a dilute acid solution) that results in dissolution of only readily soluble substances. Complete dissolution of all the particulate matter is not achieved by the digestion treatment, and thus the determination represents something less than the “total” amount (that is, less than 95 percent) of the constituent present in the sample. To achieve comparability of analytical data, equivalent digestion procedures are required of all laboratories performing such analyses because different digestion procedures are likely to produce different analytical results. Determinations of “suspended, recoverable” constituents are made either by directly analyzing the suspended material collected on the filter or, more commonly, by difference, on the basis of determinations of (1) dissolved and (2) total recoverable concentrations of the constituent. (See also “Suspended”)

**Suspended sediment** is the sediment maintained in suspension by the upward components of turbulent currents or that exists in suspension as a colloid. (See also “Sediment”)

**Suspended-sediment concentration** is the velocity-weighted concentration of suspended sediment in the sampled zone (from the water surface to a point approximately 0.3 foot above the bed) expressed as milligrams of dry sediment per liter of water-sediment mixture (mg/L). The analytical technique uses the mass of all of the sediment and the net weight of the water-sediment mixture in a sample to compute the suspended-sediment concentration. (See also “Sediment” and “Suspended sediment”)

**Suspended-sediment discharge** (tons/d) is the rate of sediment transport, as measured by dry mass or volume, that passes a cross section in a given time. It is calculated in units of tons per day as follows: concentration (mg/L) x discharge (ft<sup>3</sup>/s) x 0.0027. (See also “Sediment,” “Suspended sediment,” and “Suspended-sediment concentration”)

**Suspended-sediment load** is a general term that refers to a given characteristic of the material in suspension that passes a point during a specified period of time. The term needs to be qualified, such as “annual suspended-sediment load” or “sand-size suspended-sediment load,” and so on. It is not synonymous with either suspended-sediment discharge or concentration. (See also “Sediment”)

**Suspended solids, total residue at 105°C concentration** is the concentration of inorganic and organic material retained on a filter, expressed as milligrams of dry material per liter of water (mg/L). An aliquot of the sample is used for this analysis.

**Suspended, total** is the total amount of a given constituent in the part of a water-sediment sample that is retained on a 0.45-micrometer membrane filter. This term is used only when the analytical procedure assures measurement of at least 95 percent of the constituent determined. Knowledge of the expected form of the constituent in the sample, as well as the analytical methodology used, is required to determine when the results should be reported as “suspended, total.” Determinations of “suspended, total” constituents are made either by directly analyzing portions of the suspended material collected on the filter or, more commonly, by difference, on the basis of determinations of (1) dissolved and (2) total concentrations of the constituent. (See also “Suspended”)

**Synoptic studies** are short-term investigations of specific water-quality conditions during selected seasonal or hydrologic periods to provide improved spatial resolution for critical water-quality conditions. For the period and conditions sampled, they assess the spatial distribution of selected water-quality conditions in relation to causative factors, such as land use and contaminant sources.

**Taxa (Species) richness** is the number of species (taxa) present in a defined area or sampling unit.

**Taxonomy** is the division of biology concerned with the classification and naming of organisms. The classification of organisms is based upon a hierarchical scheme beginning with Kingdom and ending with Species at the base. The higher the classification level, the fewer features the organisms have in common. For example, the taxonomy of a particular mayfly, *Hexagenia limbata*, is the following:

Kingdom:	Animal
Phylum:	Arthropoda
Class:	Insecta
Order:	Ephemeroptera
Family:	Ephemeridae
Genus:	<i>Hexagenia</i>
Species:	<i>Hexagenia limbata</i>

**Thalweg** is the line formed by connecting points of minimum streambed elevation (deepest part of the channel).

**Thermograph** is an instrument that continuously records variations of temperature on a chart. The more general term

“temperature recorder” is used in the table descriptions and refers to any instrument that records temperature whether on a chart, a tape, or any other medium.

**Time-weighted average** is computed by multiplying the number of days in the sampling period by the concentrations of individual constituents for the corresponding period and dividing the sum of the products by the total number of days. A time-weighted average represents the composition of water resulting from the mixing of flow proportionally to the duration of the concentration.

**Tons per acre-foot** (T/acre-ft) is the dry mass (tons) of a constituent per unit volume (acre-foot) of water. It is computed by multiplying the concentration of the constituent, in milligrams per liter, by 0.00136.

**Tons per day** (T/DAY, tons/d) is a common chemical or sediment discharge unit. It is the quantity of a substance in solution, in suspension, or as bedload that passes a stream section during a 24-hour period. It is equivalent to 2,000 pounds per day, or 0.9072 metric tons per day.

**Total** is the amount of a given constituent in a representative whole-water (unfiltered) sample, regardless of the constituent’s physical or chemical form. This term is used only when the analytical procedure assures measurement of at least 95 percent of the constituent present in both the dissolved and suspended phases of the sample. A knowledge of the expected form of the constituent in the sample, as well as the analytical methodology used, is required to judge when the results should be reported as “total.” (Note that the word “total” does double duty here, indicating both that the sample consists of a water-suspended sediment mixture and that the analytical method determined at least 95 percent of the constituent in the sample.)

**Total coliform bacteria** are a particular group of bacteria that are used as indicators of possible sewage pollution. This group includes coliforms that inhabit the intestine of warmblooded animals and those that inhabit soils. They are characterized as aerobic or facultative anaerobic, gram-negative, nonspore-forming, rod-shaped bacteria that ferment lactose with gas formation within 48 hours at 35°C. In the laboratory, these bacteria are defined as all the organisms that produce colonies with a golden-green metallic sheen within 24 hours when incubated at 35°C plus or minus 1.0°C on M-Endo medium (nutrient medium for bacterial growth). Their concentrations are expressed as number of colonies per 100 milliliters of sample. (See also “Bacteria”)

**Total discharge** is the quantity of a given constituent, measured as dry mass or volume, that passes a stream cross section per unit of time. When referring to constituents other than water, this term needs to be qualified, such as “total sediment discharge,” “total chloride discharge,” and so on.

**Total in bottom material** is the amount of a given constituent in a representative sample of bottom material. This term is used only when the analytical procedure assures measurement of at least 95 percent of the constituent determined. A knowledge of the expected form of the constituent in the sample, as well as the analytical methodology used, is required to judge when the results should be reported as “total in bottom material.”

**Total length** (fish) is the straight-line distance from the anterior point of a fish specimen’s snout, with the mouth closed, to the posterior end of the caudal (tail) fin, with the lobes of the caudal fin squeezed together.

**Total load** refers to all of a constituent in transport. When referring to sediment, it includes suspended load plus bed load.

**Total organism count** is the number of organisms collected and enumerated in any particular sample. (See also “Organism count/volume”)

**Total recoverable** is the amount of a given constituent in a whole-water sample after a sample has been digested by a method (usually using a dilute acid solution) that results in dissolution of only readily soluble substances. Complete dissolution of all particulate matter is not achieved by the digestion treatment, and thus the determination represents something less than the “total” amount (that is, less than 95 percent) of the constituent present in the dissolved and suspended phases of the sample. To achieve comparability of analytical data for whole-water samples, equivalent digestion procedures are required of all laboratories performing such analyses because different digestion procedures may produce different analytical results.

**Total sediment discharge** is the mass of suspended-sediment plus bed-load transport, measured as dry weight, that passes a cross section in a given time. It is a rate and is reported as tons per day. (See also “Bedload,” “Bedload discharge,” “Sediment,” “Suspended sediment,” and “Suspended-sediment concentration”)

**Total sediment load** or **Total load** is the sediment in transport as bedload and suspended-sediment load. The term may be qualified, such as “annual suspended-sediment load” or “sand-size suspended-sediment load,” and so on. It differs from total sediment discharge in that load refers to the material, whereas discharge refers to the quantity of material, expressed in units of mass per unit time. (See also “Sediment,” “Suspended-sediment load,” and “Total load”)

**Transect**, as used in this report, is a line across a stream perpendicular to the flow and along which measurements are taken, so that morphological and flow characteristics along the line are described from bank to bank. Unlike a cross section, no attempt is made to determine known elevation points along the line.

**Turbidity** is the reduction in the transparency of a solution due to the presence of suspended and some dissolved

substances. The measurement technique records the collective optical properties of the solution that cause light to be scattered and attenuated rather than transmitted in straight lines; the higher the intensity of scattered or attenuated light, the higher the value of the turbidity. Turbidity is expressed in nephelometric turbidity units (NTU). Depending on the method used, the turbidity units as NTU can be defined as the intensity of light of a specified wavelength scattered or attenuated by suspended particles or absorbed at a method specified angle, usually 90 degrees, from the path of the incident light. Currently approved methods for the measurement of turbidity in the USGS include those that conform to U.S. EPA Method 180.1, ASTM D1889-00, and ISO 7027. Measurements of turbidity by these different methods and different instruments are unlikely to yield equivalent values.

**Ultraviolet (UV) absorbance (absorption)** at 254 or 280 nanometers is a measure of the aggregate concentration of the mixture of UV absorbing organic materials dissolved in the analyzed water, such as lignin, tannin, humic substances, and various aromatic compounds. UV absorbance (absorption) at 254 or 280 nanometers is measured in UV absorption units per centimeter of pathlength of UV light through a sample.

**Unconfined aquifer** is an aquifer whose upper surface is a water table free to fluctuate under atmospheric pressure. (See “Water-table aquifer”)

**Vertical datum** (See “Datum”)

**Volatile organic compounds (VOCs)** are organic compounds that can be isolated from the water phase of a sample by purging the water sample with inert gas, such as helium, and subsequently analyzed by gas chromatography. Many VOCs are human-made chemicals that are used and produced in the manufacture of paints, adhesives, petroleum products, pharmaceuticals, and refrigerants. They are often components of fuels, solvents, hydraulic fluids, paint thinners, and dry cleaning agents commonly used in urban settings. VOC contamination of drinking-water supplies is a human health concern because many are toxic and are known or suspected human carcinogens.

**Water table** is that surface in a ground-water body at which the water pressure is equal to the atmospheric pressure.

**Water-table aquifer** is an unconfined aquifer within which the water table is found.

**Water year** in USGS reports dealing with surface-water supply is the 12-month period October 1 through September 30. The water year is designated by the calendar year in which it ends and which includes 9 of the 12 months. Thus, the year ending September 30, 2003, is called the “2003 water year.”

**WDR** is used as an abbreviation for “Water-Data Report” in the REVISED RECORDS paragraph to refer to State annual hydrologic-data reports. (WRD was used as an abbreviation

for “Water-Resources Data” in reports published prior to 1976.)

**Weighted average** is used in this report to indicate discharge-weighted average. It is computed by multiplying the discharge for a sampling period by the concentrations of individual constituents for the corresponding period and dividing the sum of the products by the sum of the discharges. A discharge-weighted average approximates the composition of water that would be found in a reservoir containing all the water passing a given location during the water year after thorough mixing in the reservoir.

**Wet mass** is the mass of living matter plus contained water. (See also “Biomass” and “Dry mass”)

**Wet weight** refers to the weight of animal tissue or other substance including its contained water. (See also “Dry weight”)

**WSP** is used as an acronym for “Water-Supply Paper” in reference to previously published reports.

**Zooplankton** is the animal part of the plankton. Zooplankton are capable of extensive movements within the water column and often are large enough to be seen with the unaided eye. Zooplankton are secondary consumers feeding upon bacteria, phytoplankton, and detritus. Because they are the grazers in the aquatic environment, the zooplankton are a vital part of the aquatic food web. The zooplankton community is dominated by small crustaceans and rotifers. (See also “Plankton”)

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6–A6. *A coupled surface-water and ground-water flow model (MODBRANCH) for simulation of stream-aquifer interaction*, by Eric D. Swain and Eliezer J. Wexler: USGS–TWRI book 6, chap. A6. 1996. 125 p.

6–A7. *User's guide to SEAWAT: A computer program for simulation of three-dimensional variable-density ground-water flow*, by Weixing Guo and Christian D. Langevin: USGS–TWRI book 6, chap. A7. 2002. 77 p.

### **Book 7. Automated Data Processing and Computations**

#### **Section C. Computer Programs**

7–C1. *Finite difference model for aquifer simulation in two dimensions with results of numerical experiments*, by P.C. Trescott, G.F. Pinder, and S.P. Larson: USGS–TWRI book 7, chap. C1. 1976. 116 p.

7–C2. *Computer model of two-dimensional solute transport and dispersion in ground water*, by L.F. Konikow and J.D. Bredehoeft: USGS–TWRI book 7, chap. C2. 1978. 90 p.

7–C3. *A model for simulation of flow in singular and interconnected channels*, by R.W. Schaffranek, R.A. Baltzer, and D.E. Goldberg: USGS–TWRI book 7, chap. C3. 1981. 110 p.

### **Book 8. Instrumentation**

#### **Section A. Instruments for Measurement of Water Level**

8–A1. *Methods of measuring water levels in deep wells*, by M.S. Garber and F.C. Koopman: USGS–TWRI book 8, chap. A1. 1968. 23 p.

8–A2. *Installation and service manual for U.S. Geological Survey manometers*, by J.D. Craig: USGS–TWRI book 8, chap. A2. 1983. 57 p.

**Section B. Instruments for Measurement of Discharge**

8–B2. *Calibration and maintenance of vertical-axis type current meters*, by G.F. Smoot and C.E. Novak: USGS–TWRI book 8, chap. B2. 1968. 15 p.

**Book 9. Handbooks for Water-Resources Investigations**

**Section A. National Field Manual for the Collection of Water-Quality Data**

9–A1. *National field manual for the collection of water-quality data: Preparations for water sampling*, by F.D. Wilde, D.B. Radtke, Jacob Gibs, and R.T. Iwatsubo: USGS–TWRI book 9, chap. A1. 1998. 47 p.

9–A2. *National field manual for the collection of water-quality data: Selection of equipment for water sampling*, edited by F.D. Wilde, D.B. Radtke, Jacob Gibs, and R.T. Iwatsubo: USGS–TWRI book 9, chap. A2. 1998. 94 p.

9–A3. *National field manual for the collection of water-quality data: Cleaning of equipment for water sampling*, edited by F.D. Wilde, D.B. Radtke, Jacob Gibs, and R.T. Iwatsubo: USGS–TWRI book 9, chap. A3. 1998. 75 p.

9–A4. *National field manual for the collection of water-quality data: Collection of water samples*, edited by F.D. Wilde, D.B. Radtke, Jacob Gibs, and R.T. Iwatsubo: USGS–TWRI book 9, chap. A4. 1999. 156 p.

9–A5. *National field manual for the collection of water-quality data: Processing of water samples*, edited by F.D. Wilde, D.B. Radtke, Jacob Gibs, and R.T. Iwatsubo: USGS–TWRI book 9, chap. A5. 1999, 149 p.

9–A6. *National field manual for the collection of water-quality data: Field measurements*, edited by F.D. Wilde and D.B. Radtke: USGS–TWRI book 9, chap. A6. 1998. Various paginated.

9–A7. *National field manual for the collection of water-quality data: Biological indicators*, edited by D.N. Myers and F.D. Wilde: USGS–TWRI book 9, chap. A7. 1997 and 1999. Various paginated.

9–A8. *National field manual for the collection of water-quality data: Bottom-material samples*, by D.B. Radtke: USGS–TWRI book 9, chap. A8. 1998. 48 p.

9–A9. *National field manual for the collection of water-quality data: Safety in field activities*, by S.L. Lane and R.G. Fay: USGS–TWRI book 9, chap. A9. 1998. 60 p.

**Other USGS Methods Report:**

OFR 93-125. *Methods of analysis by the U.S. Geological Survey National Water Quality Laboratory--Determination of inorganic and organic constituents in water and fluvial sediments*, by M.J. Fishman, ed., 1993. 217 p.

**Table 10.** Montana active and discontinued streamflow-gaging, water-quality, and crest-stage gage stations (active stations in bold print)

[P, present;--, no data]

Station number	Station name	Drainage area (square miles)	Period of record (by water year)							
			Discharge or contents		Water quality					
			Daily or monthly	Annual peak	Daily			Periodic		
				Specific conductance	Water temperature	Sediment	Chemistry	Sediment	Biology	
<u>Part 5--Hudson Bay Basin</u>										
05010000	Belly River at international boundary	74.8	1947-64	1948-64	--	--	--	--	--	--
05010500	North Fork Belly River at international boundary	10.1	1947-55	1948-55	--	--	--	--	--	--
05010700	Mountain View Irrigation District Canal near Mtn. View, Alberta	--	1935-78	--	--	--	--	--	--	--
05011000	Belly River near Mountain View, Alberta	121	1912-78	1912-78	--	--	--	--	--	--
05011500	Waterton River near international boundary	61.0	1947-64	1948-64	--	--	--	--	--	--
05012000	Street Creek at international boundary	6.0	1948-55	1948-55, 1964	--	--	--	--	--	--
05012500	Boundary Creek at international boundary	21.0	1948-64	1948-64	--	--	--	--	--	--
05013000	Waterton River near Waterton Park, Alberta	238	1908-33, 1948-78	1908-30, 1933, 1948-78	--	--	--	--	--	--
05013500	St. Mary Lake near St. Mary	130	1929-61	--	--	--	--	--	--	--
05013600	St. Mary River near St. Mary	130	1961-62	--	--	--	--	--	--	--
05013700	St. Mary River above Swiftcurrent Creek, near Babb	173	1902-15	1902-15	--	--	--	--	--	--
05013900	Grinnell Creek at Grinnell Glacier, near Many Glacier	1.1	1959-71	1960-63, 1965-66, 1968-71	--	--	--	--	--	--
05014000	Grinnell Creek near Many Glacier	3.32	1949-78	1950-78	--	--	--	--	--	--
<b>05014300</b>	<b>Swiftcurrent Creek above Swiftcurrent Lake, nr Many Glacier</b>		<b>2003</b>	<b>2003</b>						
<b>05014500</b>	<b>Swiftcurrent Creek at Many Glacier</b>	30.9	<b>1912-P</b>	<b>1913-P</b>	--	1966-69	--	--	1966	--
05015000	Canyon Creek near Many Glacier	7.1	1918-37	1919, 1921-27, 1929-31, 1934,1936	--	--	--	--	--	--
<b>05015500</b>	<b>Lake Sherburne at Sherburne</b>	64.1	<b>1915-P</b>	--	--	--	--	--	--	--
<b>05016000</b>	<b>Swiftcurrent Creek at Sherburne</b>	64.6	<b>1912-81, 1984-P</b>	<b>1913-P</b>	--	--	--	1990-92	<b>1996-P</b>	--
05016400	Swiftcurrent Creek at mouth, near Babb	--	--	--	--	--	--	--	1996	--
05016500	Swiftcurrent Creek near Babb	98.6	1902-10	1902, 1904-07, 1909	--	--	--	--	--	--
05017000	Lower St. Mary Lake near Babb	276	1929-55	--	--	--	--	--	--	--
<b>05017500</b>	<b>St. Mary River near Babb</b>	276	<b>1901-02, 1910-25, 1950-P</b>	<b>1902, 1911-25, 1951-P</b>	--	--	--	1965	--	--
<b>05018000</b>	<b>St. Mary Canal at intake, near Babb</b>	--	<b>1918-50, 1997-P</b>	--	--	--	--	--	--	--
<b>05018500</b>	<b>St. Mary Canal at St. Mary Crossing, near Babb</b>	--	<b>1918-P</b>	--	--	--	--	--	--	--

**Table 10.** Montana active and discontinued streamflow-gaging, water-quality, and crest-stage gage stations (active stations in bold print)--Continued

Station number	Station name	Drainage area (square miles)	Period of record (by water year)							
			Discharge or contents		Water quality					
			Daily or monthly	Annual peak	Daily			Periodic		
				Specific conductance	Water temperature	Sediment	Chemistry	Sediment	Biology	
<u>Part 5--Hudson Bay Basin--Continued</u>										
05019000	St. Mary Canal at Hudson Bay Divide, near Browning	--	1917-66	--	--	--	--	1965, 1981-83	--	--
05019500	St. Mary River below St. Mary Canal, near Babb	286	1929-50	1929-33, 1935-50	--	--	--	--	--	--
05020000	Kennedy Creek near Babb	60.8	1905	1964,1975	--	--	--	--	--	--
<b>05020500</b>	<b>St. Mary River at international boundary</b>	465	<b>1902-P</b>	<b>1903-P</b>	1978-81	1978-79	--	1978-93	1978-93	1978-93
<u>Part 6--Missouri River Basin</u>										
<b>06006000</b>	<b>Red Rock Creek above Lakes, near Lakeview</b>	39.2	<b>1997-P</b>	<b>1997-P</b>	--	--	--	--	--	--
06007000	Tom Creek near Lakeview	6.43	1989	1989	--	--	--	--	--	--
06008000	Odell Creek above Taft Ranch, near Lakeview	17.7	1993-98	1994-98	--	--	--	--	--	--
06010000	Red Rock River near Lakeview	237	1933-37	--	--	--	--	--	--	--
06010500	Red Rock River at Metzler Fork, near Monida	264	1925-29	--	--	--	--	--	--	--
06010600	Red Rock River at Brundage Bridge, near Lakeview	277	1988-89	1989	--	--	--	--	--	--
06011000	Red Rock River at Kennedy Ranch, near Lakeview	323	1936-67	1937-42, 1945-54, 1956-67, 1984	--	--	--	--	--	--
06011400	Long Creek near Lakeview	36	--	1960-67, 1969,1984	--	--	--	--	--	--
06011500	Red Rock River above Lima Reservoir, near Monida	431	1911, 1914-18, 1925,1930	--	--	--	--	--	--	--
06011900	Red Rock River tributary near Monida	0.37	--	1960-67, 1984	--	--	--	--	--	--
<b>06012000</b>	<b>Lima Reservoir near Monida</b>	570	<b>1940-P</b>	--	--	--	--	--	--	--
<b>06012500</b>	<b>Red Rock River below Lima Reservoir, near Monida</b>	570	<b>1911-19, 1925-69, 1974-82, 1985-P</b>	<b>1912-18, 1926-69, 1974-82, 1985-P</b>	--	--	--	--	--	--
06013000	Red Rock River at Lima	602	1907-11	--	--	--	--	--	--	--
06013200	Traux Creek near Lima	4.06	--	1960-74, 1984	--	--	--	--	--	--
06013400	Muddy Creek near Dell	63.4	--	1960-74, 1984	--	--	--	--	--	--
06013500	Big Sheep Creek below Muddy Creek, near Dell	278	1936, 1946-53, 1977-79	1946-53, 1960-91	--	1977-79	1977-79	--	1977-79	--
06013900	Sage Creek tributary near Dell	0.34	--	1959-67	--	--	--	--	--	--
06014000	Red Rock River near Dell	1,421	1942-67	1943-67	--	--	--	--	--	--

**Table 10.** Montana active and discontinued streamflow-gaging, water-quality, and crest-stage gage stations (active stations in bold print)--Continued

Station number	Station name	Drainage area (square miles)	Period of record (by water year)							
			Discharge or contents		Water quality					
			Daily or monthly	Annual peak	Daily			Periodic		
					Specific conductance	Water temperature	Sediment	Chemistry	Sediment	Biology
<u>Part 6--Missouri River Basin--Continued</u>										
06014500	Red Rock River at Red Rock	1,548	1890, 1951-52, 1974-83	1974-83	--	--	--	--	--	--
06015000	Horse Prairie Creek near Grant	325	1946-53	1946-53	--	--	--	--	--	--
<b>06015300</b>	<b>Clark Canyon Reservoir near Grant</b>	2,321	<b>1964-P</b>	--	--	--	--	--	--	--
06015400	Beaverhead River near Grant	2,322	1962-83	1963-83	--	--	--	--	--	--
<b>06015430</b>	<b>Clark Canyon near Dillon</b>	18.0	--	<b>1969, 1974-P</b>	--	--	--	--	--	--
06015500	Grasshopper Creek near Dillon	348	1921-33, 1946-54, 1955-58, 1960-61	1921-32, 1946-53, 1955-58, 1960-73, 1975	--	--	--	1986	--	--
<b>06016000</b>	<b>Beaverhead River at Barretts</b>	2,737	<b>1907-P</b>	<b>1908-P</b>	1965-78	1965-78	--	1965-78, 1986	--	--
06016500	Rattlesnake Creek near Dillon	23.9	1946-49	--	--	--	--	--	--	--
06016900	Beaverhead River tributary near Dillon	0.93	--	1960-74	--	--	--	--	--	--
<b>06017000</b>	<b>Beaverhead River at Dillon</b>	2,895	<b>1950-52, 1963-71, 2002-P</b>	<b>1951-52, 1964-71, 2002-P</b>	--	--	--	--	--	--
06017500	Blacktail Deer Creek near Dillon	312	1946-54, 1955-66	1946-53, 1955-66, 1984	--	--	--	--	--	--
06017600	Blacktail Deer Creek at Dillon	--	--	--	--	--	--	1986	--	--
06018000	Beaverhead River near Dillon	3,484	1951-52, 1963-83	1951-52, 1964-83	--	--	--	--	--	--
06018200	Beaverhead River tributary No. 2 near Dillon	0.88	--	1958-65	--	--	--	--	--	--
<b>06018500</b>	<b>Beaverhead River near Twin Bridges</b>	3,619	<b>1935-P</b>	<b>1936-44, 1946-P</b>	--	<b>2001-P</b>	1962-74	<b>1950-51, 1962-81, 1986, 1999-P</b>	<b>1999-P</b>	--
06019000	Ruby River above Warm Springs Creek, near Alder	145	1948-53	1948-53	--	--	--	--	--	--
06019400	Sweetwater Creek near Alder	81.5	--	1974-91	--	--	--	--	--	--
<b>06019500</b>	<b>Ruby River above Reservoir, near Alder</b>	534	<b>1938-P</b>	<b>1939-P</b>	--	--	--	--	1994	--
06019800	Idaho Creek near Alder	11.0	--	1960-85	--	--	--	--	--	--
06020000	Ruby River at damsite, near Alder	592	1911-14, 1935-37	--	--	--	--	--	--	--
<b>06020600</b>	<b>Ruby River below Reservoir, near Alder</b>	596	<b>1962-P</b>	<b>1963-P</b>	--	--	--	--	1994	--
06021000	Ruby River near Alder	614	1929-39, 1946-61	1929-39, 1947-60	--	--	--	--	--	--
06021500	Ruby River at Laurin	650	1946-61	1947-60	--	--	--	--	--	--
06022000	Ruby River below Ramshorn Creek, near Sheridan	843	1946-53	1947-53	--	--	--	--	--	--

**Table 10.** Montana active and discontinued streamflow-gaging, water-quality, and crest-stage gage stations (active stations in bold print)--Continued

Station number	Station name	Drainage area (square miles)	Period of record (by water year)							
			Discharge or contents		Water quality					
			Daily or monthly	Annual peak	Daily		Periodic			
				Specific conductance	Water temperature	Sediment	Chemistry	Sediment	Biology	
<u>Part 6--Missouri River Basin--Continued</u>										
06022500	Ruby River near Sheridan	863	1946-51	--	--	--	--	--	--	--
06023000	Ruby River near Twin Bridges	935	1940-43, 1946-65, 1979-81	1942-73, 1947-65, 1980-81	--	1979-81	--	1986	1965	--
06023500	Big Hole River near Jackson	44.0	1948-54	1948-53	--	--	--	--	--	--
06024000	Miner Creek near Jackson	17.6	1948-54	1948-53	--	--	--	--	--	--
<b>06024450</b>	<b>Big Hole River below Big Lake Creek, at Wisdom</b>	575	<b>1988-P</b>	<b>1988-P</b>	--	<b>1988-P</b>	--	--	--	--
06024470	Swamp Creek near Wisdom	66.1	1995-96	1995-96	--	--	--	--	--	--
06024500	Trail Creek near Wisdom	71.4	1948-54, 1966-72	1948-53, 1967-72	--	--	--	--	--	--
06024510	West Fork Ruby Creek near Wisdom	13.4	1995-96	1995-96	--	--	--	--	--	--
<b>06024540</b>	<b>Big Hole River below Mudd Creek, near Wisdom</b>	1,267	<b>1997-P</b>	<b>1998-P</b>	--	--	--	--	--	--
06024580	Big Hole River near Wise River	1,611	1979-81	1980-81	--	--	--	--	--	--
06024590	Wise River near Wise River	214	1973-85	1973-85	--	--	--	--	--	--
06025000	Big Hole River near Dewey	1,990	1910-13	--	--	--	--	--	--	--
<b>06025100</b>	<b>Quartz Hill Gulch near Wise River</b>	14.3	--	<b>1974-P</b>	--	--	--	--	--	--
06025250	Big Hole River at Maiden Rock, near Divide	2,199	1997-2002	1998-2002	--	--	--	--	--	--
06025270	Moose Creek above McClean Creek, near Divide	31.9	1998-99	1998-99	--	--	--	--	--	--
06025300	Moose Creek near Divide	42.3	--	1960-74	--	--	--	--	--	--
06025480	Rock Creek below Browns Lake, near Glen	23.0	1998-99	1998-99	--	--	--	--	--	--
<b>06025500</b>	<b>Big Hole River near Melrose</b>	2,476	<b>1923-P</b>	<b>1924-40, 1942-P</b>	--	<b>1960-64, 1977-P</b>	1960-64	1957, 1961, 1961-64	--	--
06025700	Willow Creek diversions to Birch Creek, near Glen	--	1946-53, 1955-66	--	--	--	--	--	--	--
06025800	Willow Creek near Glen	35.6	1962-66, 1997-99	1998-99	--	--	--	1963-65	1964-65	--
06026000	Birch Creek near Glen	36.0	1946-53, 1955-76	1946-53, 1955-76	--	--	--	1959-62	1960-61	--
<b>06026210</b>	<b>Big Hole River near Glen</b>	2,655	<b>1997-P</b>	<b>1998-P</b>	--	--	--	--	--	--
06026400	Big Hole River near Twin Bridges	2,762	1979-81	1980-81	--	--	--	1986	--	--
<b>06026500</b>	<b>Jefferson River near Twin Bridges</b>	7,632	<b>1940-43, 1958-72, 1994-P</b>	<b>1942-43, 1958-72, 1994-P</b>	--	1994-2002	1960-62, 1965-72	1958-62, 1965-72	1971-72	--
06027000	Jefferson River near Silver Star	7,683	1910-16, 1920-39	1911-16, 1921-39, 1966	--	--	--	--	--	--
06027200	Jefferson River at Silver Star	7,683	1972-74	1973-74	--	--	--	1973-74	1974	--
06027500	Bell Creek near Waterloo	5.63	1941-42	--	--	--	--	--	--	--
06027700	Fish Creek near Silver Star	38.9	1959-91	1959-91	--	--	--	--	--	--

**Table 10.** Montana active and discontinued streamflow-gaging, water-quality, and crest-stage gage stations (active stations in bold print)--Continued

Station number	Station name	Drainage area (square miles)	Period of record (by water year)							
			Discharge or contents		Water quality					
			Daily or monthly	Annual peak	Daily			Periodic		
					Specific conductance	Water temperature	Sediment	Chemistry	Sediment	Biology
<u>Part 6--Missouri River Basin--Continued</u>										
06028000	Big Pipestone Creek near Whitehall	108	1910-11	--	--	--	--	--	--	--
06028500	Little Pipestone Creek near Whitehall	30.7	1935-40	1935-40	--	--	--	--	--	--
06028700	Big Pipestone Creek at Whitehall	--	--	--	--	--	--	1986	--	--
06029000	Whitetail Creek near Whitehall	30.8	1949-68	1950-53, 1955-68, 1981	--	--	--	--	--	--
06029500	Little Whitetail Creek near Whitetail	91.0	1911	--	--	--	--	--	--	--
06030000	Whitetail Creek at Whitehall	179	1911	--	--	--	--	--	--	--
06030200	Jefferson River tributary near Whitehall	1.85	--	1960-75	--	--	--	--	--	--
<b>06030300</b>	<b>Jefferson River tributary No. 2 near Whitehall</b>	4.50	--	<b>1958-P</b>	--	--	--	--	--	--
06030500	Boulder River above Rock Creek, near Basin	19.4	1936, 1946-53, 1955-57	1947-53, 1955-57, 1975,1981	--	--	--	--	--	--
06031000	Rock Creek at CCC Camp, near Bernice	9.87	1936	--	--	--	--	--	--	--
<b>06031450</b>	<b>Boulder River above Kleinsmith Gulch, near Basin</b>	--	--	--	--	--	--	<b>1997-P</b>	<b>1997-P</b>	--
06031500	Boulder River at Basin	219	1921-23	--	--	--	--	1997-99	1997-99	--
<b>06031600</b>	<b>Basin Creek at Basin</b>	--	--	--	--	--	--	<b>1997-P</b>	<b>1997-P</b>	--
<b>06031950</b>	<b>Cataract Creek near Basin</b>	30.6	--	<b>1973-P</b>	--	--	--	1997-99	1997-99	--
<b>06031960</b>	<b>Cataract Creek at Basin</b>	--	--	--	--	--	--	<b>1997-P</b>	<b>1997-P</b>	--
06032000	Boulder River near Basin	292	1919-20	--	--	--	--	1997-99	1997-99	--
06032300	High Ore Creek near Basin	8.86	1997	1997	--	--	1997	1997-2002	1997-2002	--
<b>06032400</b>	<b>Boulder River below Little Galena Gulch near Boulder</b>	318	1997	1997	--	--	1997	<b>1997-P</b>	<b>1997-P</b>	--
06032500	Muskrat Creek near Boulder	6.09	1912-14	--	--	--	--	--	--	--
<b>06033000</b>	<b>Boulder River near Boulder</b>	381	<b>1929-72, 1985-P</b>	<b>1929-72, 1975,1981, 1985-P</b>	--	--	--	1997-99	1997-99	--
06033500	North Fork Little Boulder River near Boulder	18.8	1926-27	--	--	--	--	--	--	--
06033900	Boulder River near Cardwell	756	--	--	--	--	--	1986	1997	--
06034000	South Boulder River near Jefferson Island	27.5	1926-33	1926-33	--	--	--	--	--	--
06034300	South Boulder River near Cardwell	--	--	--	--	--	--	1986	--	--
06034500	Jefferson River at Sappington	9,277	1895-1905, 1938-69	1895-1905, 1939-69, 1975	--	--	--	--	--	--
06034700	Sand Creek at Sappington	9.41	--	1960-74	--	--	--	--	--	--
06034800	Jefferson River tributary No. 3 near Sappington	1.14	--	1960-74	--	--	--	--	--	--
06035000	Willow Creek near Harrison	83.8	1938-2002	1938-2002	--	2002	--	--	--	--
06035500	Norwegian Creek near Harrison	22.4	1938-43, 1946-51	1938-43, 1947-51	--	--	--	--	--	--

**Table 10.** Montana active and discontinued streamflow-gaging, water-quality, and crest-stage gage stations (active stations in bold print)--Continued

Station number	Station name	Drainage area (square miles)	Period of record (by water year)							
			Discharge or contents		Water quality					
			Daily or monthly	Annual peak	Specific conductance	Daily Water temperature	Sediment	Chemistry	Periodic Sediment	Biology
<u>Part 6--Missouri River Basin--Continued</u>										
06036500	Willow Creek near Willow Creek	165	1919-33, 1946-53, 1955-57	1920-29, 1931-32, 1947-53, 1955-56	--	--	--	1986	--	--
06036600	Jefferson River tributary No. 4 near Three Forks	0.53	--	1960-74, 1982-83	--	--	--	--	--	--
<b>06036650</b>	<b>Jefferson River near Three Forks</b>	9,532	<b>1978-P</b>	<b>1979-P</b>	--	<b>1980-81</b> <b>2000-P</b>	--	<b>1986-87,</b> <b>1999-P</b>	<b>1999-P</b>	--
06036700	Jefferson River tributary No. 5 near Three Forks	3.69	--	1960-73, 1980, 1982-83	--	--	--	--	--	--
06036800	Firehole River near Old Faithful, Yellowstone National Park	--	--	--	--	--	--	1958	--	--
<b>06036905</b>	<b>Firehole River near West Yellowstone</b>	282	<b>1984-96</b> <b>2003</b>	<b>1984-96</b> <b>2003</b>	1983-88	<b>1983-93</b> <b>2003</b>	--	1987,1989	--	--
06037000	Gibbon River near West Yellowstone	118	1913-16, 1984-96	1984-96	1983-88	1983-93	--	1987, 1989	--	--
<b>06037100</b>	<b>Gibbon River at Madison Junction, Yellowstone Nat'l Park</b>	126	<b>2003</b>	<b>2003</b>	--	<b>2003</b>	--	--	--	--
<b>06037500</b>	<b>Madison River near West Yellowstone</b>	420	<b>1913-73,</b> <b>1983-86,</b> <b>1989-P</b>	<b>1914-17,</b> <b>1919-73,</b> <b>1984-86,</b> <b>1989-P</b>	1983-86	1983-86	--	1959, 1986-95	1989-90 1992-95	--
06037600	Madison River above Hebgen Lake, near West Yellowstone	--	--	--	--	--	--	1993-94	1993-94	--
06037700	South Fork Madison River above Denny Creek, near West Yellowstone	--	--	--	--	--	--	1987-88	--	--
<b>06038000</b>	<b>Hebgen Lake near Grayling</b>	904	<b>1936-P</b>	--	--	--	--	--	--	--
<b>06038500</b>	<b>Madison River below Hebgen Lake, near Grayling</b>	905	<b>1909-P</b>	<b>1940-P</b>	--	--	--	1986-95	1992-95	--
06038550	Cabin Creek near West Yellowstone	30.3	--	<b>1974-P</b>	--	--	--	--	--	--
<b>06038800</b>	<b>Madison River at Kirby Ranch, near Cameron</b>	1,065	<b>1959-63,</b> <b>1978-P</b>	<b>1960-61,</b> <b>1963,</b> <b>1985-P</b>	--	1995-2002	1960	1959	1959-60	--
06039000	West Fork Madison River near Lakeview	11.9	1936	--	--	--	--	--	--	--
06039200	West Fork Madison River near Cameron	220	1965-67	1966-67	--	--	--	1986-88	--	--
06039500	Madison River at Lyon	1,346	1928-32	--	--	--	--	1959	--	--
06040000	Madison River near Cameron	1,669	1952-63, 1968-70	1952-58, 1960-63, 1968-70	--	--	--	1988, 1993-95	1993-95	--
06040010	Blaine Spring Creek near Cameron	3.42	1971-72	--	--	--	--	--	--	--
06040300	Jack Creek near Ennis	51.5	1973-86, 1992	1974-86, 1991-92	--	--	--	1980	--	--
06040400	Meadow Creek near McAllister	--	--	--	--	--	--	1986	--	--
<b>06040500</b>	<b>Ennis Lake near McAllister</b>	2,181	<b>1936-P</b>	--	--	--	--	--	--	--



**Table 10.** Montana active and discontinued streamflow-gaging, water-quality, and crest-stage gage stations (active stations in bold print)--Continued

Station number	Station name	Drainage area (square miles)	Period of record (by water year)							
			Discharge or contents		Water quality					
			Daily or monthly	Annual peak	Daily			Periodic		
					Specific conductance	Water temperature	Sediment	Chemistry	Sediment	Biology
<u>Part 6--Missouri River Basin--Continued</u>										
<b>06040800</b>	<b>Madison River above Powerplant, near McAllister</b>	4,690	<b>2002-P</b>	<b>2002-P</b>	--	--	--	--	--	--
<b>06041000</b>	<b>Madison River below Ennis Lake, near McAllister</b>	2,186	<b>1901-P</b>	<b>1943-P</b>	--	<b>1977-P</b>	--	1972-73, 1986-87, 1991-95	1991-95	1972-73
06041300	Hot Springs Creek near Norris	72.5	--	--	--	--	--	1986-87, 1993-94	1993-94	--
06041500	Madison River near Norris	2,288	1890-93, 1910	--	--	--	--	1993-95	1993-95	--
06041700	Cherry Creek near Norris	--	--	--	--	--	--	1986-87, 1993-94	1993-94	--
06042000	Madison River below Cherry Creek, near Norris	2,387	1897-1905	1898-1905	--	--	--	--	--	--
06042500	Madison River near Three Forks	2,511	1893-97, 1928-32, 1941-50	1894-96, 1929-32, 1942-50	--	--	--	--	--	--
06042600	Madison River at Three Forks	2,531	--	--	--	--	--	1986-87, 1990, 1993-95	1990, 1993-95	--
06043000	Taylor Creek near Grayling	98.0	1946-54, 1955-57, 1966-67	1947-53, 1955-57, 1967	--	--	--	--	--	--
06043200	Squaw Creek near Gallatin Gateway	40.4	--	1959-75	--	--	--	--	--	--
<b>06043300</b>	<b>Logger Creek near Gallatin Gateway</b>	2.48	--	<b>1959-P</b>	--	--	--	--	--	--
<b>06043500</b>	<b>Gallatin River near Gallatin Gateway</b>	825	<b>1889-94, 1930-69, 1971-81, 1985-P</b>	<b>1890-94, 1931-81, 1985-P</b>	--	2001-2002	--	1949-51, 1986-87, 1998	--	1998
06044000	Gallatin River near Salesville	833	1895-1905, 1910-13, 1921-23	1896-1905, 1912-13, 1921-23	--	--	--	--	--	--
06044100	Wilson Creek near Gallatin Gateway	5.33	1952-53	--	--	--	--	--	--	--
06044200	West Fork Wilson Creek near Gallatin Gateway	3.81	1952-53	--	--	--	--	--	--	--
06044300	Big Bear Creek near Gallatin Gateway	13.2	1952-53	--	--	--	--	--	--	--
06044400	Little Bear Creek near Gallatin Gateway	3.87	1952-53	--	--	--	--	--	--	--
06044500	South Cottonwood Creek near Gallatin Gateway	21.9	1951-53	--	--	--	--	--	--	--
06045000	Gallatin River at Axtell Bridge, near Gallatin Gateway	927	1950-54	--	--	--	--	--	--	--
06045200	Fish Creek near Gallatin Gateway	--	1952-53	--	--	--	--	--	--	--
06045300	Yellow Dog Creek near Belgrade	6.85	1952-53	--	--	--	--	--	--	--
06045350	Godfrey Creek near Belgrade	6.32	1952-53	--	--	--	--	--	--	--
06045400	Baker Creek near Manhattan	--	1952-53	--	--	--	--	--	--	--
06045500	Gallatin River near Belgrade	965	1950-54	--	--	--	--	1949	--	--
06046000	Gallatin River near Manhattan	970	1950-54	--	--	--	--	1949	--	--

**Table 10.** Montana active and discontinued streamflow-gaging, water-quality, and crest-stage gage stations (active stations in bold print)--Continued

Station number	Station name	Drainage area (square miles)	Period of record (by water year)							
			Discharge or contents		Water quality					
			Daily or monthly	Annual peak	Daily			Periodic		
Specific conductance	Water temperature	Sediment			Chemistry	Sediment	Biology			
<u>Part 6--Missouri River Basin--Continued</u>										
06046100	Ridgley Creek near Manhattan	--	1952-53	--	--	--	--	--	--	--
06046200	Gallatin River above Camp Creek, near Manhattan	--	--	--	--	--	--	1949	--	--
06046300	Camp Creek near Belgrade	34.5	1952-53	--	--	--	--	--	--	--
06046400	Randall Creek near Manhattan	--	1952-53	--	--	--	--	--	--	--
06046500	Rocky Creek near Bozeman	50.5	1951-53	1952-53, 1959-91	--	--	--	1949	--	--
06046520	Unnamed Creek near Bozeman	2.63	--	1997	--	--	--	--	--	--
06046700	Pitcher Creek near Bozeman	2.33	--	1960-75, 1981	--	--	--	--	--	--
06047000	Bear Canyon near Bozeman	17.0	1951-53	1952-53, 1959-73, 1975,1981	--	--	--	--	--	--
06047500	Sourdough Creek near Bozeman	28.2	1951-53	--	--	--	--	--	--	--
06048000	East Gallatin River at Bozeman	148	1939-61	1940-61, 1981	--	--	--	1949,1951	--	--
06048500	Bridger Creek near Bozeman	62.5	1946-69, 1971-72, 1987	1946-69, 1971-72, 1981,1987	--	--	--	1949	--	--
06048600	Lyman Creek near Bozeman	1.75	1952-53	--	--	--	--	1949	--	--
<b>06048700</b>	<b>East Gallatin River below Bridger Creek, near Bozeman</b>	226	<b>2002-P</b>	<b>2002-P</b>	--	2002	--	--	--	--
06048800	Deer Creek near Bozeman	--	1953	--	--	--	--	--	--	--
06048900	East Gallatin River near Belgrade	--	1952-53	--	--	--	--	--	--	--
06049000	Middle Cottonwood Creek near Bozeman	4.25	1951-53	--	--	--	--	--	--	--
06050000	Hyalite Creek at Hyalite Ranger Station, near Bozeman	48.2	1895-96, 1898-1900, 1902,1904, 1935-95	1898-1899, 1902, 1935-95	--	--	--	1949	--	--
06050100	Hyalite Creek near Belgrade	--	1952	--	--	--	--	--	--	--
06050200	Bostwick Creek near Belgrade	5.04	1952-53	--	--	--	--	1949	--	--
06050400	Thompson Creek near Belgrade	--	1952-53	--	--	--	--	--	--	--
06050450	Ben Hart Creek near Belgrade	--	1952-53	--	--	--	--	--	--	--
06050500	Ross Creek near Belgrade	1.25	1951-53	--	--	--	--	1949,1951	--	--
06050700	Truman Creek near Belgrade	2.94	1952-53	--	--	--	--	--	--	--
06051000	Reese Creek near Belgrade	21.5	1951-53	--	--	--	--	--	--	--
06051200	Bear Creek near Belgrade	4.30	1952-53	--	--	--	--	--	--	--
06051300	Foster Creek near Belgrade	--	1953	--	--	--	--	--	--	--
06051500	Dry Creek at Andrus Ranch, near Manhattan	96.2	1952-53	--	--	--	--	--	--	--
06051700	Reynolds (Quagle) Creek near Manhattan	--	1953	--	--	--	--	--	--	--
06052000	Dry Creek at Brownell Ranch, near Manhattan	104	1951	--	--	--	--	--	--	--
06052050	Story Creek near Manhattan	--	1952-53	--	--	--	--	--	--	--

**Table 10.** Montana active and discontinued streamflow-gaging, water-quality, and crest-stage gage stations (active stations in bold print)--Continued

Station number	Station name	Drainage area (square miles)	Period of record (by water year)							
			Discharge or contents		Water quality					
			Daily or monthly	Annual peak	Daily			Periodic		
					Specific conductance	Water temperature	Sediment	Chemistry	Sediment	Biology
<u>Part 6--Missouri River Basin--Continued</u>										
06052100	Cowan Creek near Manhattan	--	1952-53	--	--	--	--	--	--	--
06052200	Gibson Creek near Manhattan	--	1952-53	--	--	--	--	1949,1951	--	--
06052300	Bull Run Creek near Manhattan	--	1952-53	--	--	--	--	--	--	--
<b>06052500</b>	<b>Gallatin River at Logan</b>	1,795	<b>1893-1905, 1928-P</b>	<b>1895-1900, 1902-1905, 1929-33, 1935-P</b>	--	<b>1979-85, 2001-P</b>	--	<b>1949,1951, 1957,1986, 1999-P</b>	<b>1965, 1999-P</b>	--
06053000	Sixteenmile Creek at Ringling	79.0	1950-55	1951-55	--	--	--	--	--	--
<b>06053050</b>	<b>Lost Creek near Ringling</b>	9.59	--	<b>1974-P</b>	--	--	--	--	--	--
06053400	Sixteenmile Creek near Toston	--	--	--	--	--	--	1986	--	--
06053500	Broadwater East Canal near Toston	--	1941-49	--	--	--	--	--	--	--
06054000	Broadwater West Canal near Toston	--	1941-49	--	--	--	--	--	--	--
<b>06054500</b>	<b>Missouri River at Toston</b>	14,669	<b>1890-91, 1910-16, 1941-P</b>	<b>1890, 1910-16, 1941-P</b>	1973-81	<b>1949-53 1973-P</b>	1949-53	<b>1949-51, 1972-95, 1999-P</b>	<b>1965, 1973-95, 1999-P</b>	1972-94
06055000	Crow Creek near Townsend	48.6	1912-13	--	--	--	--	1950,1986, 1988-91	1989-90	--
06055500	Crow Creek near Radersburg	76.6	1901, 1919-29, 1966-72, 1989-90	1901, 1920-29, 1966-72, 1975,1981, 1989-90	--	--	--	--	--	--
06056200	Castle Creek tributary near Ringling	2.51	--	1960-74, 1981, 1989-90	--	--	--	--	--	--
<b>06056300</b>	<b>Cabin Creek near Townsend</b>	11.8	--	<b>1960-P</b>	--	--	--	--	--	--
06056500	Deep Creek near Townsend	65.4	1910-15	--	--	--	--	--	--	--
06056600	Deep Creek below North Fork Deep Creek, near Townsend	87.7	--	1959-73, 1975,1981, 1989-90	--	--	--	--	--	--
06057000	Missouri River near Townsend	15,343	1891-1904	1892-1903, 1964	--	--	--	--	--	--
06057400	Beaver Creek above Weasel Creek, near Winston	21.5	--	--	--	--	--	1950, 1988-91	1989-90	--
06057500	Lake Sewell near Helena	15,894	1936-53	--	--	--	--	--	--	--
06058000	Missouri River at Canyon Ferry	15,894	1889	--	--	--	--	--	--	--
<b>06058500</b>	<b>Canyon Ferry Lake near Helena</b>	15,904	<b>1953-P</b>	--	--	--	--	--	--	--
06058502	Missouri River below Canyon Ferry Dam, near Helena	15,904	--	--	1968-87	--	--	1968-87	--	--
06058700	Mitchell Gulch near East Helena	8.09	--	1959-2002	--	--	--	--	--	--
06058900	Prickly Pear Creek below Anderson Gulch, near Jefferson City	14.0	--	1989-90	--	--	--	1988-90	1989-90	--
06059000	Dutchman Creek near Alhambra	9.78	1921-24	--	--	--	--	--	--	--

**Table 10.** Montana active and discontinued streamflow-gaging, water-quality, and crest-stage gage stations (active stations in bold print)--Continued

Station number	Station name	Drainage area (square miles)	Period of record (by water year)							
			Discharge or contents		Water quality					
			Daily or monthly	Annual peak	Daily		Periodic			
				Specific conductance	Water temperature	Sediment	Chemistry	Sediment	Biology	
<u>Part 6--Missouri River Basin--Continued</u>										
06059500	Warm Springs Creek at Alhambra	20.6	1921-24	--	--	--	--	--	--	--
06060000	Clancy Creek at Clancy	33.1	1921-23	--	--	--	--	--	--	--
06060500	Lump Gulch at Foley's Ranch, near Clancy	33.0	1921-24	--	--	--	--	--	--	--
06061000	Lump Gulch at Zastrow's Ranch, near Clancy	43.4	1908-13	1909-13, 1981	--	--	--	--	--	--
<b>06061500</b>	<b>Prickly Pear Creek near Clancy</b>	192	1908-16, 1921-33, 1945-69, 1978-2002	1911-16, 1923-33, 1946-53, 1955-69, 1975, 1979-2002	--	--	--	<b>1950, 1999-P</b>	<b>1999-P</b>	--
06061700	Jackson Creek near East Helena	3.44	--	1961-75, 1981, 1989-90	--	--	--	--	--	--
06061800	Crystal Creek near East Helena	3.77	--	1961-75, 1981, 1989-90	--	--	--	--	--	--
06061900	McClellan Creek near East Helena	33.2	--	1961-75, 1981, 1989-90	--	--	--	1988-90	1989-90	--
06062000	Prickly Pear Creek at East Helena	251	1908-13	--	--	--	--	1995	--	--
06062010	Prickly Pear Creek below East Helena	--	--	--	--	--	--	1971	--	--
<b>06062500</b>	<b>Tenmile Creek near Rimini</b>	30.9	<b>1914-94, 1997-P</b>	<b>1915-94, 1997-P</b>	--	--	--	1981, 1997-99	1997-99	--
06062700	Little Porcupine Creek tributary near Helena	0.39	--	1959-73, 1981, 1989	--	--	--	--	--	--
<b>06062750</b>	<b>Tenmile Creek at Tenmile Water Treatment Plant, near Rimini</b>	51.1	<b>1997-P</b>	<b>1997-P</b>	--	--	--	<b>1999-P</b>	<b>1999-P</b>	--
<b>06063000</b>	<b>Tenmile Creek near Helena</b>	96.5	1908-54, 1997-98	1909-54, 1975, 1981, 1997-98	--	--	--	<b>1950-51, 1997-98 2002-P</b>	<b>1997-98 2002-P</b>	--
06063500	Sevenmile Creek at Birdseye	31.9	1908-13	--	--	--	--	--	--	--
06064000	Sevenmile Creek near Helena	--	1908	--	--	--	--	--	--	--
<b>06064100</b>	<b>Tenmile Creek at Green Meadow Drive, at Helena</b>	161	1997-98	1997-98	--	--	--	<b>2002-P</b>	<b>2002-P</b>	--
06064150	Tenmile Creek above Prickly Pear Creek, near Helena	188	1997-98	1997-98	--	--	--	--	--	--
<b>06064500</b>	<b>Lake Helena near Helena</b>	610	<b>1945-P</b>	--	--	--	--	--	--	--
<b>06065000</b>	<b>Hauser Lake near Helena</b>	16,876	<b>1936-P</b>	--	--	--	--	--	--	--
<b>06065500</b>	<b>Missouri River below Hauser Dam, near Helena</b>	16,876	<b>1923-42, 1995-P</b>	<b>1923-42, 1995-P</b>	--	--	--	--	--	--
<b>06066000</b>	<b>Holter Lake near Wolf Creek</b>	17,149	<b>1936-P</b>	--	--	--	--	--	--	--
<b>06066500</b>	<b>Missouri River below Holter Dam, near Wolf Creek</b>	17,149	<b>1945-P</b>	<b>1946-P</b>	--	<b>2000-P</b>	--	--	--	--
06067000	Little Prickly Pear Creek above Deadman Creek, near Marysville	20.1	1909-11	--	--	--	--	--	--	--

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			Daily or monthly	Annual peak	Daily			Periodic		
				Specific conductance	Water temperature	Sediment	Chemistry	Sediment	Biology	
<b>Part 6--Missouri River Basin--Continued</b>										
06067500	Deadman Creek near Marysville	9.52	1909-11	--	--	--	--	--	--	--
06068000	Lost Horse Creek near Marysville	13.1	1909-11	--	--	--	--	--	--	--
06068500	Little Prickly Pear Creek near Marysville	44.4	1913-33	1913-32	--	--	--	--	--	--
06069000	Marsh Creek near Marysville	6.07	1909-12	--	--	--	--	--	--	--
06070000	Canyon Creek near Canyon Creek	73.8	1921-23	--	--	--	--	--	--	--
06070500	Cottonwood Creek near Canyon Creek	16.5	1921-22	--	--	--	--	--	--	--
06071000	Little Prickly Pear Creek near Canyon Creek	183	1909-11, 1913-24	1909-11, 1913-24	--	--	--	--	--	--
06071080	Sieben Ranch ditch below Clark Creek, near Wolf Creek	--	--	--	--	--	--	--	1964-67	--
06071100	Little Prickly Pear Creek at Sieben Ranch, near Wolf Creek	270	1962-67	1962-67	--	--	1962-67	1964	1966	--
06071130	Little Prickly Pear Creek above Medicine Rock Creek, near Wolf Creek	--	--	--	--	--	--	--	1964-67	--
06071180	Medicine Rock Creek near Wolf Creek	--	--	--	--	--	--	--	1964-67	--
06071200	Lyons Creek near Wolf Creek	29.9	--	1959-73, 1975	--	--	--	--	1964-67	--
06071220	Little Prickly Pear Creek below Lyons Creek, near Wolf Creek	--	--	--	--	--	--	--	1965-67	--
06071230	Little Prickly Pear Creek above Sheep Creek, near Wolf Creek	--	--	--	--	--	--	--	1964	--
06071240	Sheep Creek near Wolf Creek	--	--	--	--	--	--	--	1964-67	--
06071290	Wolf Creek at Wolf Creek	--	--	--	--	--	--	--	1964-64	--
<b>06071300</b>	<b>Little Prickly Pear Creek at Wolf Creek</b>	381	<b>1962-67, 1992-P</b>	<b>1962-65, 1967,1975, 1992-P</b>	--	2001-2002	1962-67	1964	1964-67	--
06071400	Dog Creek near Craig	15.7	--	1960-75	--	--	--	--	--	--
06071500	Missouri River at Craig	17,739	1890-92	--	--	--	--	--	--	--
06071600	Wegner Creek at Craig	35.7	--	1960-91	--	--	--	--	--	--
06072000	Dearborn River above Falls Creek, near Clemons	69.6	1908-12	--	--	--	--	--	--	--
06072500	Falls Creek near Clemons	37.6	1908-12	--	--	--	--	--	--	--
06073000	Dearborn River near Clemons	123	1921-23, 1929-53	1921-23, 1929-53, 1964,1975	--	--	--	--	--	--
<b>06073500</b>	<b>Dearborn River near Craig</b>	325	<b>1946-69, 1994-P</b>	<b>1946-69, 1975, 1994-P</b>	--	<b>1993-P</b>	--	<b>1991, 1999-P</b>	<b>1999-P</b>	--
<b>06073600</b>	<b>Black Rock Creek near Augusta</b>	5.54	--	<b>1974-P</b>	--	--	--	--	--	--
06074000	Missouri River at Cascade	18,493	1902-15, 1953	1903-15	--	--	--	--	--	--
06074500	Smith River near White Sulphur Springs	30.7	1923-31, 1934-36	1923-31, 1934-36	--	--	--	--	--	--
06075500	Smith River above Fivemile Creek, near White Sulphur Springs	73.2	1934-43	1934-43	--	--	--	--	--	--
06075600	Fivemile Creek near White Sulphur Springs	6.42	--	1960-74	--	--	--	--	--	--

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			Discharge or contents		Water quality					
			Daily or monthly	Annual peak	Daily		Periodic			
				Specific conductance	Water temperature	Sediment	Chemistry	Sediment	Biology	
<u>Part 6--Missouri River Basin--Continued</u>										
06075700	North Fork Smith River near mouth, near White Sulphur Springs	185	--	--	--	--	--	1993-95	1993-95	1993-95
06075800	South Fork Smith River at mouth, near White Sulphur Springs	174	--	--	--	--	--	1993-95	1993-95	1993-95
06075900	Big Birch Creek at mouth, near White Sulphur Springs	49.6	--	--	--	--	--	1993-95	1993-95	1993-95
06076000	Newlan Creek near White Sulphur Springs	7.27	1946-54	1946-53, 1960-73	--	--	--	--	--	--
06076500	Newlan Creek near damsite, near White Sulphur Springs	44.8	1950-57	1951-57	--	--	--	--	--	--
06076550	Newlan Creek at mouth, near White Sulphur Springs	--	--	--	--	--	--	1993-95	1993-95	1993-95
06076600	Camas Creek at mouth, near White Sulphur Springs	--	--	--	--	--	--	1993-95	1993-95	1992-95
06076650	Benton Gulch at mouth, near White Sulphur Springs	57.6	--	--	--	--	--	1993-95	1993-95	1993-95
06076690	Smith River near Fort Logan	846	1978-96	1978-96	--	--	--	1993-95	1993-95	1993-95
06076700	Sheep Creek near Neihart	5.22	--	1960-91	--	--	--	--	--	--
06076800	Nugget Creek near Neihart	1.50	--	1959-73	--	--	--	--	--	--
06077000	Sheep Creek near White Sulphur Springs	42.8	1941-72	1942-72, 1975,1981	--	--	--	1956,1980	1980	--
06077090	Sheep Creek near mouth, near White Sulphur Springs	192	--	--	--	--	--	1993-95	1993-95	1991, 1993-95
<b>06077200</b>	<b>Smith River below Eagle Creek, near Fort Logan</b>	1,088	<b>1996-P</b>	<b>1997-P</b>	--	<b>1997-P</b>	--	--	--	--
06077300	Trout Creek near Eden	13.2	--	1974-84	--	--	--	--	--	--
06077500	Smith River near Eden	1,594	1951-69	1951-69, 1975,1981	--	--	--	--	--	--
06077700	Smith River tributary near Eden	1.44	--	1960-73, 1975	--	--	--	--	--	--
06077800	Goodman Coulee near Eden	22.1	--	1959-82	--	--	--	--	--	--
06078000	Smith River at Truly	2,006	1905-07, 1929-32	1905-07, 1929-32, 1953	--	--	--	1991	--	--
<b>06078200</b>	<b>Missouri River near Ulm</b>	20,941	<b>1957-P</b>	<b>1948,1953, 1958-P</b>	--	--	--	--	--	--
06078230	Sand Coulee Creek above Cottonwood Creek, at Centerville	78.8	1995-96	1995-96	--	--	--	1994-96	--	--
06078250	Cottonwood Creek near Stockett	--	1995-96	1995-96	--	--	--	1994-96	--	--
06078260	Number Five Coulee below Giffen Spring, near Stockett	16.7	1995-96	1995-96	--	--	--	1994-96	--	--
06078270	Sand Coulee at Sand Coulee	6.36	1995-96	1995-96	--	--	--	1994-96	--	--
06078500	North Fork Sun River near Augusta	258	1911-12, 1946-68, 1989-93	1911-12, 1946-68, 1989-93	--	--	--	--	1989-93	--
06079000	South Fork Sun River near Augusta	252	1911-12	--	--	--	--	--	--	--
<b>06079500</b>	<b>Gibson Reservoir near Augusta</b>	575	<b>1930-P</b>	--	--	--	--	1951	--	--
06079600	Beaver Creek at Gibson Dam, near Augusta	20.8	--	1959-73	--	--	--	--	--	--

**Table 10.** Montana active and discontinued streamflow-gaging, water-quality, and crest-stage gage stations (active stations in bold print)--Continued

Station number	Station name	Drainage area (square miles)	Period of record (by water year)							
			Discharge or contents		Water quality					
			Daily or monthly	Annual peak	Daily			Periodic		
					Specific conductance	Water temperature	Sediment	Chemistry	Sediment	Biology
<u>Part 6--Missouri River Basin--Continued</u>										
06080000	Sun River near Augusta	609	1889-91, 1904-40	1890, 1905-29, 1964	--	--	--	--	--	--
06080500	Pishkun Reservoir near Augusta	--	1936-95	--	--	--	--	1951	--	--
06080700	Spring Valley Canal below Spring Valley drop, near Fairfield	--	1967-68	--	--	--	--	--	--	--
06080800	Spring Valley Canal above Upper Turnbull drop, near Fairfield	--	1967-68	--	--	--	--	--	--	--
06080900	Sun River below diversion dam, near Augusta	609	1967-80	1964, 1968-80	1968-79	--	--	1968-79	--	--
06081000	Floweree Big Canal near Augusta	--	1912	--	--	--	--	--	--	--
06081500	Willow Creek near Augusta	96.1	1905-25	1905-1910, 1912-25	--	--	--	--	--	--
06082000	Willow Creek Reservoir near Augusta	--	1936-95	--	--	--	--	--	--	--
06082200	Sun River below Willow Creek, near Augusta	827	1967-74	1964, 1968-75	--	--	--	--	--	--
06082500	Smith Creek near Augusta	25.0	1906-13	1906-12	--	--	--	--	--	--
06083000	Nilan Reservoir near Augusta	--	1951-95	--	--	--	--	--	--	--
06083500	Ford Creek near Augusta	19.4	1906-13	1906-12, 1964	--	--	--	--	--	--
06084000	Smith Creek below Ford Creek, near Augusta	74.0	1946-52	1946-52, 1964,1975	--	--	--	1951	--	--
06084500	Elk Creek at Augusta	157	1905-25	1905-24, 1964,1975	--	--	--	--	--	--
06085000	Crown Butte Canal at Riebling	--	1912	--	--	--	--	--	--	--
06085500	Crown Butte Canal near Simms	--	1912	--	--	--	--	--	--	--
<b>06085800</b>	<b>Sun River at Simms</b>	1,320	<b>1953, 1966-79, 1997-P</b>	<b>1964, 1966-79, 1997-P</b>	--	--	--	1996-98	1996-98	--
06086000	Sun River at Fort Shaw	1,417	1912-28	1913-28	--	--	--	--	--	--
06086500	Sun River Canal at Sun River	--	1912	--	--	--	--	--	--	--
06087000	Sun River Canal at Vaughn	--	1912	--	--	--	--	--	--	--
06087500	Sun River at Sun River	1,454	1905-12	1906-12	--	--	--	--	--	--
06087900	Muddy Creek tributary near Power	3.15	--	1963-78, 1986	--	--	--	--	--	--
06088000	Muddy Creek near Power	137	1935-40, 1982-83	1982-83	--	--	--	1992	--	--
06088100	Spring Coulee near Power	30.4	1982-83	1982	--	--	--	1992	--	--
06088200	Tank Coulee near Power	31.0	1982-83	1982	--	--	--	1992	--	--
<b>06088300</b>	<b>Muddy Creek near Vaughn</b>	282	<b>1968-87, 1996-P</b>	<b>1968-87, 1996-P</b>	1968-82	1968-79	1968-82	<b>1968-82, 1992-P</b>	<b>1971-82, 1996-P</b>	--

**Table 10.** Montana active and discontinued streamflow-gaging, water-quality, and crest-stage gage stations (active stations in bold print)--Continued

Station number	Station name	Drainage area (square miles)	Period of record (by water year)							
			Discharge or contents		Water quality					
			Daily or monthly	Annual peak	Daily		Periodic			
				Specific conductance	Water temperature	Sediment	Chemistry	Sediment	Biology	
<u>Part 6--Missouri River Basin--Continued</u>										
<b>06088500</b>	<b>Muddy Creek at Vaughn</b>	314	<b>1925-26, 1934-68, 1971-P</b>	<b>1925, 1934-37, 1939-68, 1971-P</b>	1968, 1972-82	1968, 1971-79	1971-82	<b>1968, 1972-82, 1992-P</b>	<b>1968, 1971-81, 1993-P</b>	--
<b>06089000</b>	<b>Sun River near Vaughn</b>	1,849	<b>1897, 1934-P</b>	<b>1934-P</b>	<b>1969-P</b>	<b>1969-79 1999-P</b>	--	<b>1969-P</b>	<b>1987-94 1996-P</b>	1987-94
06089300	Sun River tributary near Great Falls	21.0	--	1956-73, 1975, 1979-80	--	--	--	--	--	--
06090100	Missouri River at Black Eagle Dam, at Great Falls	--	--	--	--	--	--	1951	--	--
06090130	Missouri River below Rainbow Dam, near Great Falls	--	--	--	--	--	--	1971	--	--
<b>06090300</b>	<b>Missouri River near Great Falls</b>	23,292	<b>1953, 1956-P</b>	<b>1952-P</b>	--	--	--	1994-95	1994-95	--
06090500	Belt Creek near Monarch	368	1951-82	1952-82	--	1977-81	--	--	--	--
<b>06090550</b>	<b>Little Otter Creek near Raynesford</b>	39.5	--	<b>1974-P</b>	--	--	--	--	--	--
06090570	Big Otter Creek near Belt	197	1994-98	1994-98	--	--	--	--	--	--
06090590	Anaconda Drain at Belt	0.05	1995-96	1995-96	--	--	--	94-96	--	--
06090600	Belt Creek near Belt	700	1905-07	--	--	--	--	--	--	--
06090610	Belt Creek near Portage	799	1980-83	1981-83	--	1981-83	--	1981-83	1981-83	--
<b>06090650</b>	<b>Lake Creek near Power</b>	83.8	<b>1990-P</b>	<b>1990-P</b>	1992-96	1992-95	1992-95	1990-96	--	--
06090700	Highwood Creek near Highwood	57.8	1905-06	--	--	--	--	--	--	--
06090720	Highwood Creek near Portage	122	1980-83	1981-83	--	1981-83	--	1981-83	1981-83	1981
<b>06090800</b>	<b>Missouri River at Fort Benton</b>	24,749	<b>1890-P</b>	<b>1891-1899, 1901-P</b>	--	1981-82	1980	1969-73 1981-86	1965, 1980-86	1969-73 1981-86
06090810	Ninemile Coulee near Fort Benton	16.9	--	1972-73, 1975-90	--	--	--	--	--	--
06091000	Two Medicine River near East Glacier	51.1	1912-13, 1918-24, 1962-64	1912, 1918-21, 1923-24, 1963-64	--	--	--	--	--	--
06091500	Two Medicine River at Midvale	--	1902-03	--	--	--	--	--	--	--
<b>06091700</b>	<b>Two Medicine River below South Fork, near Browning</b>	250	<b>1977-P</b>	<b>1977-P</b>	--	--	--	1988-89	--	--
06091850	Two Medicine Canal wasteway to Mission Lake, near Blackfoot	--	--	--	--	--	--	1971	--	--
06091852	Mission Lake near Blackfoot	--	--	--	--	--	--	1971-75	--	--
06091853	Spring Creek at Mission Lake outlet, near Cut Bank	--	--	--	--	--	--	1971	--	--
06091900	Two Medicine Canal near Cut Bank	--	--	--	--	--	--	1956	--	--
06092000	Two Medicine River near Browning	317	1907-25, 1951-77	1907, 1909-12, 1914-24, 1951-77	--	--	--	1956	--	--
06092500	Badger Creek near Browning	133	1951-73	1951-73	--	--	--	--	--	--



**Table 10.** Montana active and discontinued streamflow-gaging, water-quality, and crest-stage gage stations (active stations in bold print)--Continued

Station number	Station name	Drainage area (square miles)	Period of record (by water year)							
			Discharge or contents		Water quality					
			Daily or monthly	Annual peak	Daily		Periodic			
				Specific conductance	Water temperature	Sediment	Chemistry	Sediment	Biology	
<u>Part 6--Missouri River Basin--Continued</u>										
<b>06093200</b>	<b>Badger Creek below Four Horns Canal, near Browning</b>	152	<b>1973-P</b>	<b>1974-P</b>	--	--	--	1988-89	--	--
06093300	Badger Canal near Dupuyer	--	--	--	--	--	--	1956	--	--
06093500	Badger Creek near Family	239	1907-25	1910-13, 1915-24	--	--	--	--	--	--
06093600	Two Medicine River near Cut Bank	--	--	--	--	--	--	1982-84	--	--
06094000	Swift Reservoir near Dupuyer	75.3	1916, 1936-64, 1967-95	--	--	--	--	--	--	--
06094500	Birch Creek at Swift Dam, near Dupuyer	75.3	1913-29	1913-26, 1929	--	--	--	--	--	--
06095000	Birch Creek near Dupuyer	105	1907-37	1909-37, 1964	--	--	--	--	--	--
06095500	Lake Frances near Valier	--	1936-95	--	--	--	--	--	--	--
06096000	Birch Creek at Nelson's Ranch, near Dupuyer	111	1914-26	1914-15, 1917-21, 1923-26	--	--	--	--	--	--
06096500	Birch Creek at Hall's Ranch, near Dupuyer	122	1913-20	1913-15, 1917-20	--	--	--	--	--	--
06097000	Birch Creek at Robare	128	1914-26	1915, 1917-23, 1925-26	--	--	--	--	--	--
06097100	Blacktail Creek near Heart Butte	16.4	--	1975-91	--	--	--	--	--	--
06097200	Blacktail Creek near Dupuyer	--	--	--	--	--	--	1982-84	--	--
06097500	Dupuyer Creek at Dupuyer	65.7	1908-13	--	--	--	--	--	--	--
06098000	Dupuyer Creek near Valier	137	1912-37	1913-29, 1932-37, 1948, 1964	--	--	--	--	--	--
06098100	Birch Creek near Valier	471	1978-83	1978-83	--	--	--	1955, 1978-83	--	--
<b>06098500</b>	<b>Cut Bank Creek near Browning</b>	123	<b>1918-25, 1991-P</b>	<b>1918, 1920-24, 1991-P</b>	--	--	--	1991-92	--	--
<b>06098700</b>	<b>Powell Coulee near Browning</b>	12.7	--	<b>1974-P</b>	--	--	--	--	--	--
06098900	Big Rock Coulee near Santa Rita	185	--	--	--	--	--	1982-84, 1991-92	--	--
<b>06099000</b>	<b>Cut Bank Creek at Cut Bank</b>	1,041	<b>1905-20, 1922-24, 1951-73, 1982-P</b>	<b>1906-12, 1914-17, 1919-20, 1922-24, 1951-73, 1975, 1982-P</b>	--	--	--	1951, 1982-89, 1991-92	--	--

**Table 10.** Montana active and discontinued streamflow-gaging, water-quality, and crest-stage gage stations (active stations in bold print)--Continued

Station number	Station name	Drainage area (square miles)	Period of record (by water year)							
			Discharge or contents		Water quality					
			Daily or monthly	Annual peak	Daily		Periodic			
				Specific conductance	Water temperature	Sediment	Chemistry	Sediment	Biology	
<u>Part 6--Missouri River Basin--Continued</u>										
06099100	Spring Creek near Cut Bank	91	--	--	--	--	--	1982-84, 1991-92	--	--
06099300	Cut Bank Creek at mouth, near Cut Bank	1,213	--	--	--	--	--	1991-92	--	--
<b>06099500</b>	<b>Marias River near Shelby</b>	3,242	<b>1902-08, 1911-P</b>	<b>1902-04, 1906-07, 1911-46, 1948-P</b>	--	1950-51	1950-51	--	--	--
06099700	Middle Fork Dry Fork Marias River near Dupuyer	20.2	--	1960-74, 1986	--	--	--	--	--	--
06100000	Dry Fork Marias River near Valier	131	1911-15	--	--	--	--	--	1980	--
06100200	Heines Coulee tributary near Valier	0.60	--	1960-75, 1986	--	--	--	--	--	--
<b>06100300</b>	<b>Lone Man Coulee near Valier</b>	14.1	--	<b>1960-P</b>	--	--	--	--	--	--
06100500	Dry Fork Marias River at Fowler	314	1921-31	1920-31	--	--	--	--	--	--
06101000	Willow Creek near Devon	310	1921-25	--	--	--	--	--	--	--
06101200	Willow Creek near Galata	839	1977-82	1978-82	--	--	--	--	--	--
06101300	Lake Elwell near Chester	4,923	1956-95	--	--	--	--	--	--	--
<b>06101500</b>	<b>Marias River near Chester</b>	4,927	<b>1921, 1945-47, 1955-P</b>	<b>1921,1946, 1956-P</b>	--	<b>1994-P</b>	--	1964-72, 1978-86, 1991	1978-86	1978-86
<b>06101520</b>	<b>Favot Coulee tributary near Ledger</b>	0.86	--	<b>1974-P</b>	--	--	--	--	--	--
06101560	Pondera Coulee near Chester	598	1976-85	1964, 1976-85	--	--	--	--	--	--
06101600	Marias River tributary No. 3 near Chester	0.26	--	1962-76, 1978	--	--	--	--	--	--
06101700	Fey Coulee tributary near Chester	2.47	--	1963-91	--	--	--	--	--	--
06101800	Sixmile Coulee near Chester	30.3	--	1963-77, 1979,1986	--	--	--	--	--	--
06101900	Dead Indian Coulee near Fort Benton	2.73	--	1963-77, 1986	--	--	--	--	--	--
06102000	Marias River near Brinkman	6,425	1922-56	1908, 1922-56	--	--	--	--	--	--
<b>06102050</b>	<b>Marias River near Loma</b>	7,137	<b>1960-72 2001-P</b>	1960-72	--	--	--	--	1965	--
06102100	Dry Fork Coulee tributary near Loma	0.84	--	1959-73	--	--	--	--	--	--
06102200	Marias River tributary at Loma	1.62	--	1956-60, 1962-73	--	--	--	--	--	--
06102300	Maris River tributary No. 2 at Loma	0.25	--	1956-60, 1962-73	--	--	--	--	--	--
<b>06102500</b>	<b>Teton River below South Fork, near Choteau</b>	105	<b>1947-55 1998-P</b>	<b>1948-54, 1964, 1998-P</b>	--	--	--	<b>1998-P</b>	<b>1998-P</b>	--

**Table 10.** Montana active and discontinued streamflow-gaging, water-quality, and crest-stage gage stations (active stations in bold print)--Continued

Station number	Station name	Drainage area (square miles)	Period of record (by water year)							
			Discharge or contents		Water quality					
			Daily or monthly	Annual peak	Daily			Periodic		
					Specific conductance	Water temperature	Sediment	Chemistry	Sediment	Biology
<u>Part 6--Missouri River Basin--Continued</u>										
06103000	Teton River at Strabane	128	1904-06, 1908-25	1908-25	--	--	--	--	--	--
06103500	McDonald Creek near Strabane	5.17	1913-14, 1917-20	--	--	--	--	--	--	--
06104000	McDonald Creek near Choteau	10.4	1917-20	--	--	--	--	--	--	--
06104500	Teton River near Choteau	221	1906, 1913-19	--	--	--	--	--	--	--
06105000	Deep Creek at Frazer's Ranch, near Choteau	37.7	1912	--	--	--	--	--	--	--
06105500	Willow Creek near Choteau	88.2	1912-17	--	--	--	--	--	--	--
06105800	Bruce Coulee tributary near Choteau	1.70	--	1963-2002	--	--	--	--	--	--
06106000	Deep Creek near Choteau	223	1911-25	1911-24, 1964	--	--	--	--	--	--
06106500	Muddy Creek near Bynum	71.1	1912-25	1913-18, 1920, 1922-24	--	--	--	--	--	--
06107000	North Fork Muddy Creek near Bynum	61.3	1912-24	1913-17, 1919-24	--	--	--	--	--	--
06107500	Muddy Creek near Agawam	274	1917	--	--	--	--	--	--	--
<b>06108000</b>	<b>Teton River near Dutton</b>	1,307	<b>1954-P</b>	<b>1955-P</b>	--	--	--	<b>1998-P</b>	<b>1998-P</b>	--
06108200	Kinley Coulee near Dutton	9.67	--	1963-78	--	--	--	--	--	--
06108300	Kinley Coulee tributary near Dutton	2.65	--	1963-78	--	--	--	--	--	--
06108500	Teton River near Fort Benton	1,989	1929-32	--	--	--	--	1991	--	--
<b>06108800</b>	<b>Teton River at Loma</b>	2,010	<b>1998-P</b>	<b>1999-P</b>	--	<b>2000-P</b>	--	<b>1998-P</b>	<b>1965, 1998-P</b>	--
06109000	Missouri River at Loma	34,221	1935-53	--	--	--	--	--	--	--
<b>06109500</b>	<b>Missouri River at Virgelle</b>	34,379	<b>1935-P</b>	<b>1935-P</b>	--	--	--	1975-85, 1991	1975-85, 1991	1975-85
06109530	Little Sandy Creek tributary near Virgelle	0.80	--	1972, 1974-2002	--	--	--	--	--	--
<b>06109560</b>	<b>Alkali Coulee tributary near Virgelle</b>	0.96	--	<b>1974-P</b>	--	--	--	--	--	--
06109750	Middle Fork Judith River below Lost Fork, near Utica	108	1972-75	1972-75	--	--	--	--	--	--
06109775	Middle Fork Judith River at Ranger Station, near Utica	--	--	--	--	--	--	1964	--	--
06109780	Middle Fork Judith River near Utica	160	1972-79	1972-79	--	--	--	--	--	--
06109800	South Fork Judith River near Utica	58.7	1958-79	1959-79	--	--	--	--	--	--
06109900	Judith River tributary near Utica	7.15	--	1960-74	--	--	--	--	--	--
06109950	Judith River tributary No. 2, near Utica	6.97	--	1959-67	--	--	--	--	--	--
06110000	Judith River near Utica	328	1920-75	1920-32, 1934-75	--	--	--	--	--	--
06110500	Ackley Lake near Hobson	--	1938-95	--	--	--	--	--	--	--

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Station number	Station name	Drainage area (square miles)	Period of record (by water year)							
			Discharge or contents		Water quality					
			Daily or monthly	Annual peak	Daily		Periodic			
Specific conductance	Water temperature	Sediment			Chemistry	Sediment	Biology			
<u>Part 6--Missouri River Basin--Continued</u>										
06111000	Ross Fork Creek near Hobson	337	1946-54, 1955-62	1947-53, 1955-62, 1975	--	--	--	--	--	--
06111500	Big Spring Creek near Lewistown	20.9	1932-57	1932-40	--	--	--	--	--	--
06111700	Mill Creek near Lewistown	3.14	--	1960-91	--	--	--	--	--	--
06112000	Cottonwood Creek near Lewistown	45.6	1946-51	--	--	--	--	--	--	--
06112100	Cottonwood Creek near Moore	47.9	1957-63	1958-73, 1975,1978	--	--	--	--	--	--
06112500	Sage Creek at Windham	58.6	1920-22	--	--	--	--	--	--	--
<b>06112800</b>	<b>Bull Creek tributary near Hilger</b>	0.99	--	<b>1974-P</b>	--	--	--	--	--	--
06113000	Judith River near Lewistown	1,939	1910-11	--	--	--	--	--	--	--
06113500	Judith River near Winifred	2,160	1929-32	--	--	--	1991	--	--	--
06114000	Wolf Creek at Neubert Ranch, near Stanford	79.2	1920-26	1920-26	--	--	--	--	--	--
06114500	Wolf Creek near Stanford	112	1950-53, 1955-62	1950-53, 1955-58, 1960-62, 1975,1978	--	--	--	--	--	--
<b>06114550</b>	<b>Wolf Creek tributary near Coffee Creek</b>	1.73	--	<b>1974-P</b>	--	--	--	--	--	--
<b>06114700</b>	<b>Judith River near mouth, near Winifred</b>	2,731	<b>2001-P</b>	<b>2001-P</b>	--	<b>2001-P</b>	--	<b>2001-P</b>	<b>2001-P</b>	--
06114900	Taffy Creek tributary near Winifred	2.95	--	1974-2002	--	--	--	--	--	--
06115000	Missouri River at Power Plant Ferry, near Zortman	40,763	1934-68	1934-67	--	--	--	--	--	--
<b>06115200</b>	<b>Missouri River near Landusky</b>	40,987	<b>1934-P</b>	<b>1934-P</b>	--	--	<b>1972-P</b>	1976-94	<b>1972-P</b>	1979-94
<b>06115270</b>	<b>Armells Creek near Landusky</b>		<b>2000-P</b>	<b>2000-P</b>	--	--	--	--	--	--
<b>06115300</b>	<b>Duval Creek near Landusky</b>	3.31	<b>2000-P</b>	<b>1963-P</b>	--	--	--	--	--	--
<b>06115350</b>	<b>Rock Creek near Landusky</b>		<b>2000-P</b>	<b>2000-P</b>	--	--	--	--	--	--
06115500	North Fork Musselshell River near Delpine	31.4	1940-79	1941-79	--	--	--	--	--	--
06116000	North Fork Musselshell River at Delpine	48.6	1909-12, 1922-32	1909-11, 1922-32	--	--	--	--	--	--
06116500	Bair Reservoir near Delpine	48.6	1939-95	--	--	--	--	--	--	--
06116900	Checkerboard Creek near Delpine	21.1	1909-15	--	--	--	--	--	--	--
06117000	Checkerboard Creek at Delpine	23.9	1922-32	1922-30, 1932	--	--	--	--	--	--
06117500	Spring Creek near Martinsdale	32.5	1922-24	--	--	--	--	--	--	--
06117800	Big Coulee near Martinsdale	2.86	--	1972, 1974-2002	--	--	--	--	--	--
06118000	North Fork Musselshell River near Martinsdale	233	1907-14	1908-14	--	--	--	--	--	--
06118500	South Fork Musselshell River above Martinsdale	287	1942-79	1942-79	--	--	--	--	--	--
06119000	Martinsdale Reservoir near Martinsdale	--	1939-95	--	--	--	--	--	--	--
06119500	South Fork Musselshell River near Martinsdale	300	1907-15, 1930-32	1908-14, 1930,1932	--	--	--	--	--	--

**Table 10.** Montana active and discontinued streamflow-gaging, water-quality, and crest-stage gage stations (active stations in bold print)--Continued

Station number	Station name	Drainage area (square miles)	Period of record (by water year)							
			Discharge or contents		Water quality					
			Daily or monthly	Annual peak	Daily		Periodic			
				Specific conductance	Water temperature	Sediment	Chemistry	Sediment	Biology	
<u>Part 6--Missouri River Basin--Continued</u>										
<b>06119600</b>	<b>Musselshell River at Martinsdale</b>	538	<b>2003</b>	2003	--	--	--	--	--	--
06120000	Big Elk Creek at Twodot	89.1	1953-56	--	--	--	--	--	--	--
<b>06120500</b>	<b>Musselshell River at Harlowton</b>	1,125	<b>1907-P</b>	<b>1909-P</b>	--	2001-2002	--	1988-91	1988-91	--
06120600	Antelope Creek tributary near Harlowton	0.47	--	1956-73	--	--	--	--	--	--
06120700	Antelope Creek tributary near mouth, near Harlowton	1.92	--	1956-73	--	--	--	--	--	--
06120800	Alkali Creek near Harlowton	21.2	--	1956-91	--	--	--	--	--	--
06120900	Antelope Creek at Harlowton	88.7	--	1950, 1954-73, 1976, 1978-80	--	--	--	--	--	--
06121000	American Fork near Harlowton	94.6	1907-14, 1924-32	1908-11, 1913, 1924-30, 1932	--	--	--	--	--	--
06121500	Lebo Creek near Harlowton	59.1	1907-14, 1924-32	1910,1913, 1924-32	--	--	--	--	--	--
06122000	American Fork below Lebo Creek, near Harlowton	166	1946-67	1947-67, 1975	--	--	--	--	--	--
06122500	Deadmans Basin Reservoir near Shawmut	--	1941-95	--	--	--	--	--	--	--
06122800	Musselshell River near Shawmut	1,479	1986-98	1986-97	--	--	--	--	--	--
06123000	Musselshell River at Shawmut	1,496	1902-07	--	--	--	--	--	--	--
<b>06123030</b>	<b>Musselshell River above Mud Creek, near Shawmut</b>	--	<b>1998-P</b>	<b>1998-P</b>	--	--	--	--	--	--
<b>06123200</b>	<b>Sadie Creek near Harlowton</b>	2.10	--	<b>1971, 1973-P</b>	--	--	--	--	--	--
06123500	Musselshell River near Ryegate	1,979	1946-79	1947-79	--	--	--	--	--	--
06124000	Careless Creek near Living Springs	21.2	1920-23	--	--	--	--	--	--	--
06124500	West Careless Creek near Living Springs	23.5	1920-21	--	--	--	--	--	--	--
<b>06124600</b>	<b>East Fork Roberts Creek tributary near Judith Gap</b>	0.74	--	<b>1974-P</b>	--	--	--	--	--	--
06125000	Roberts Creek at Hedgesville	322	1920-23	--	--	--	--	--	--	--
06125500	Careless Creek at Wallum	471	1934-42	1934-37, 1939-42	--	--	--	--	--	--
<b>06125520</b>	<b>Swimming Woman Creek tributary near Living Springs</b>	1.27	--	<b>1974-P</b>	--	--	--	--	--	--
<b>06125680</b>	<b>Big Coulee Creek tributary near Cushman</b>	1.23	--	<b>1974-P</b>	--	--	--	--	--	--
06125700	Big Coulee Creek near Lavina	232	1957-72	1958-72	--	--	--	--	--	--
06126000	Musselshell River at Lavina	2,928	1906	--	--	--	--	--	--	--
<b>06126050</b>	<b>Musselshell River near Lavina</b>	2,970	<b>1992-P</b>	<b>1992-P</b>	--	--	--	--	--	--
06126300	Currant Creek near Roundup	220	--	1958-59, 1961-73	--	--	--	--	--	--
06126470	Halfbreed Creek near Klein	53.2	1978-91	1978-91	--	--	--	1978-81, 1984	1978-81, 1984	--

**Table 10.** Montana active and discontinued streamflow-gaging, water-quality, and crest-stage gage stations (active stations in bold print)--Continued

Station number	Station name	Drainage area (square miles)	Period of record (by water year)							
			Discharge or contents		Water quality					
			Daily or monthly	Annual peak	Daily			Periodic		
Specific conductance	Water temperature	Sediment			Chemistry	Sediment	Biology			
<u>Part 6--Missouri River Basin--Continued</u>										
<b>06126500</b>	<b>Musselshell River near Roundup</b>	4,023	<b>1946-P</b>	<b>1946-48, 1950-P</b>	--	--	--	1978-81	1978-81	--
<b>06127000</b>	<b>South Willow Creek near Roundup</b>	--	1922-23	--	--	--	--	--	--	--
<b>06127020</b>	<b>Willow Creek above LMGA Reservoir, near Roundup</b>	124	<b>1995-P</b>	<b>1996-P</b>	--	--	--	--	--	--
<b>06127060</b>	<b>Willow Creek at U.S. Canal, near Roundup</b>	141	<b>1995-P</b>	<b>1996-P</b>	--	--	--	--	--	--
06127100	South Willow Creek tributary near Roundup	1.38	--	1962-76	--	--	--	--	--	--
06127150	East Parrot Creek near Roundup	20.2	--	--	--	--	--	1979-80	1979-80	--
06127160	West Parrot Creek near Roundup	20.5	--	--	--	--	--	1978-81	1978-81	--
06127200	Musselshell River tributary near Musselshell	10.8	--	1963-77, 1991	--	--	--	--	--	--
06127300	Fattig Creek near Delphia	22.9	--	--	--	--	--	1978-81	1978-81	--
<b>06127500</b>	<b>Musselshell River at Musselshell</b>	4,568	<b>1928-32, 1945-79, 1983-P</b>	<b>1929-30, 1932, 1946-79, 1983-P</b>	--	--	--	1988-91	1988-91	--
<b>06127505</b>	<b>Fishel Creek near Musselshell</b>	16.5	--	<b>1974-P</b>	--	--	--	--	--	--
<b>06127520</b>	<b>Home Creek near Sumatra</b>	1.98	--	<b>1973-P</b>	--	--	--	--	--	--
<b>06127570</b>	<b>Butts Coulee near Melstone</b>	6.71	--	<b>1963-P</b>	--	--	--	--	--	--
<b>06127585</b>	<b>Little Wall Creek tributary near Flatwillow</b>	9.77	--	<b>1974-P</b>	--	--	--	--	--	--
06127600	Musselshell River near Mosby	5,941	1963-66	--	--	--	1963-66	1963-66	1964-66	--
06127900	Flatwillow Creek near Flatwillow	188	1911-32, 1934-56	1911-32, 1934-36, 1938-56	--	--	--	--	--	--
06128200	Flatwillow Creek near Winnett	642	1921-32, 1948-51	1923-29, 1931-32, 1948-51	--	--	--	--	--	--
06128400	South Fork Bear Creek near Roy	39.6	--	1962-76	--	--	--	--	--	--
<b>06128500</b>	<b>South Fork Bear Creek tributary near Roy</b>	5.40	--	<b>1962-P</b>	--	--	--	--	--	--
06128900	Box Elder Creek tributary near Winnett	16.2	--	1955-73	--	--	--	--	--	--
06129000	Box Elder Creek near Winnett	684	1930-33, 1934-38, 1958-72	1931-32, 1934-38, 1959-71, 1978	--	--	--	--	--	--
06129100	North Fork McDonald Creek tributary near Heath	2.24	--	1960-75	--	--	--	--	--	--
06129200	Alkali Creek near Heath	3.76	--	1960-74	--	--	--	--	--	--
06129400	South Fork McDonald Creek tributary near Grassrange	0.51	--	1963-77	--	--	--	--	--	--
06129500	McDonald Creek at Winnett	421	1930-32, 1934-45, 1953-56	1931-32, 1934-45, 1953-73, 1975	--	--	--	--	--	--

**Table 10.** Montana active and discontinued streamflow-gaging, water-quality, and crest-stage gage stations (active stations in bold print)--Continued

Station number	Station name	Drainage area (square miles)	Period of record (by water year)							
			Discharge or contents		Water quality					
			Daily or monthly	Annual peak	Daily		Periodic			
				Specific conductance	Water temperature	Sediment	Chemistry	Sediment	Biology	
<u>Part 6--Missouri River Basin--Continued</u>										
<b>06129700</b>	<b>Gorman Coulee near Cat Creek</b>	2.32	--	<b>1955-59, 1962-73, 1977,1980, 1991-P</b>	--	--	--	--	--	--
06129800	Gorman Coulee tributary near Cat Creek	0.81	--	1955-2002	--	--	--	--	--	--
06130000	Flatwillow Creek near Mosby	1,855	1964-66	--	--	--	1964-66	1964-66	1964-66	--
<b>06130500</b>	<b>Musselshell River at Mosby</b>	7,846	<b>1929-35, 1934-P</b>	<b>1929, 1931-32, 1934-P</b>	--	<b>2000-P</b>	1983-95	<b>1975-95, 1999-P</b>	<b>1975-1997, 1999-P</b>	1975-95
06130600	Cat Creek near Cat Creek	36.5	--	1958-73, 1977,1980	--	--	--	--	--	--
<b>06130610</b>	<b>Bair Coulee near Mosby</b>	1.79	--	<b>1974-P</b>	--	--	--	--	--	--
<b>06130620</b>	<b>Blood Creek tributary near Valentine</b>	1.97	--	<b>1974-P</b>	--	--	--	--	--	--
<b>06130650</b>	<b>Hell Creek near Jordan</b>	70.6	<b>2000-P</b>	<b>2000-P</b>	--	--	--	--	--	--
06130680	Big Dry Creek at Jordan	521	--	--	--	--	--	1976-77	1976-77	--
06130700	Sand Creek near Jordan	317	1957-67	1958-67, 1986	--	--	--	--	--	--
06130800	Second Creek tributary near Jordan	0.52	--	1954, 1958-73	--	--	--	--	--	--
06130850	Second Creek tributary No. 2 near Jordan	2.08	--	1958-90	--	--	--	--	--	--
06130900	Second Creek tributary No. 3 near Jordan	0.72	--	1958-72	--	--	--	--	--	--
<b>06130915</b>	<b>Russian Coulee near Jordan</b>	3.45	--	<b>1974-P</b>	--	--	--	--	--	--
06130925	Thompson Creek tributary near Cohagen	1.23	--	1974-95	--	--	--	--	--	--
06130935	Crow Rock Creek near Cohagen	213	--	--	--	--	--	1978-80	1978-80	1978-80
<b>06130940</b>	<b>Spring Creek tributary near Van Norman</b>	1.39	--	<b>1974-P</b>	--	--	--	--	--	--
06130950	Little Dry Creek near Van Norman	1,224	1980	1958-75, 1986,1995	--	--	--	1976-77	1976-77	--
<b>06131000</b>	<b>Big Dry Creek near Van Norman</b>	2,554	<b>1939-P</b>	<b>1940-P</b>	--	--	--	1978,1981	1978	--
<b>06131100</b>	<b>Terry Coulee near Van Norman</b>	0.48	--	<b>1974-P</b>	--	--	--	--	--	--
06131120	Timber Creek near Van Norman	287	1982-85, 1988	1982-85, 1988	--	--	--	1976-79	1976-80	--
<b>06131200</b>	<b>Nelson Creek near Van Norman</b>	100	<b>1976-85, 2000-P</b>	<b>1976-85, 1991, 2000-P</b>	--	--	--	1976-79	1976-79	--
<b>06131300</b>	<b>McGuire Creek tributary near Van Norman</b>	0.79	--	<b>1974-P</b>	--	--	--	--	--	--
<b>06131500</b>	<b>Fort Peck Lake at Fort Peck</b>	57,500	<b>1938-P</b>	--	--	--	--	--	--	--
<b>06132000</b>	<b>Missouri River below Fork Peck Dam, at Fort Peck</b>	57,556	<b>1936-P</b>	<b>1934-P</b>	--	<b>2002-P</b>	--	<b>1964, 1975-87, 2002-P</b>	<b>1975-87, 2002-P</b>	1975-86
<b>06132200</b>	<b>South Fork Milk River near Babb</b>	70.4	<b>1961-P</b>	<b>1961-P</b>	--	--	--	1990-92	--	--
06132250	Livermore Creek near Babb	25.0	--	1962-67	--	--	--	--	--	--

**Table 10.** Montana active and discontinued streamflow-gaging, water-quality, and crest-stage gage stations (active stations in bold print)--Continued

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			Discharge or contents		Water quality					
			Daily or monthly	Annual peak	Daily			Periodic		
				Specific conductance	Water temperature	Sediment	Chemistry	Sediment	Biology	
<u>Part 6--Missouri River Basin--Continued</u>										
06132400	Dry Fork Milk River near Babb	17.9	--	1962-91	--	--	--	--	--	--
06132500	South Fork Milk River near international boundary, near Browning	287	1905-31	--	--	--	--	1964	--	--
06132700	Milk River near Del Bonita	325	1962-65	1906-08, 1911, 1913-17, 1919, 1923-24, 1927, 1929-30, 1962-67	--	--	--	--	--	--
<b>06133000</b>	<b>Milk River at western crossing of international boundary</b>	401	<b>1931-P</b>	<b>1931-38, 1940-P</b>	--	--	--	1960,1973, 1984-86, 1993	--	--
<b>06133500</b>	<b>North Fork Milk River above St. Mary Canal, near Browning</b>	60.2	<b>1911-12, 1919-P</b>	<b>1911-12, 1924, 1926-27, 1937, 1941-42, 1944-45, 1948, 1950-51, 1953-P</b>	--	--	--	1960,1965, 1973-74, 1982-83, 1990-92	--	--
<b>06134000</b>	<b>North Milk River near international boundary</b>	91.8	<b>1909-P</b>	<b>1911, 1913-P</b>	--	--	--	1960,1965, 1973-74, 1981, 1984-86, 1993	--	--
<b>06134500</b>	<b>Milk River at Milk River, Alberta</b>	1,050	<b>1909-P</b>	<b>1909, 1913-P</b>	--	--	--	1960,1965	--	--
06134600	Red River at international boundary	138	--	--	--	--	--	1995	--	--
<b>06134700</b>	<b>Verdigris Coulee near the mouth, near Milk River, Alberta</b>	137	<b>1985-P</b>	<b>1985-P</b>	--	--	--	--	--	--
06134800	Van Cleeve Coulee tributary near Sunburst	10.8	--	1963-91	--	--	--	--	--	--
06134850	Milk River near Writing-on-Stone Provincial Park, Alberta	1,690	1978-83	1978-82	--	--	--	--	--	--
06134890	Miners Coulee near international boundary	--	1966-94	--	--	--	--	--	--	--
06134930	Bear Creek near international boundary	--	1966-94	--	--	--	--	--	--	--
06134950	Milk River near Pendant D'Oreille	2,330	1978-83	1978-82	--	--	--	--	--	--
<b>06135000</b>	<b>Milk River at eastern crossing of international boundary</b>	2,525	<b>1910-P</b>	<b>1910-11, 1913-15, 1917, 1919-P</b>	--	--	--	1960,1965, 1974, 1984-86, 1993-94	--	--
06135500	Sage Creek at Q Ranch, near Wild Horse, Alberta	175	1935-83	1936-41, 1943, 1946-83	--	--	--	1965	--	--



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<b>Part 6--Missouri River Basin--Continued</b>										
06136000	Sage Creek at international boundary	220	1946-84	1946-83	--	--	--	1965	--	--
06136400	Spring Coulee tributary near Simpson	2.49	--	1972, 1974-2002	--	--	--	--	--	--
<b>06136500</b>	<b>Fresno Reservoir near Havre</b>	3,766	<b>1940-P</b>	--	--	--	--	--	--	--
06136700	Milk River below Fresno Dam, near Havre	3,400	1952-53	--	--	--	1950-53	--	--	--
06137000	Milk River above Havre	3,826	1928-33	--	--	--	--	--	--	--
<b>06137400</b>	<b>Big Sandy Creek at reservation boundary, near Rocky Boy</b>	24.7	<b>1982-P</b>	<b>1982-P</b>	--	--	--	1982-84, 1987-89	--	--
06137500	Big Sandy Creek near Big Sandy	83.3	1946-51	--	--	--	--	--	--	--
06137540	Duck Creek near Box Elder	--	--	--	--	--	1982-84	--	--	--
06137550	Camp Creek near Box Elder	7.2	--	--	--	--	1983-84	--	--	--
06137570	Boxelder Creek near Rocky Boy	48.2	1975-97	1976-97	--	--	--	1977-81, 1983-84, 1993	1977-81, 1993	1977-81
06137575	Boxelder Creek at Box Elder	67.1	--	--	--	--	1983	--	--	--
06137580	Sage Creek near Whitlash	7.26	1976-82, 1985-90	1977-82, 1985-90	--	--	--	--	--	--
<b>06137600</b>	<b>Sage Creek tributary No. 2 near Joplin</b>	2.21	--	<b>1974-P</b>	--	--	--	--	--	--
06137900	England Coulee at Hingham	0.93	--	1960-74	--	--	--	--	--	--
06138000	Sage Creek near Kremlin	914	1946-51	1946-48, 1950-52	--	--	--	--	--	--
06138500	Big Sandy Creek near Box Elder	1,629	1927-39	1927-32, 1934-36, 1938	--	--	--	--	--	--
06138570	Big Sandy Creek above Gravel Coulee, near Laredo	1,639	--	--	--	--	--	1982-84	--	--
<b>06138700</b>	<b>South Fork Spring Coulee near Havre</b>	6.47	--	<b>1960-P</b>	--	--	--	--	--	--
06138800	Spring Coulee near Havre	17.8	--	1959-73	--	--	--	--	--	--
06139000	Big Sandy Creek near Laredo	1,752	1918-20	--	--	--	--	--	--	--
<b>06139500</b>	<b>Big Sandy Creek near Havre</b>	1,805	<b>1946-53, 1984-P</b>	<b>1946-53, 1955-67, 1969, 1978, 1984-P</b>	--	--	--	1986-90	1986-90	--
06139800	West Fork Beaver Creek near Rocky Boy	2.92	2001-2002	--	--	--	--	--	--	--
06139850	Beaver Creek above Elk Creek, near Rocky Boy	7.63	2001-2002	--	--	--	--	--	--	--
<b>06139900</b>	<b>Beaver Creek at reservation boundary, near Rocky Boy</b>	16.1	<b>2001-P</b>	--	--	--	--	1982-84	--	--
06140000	Beaver Creek near Havre	87.4	1918-21	1919-21, 1966-86	--	--	--	--	--	--
06140400	Bullhook Creek near Havre	39.6	--	1960-71, 1973-75, 1986	--	--	--	--	--	--

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<u>Part 6--Missouri River Basin--Continued</u>										
<b>06140500</b>	<b>Milk River at Havre</b>	5,785	<b>1898-1923, 1954-P</b>	<b>1899-1922, 1952-53, 1955-P</b>	--	--	--	1964-72	--	--
06141000	Boxelder Creek near Havre	23.7	1919-22	--	--	--	--	--	--	--
06141500	Boxelder Creek at P.X. Ranch, near Havre	33.3	1918	--	--	--	--	--	--	--
06141600	Little Boxelder Creek at mouth, near Havre	95.9	1986-92, 1994-96	1986-92, 1994-96	--	--	--	--	--	--
06141900	Milk River tributary near Lohman	0.11	--	1960-74	--	--	--	--	--	--
06142000	Clear Creek near Bearpaw	69.6	1918-22	--	--	--	--	--	--	--
<b>06142400</b>	<b>Clear Creek near Chinook</b>	135	<b>1984-P</b>	<b>1984-P</b>	--	--	--	--	--	--
06142500	Fort Belknap Canal near Chinook	--	1903-21	--	--	--	--	--	--	--
06143000	Milk River at Lohman	6,166	1918-26, 1934-51	1919,1923, 1925, 1934-48, 1950-52	--	--	--	--	--	--
06144000	Paradise Valley Canal near headgate, near Chinook	--	1906-08, 1920-21	--	--	--	--	--	--	--
06144100	Walburger Coulee below diversion, near Govenlock, Sask.	32.6	1963-79	1963-78	--	--	--	--	--	--
06144250	Lodge Creek at Alberta boundary	342	1951, 1963-67	--	--	--	1960	--	--	--
<b>06144260</b>	<b>Altawan Reservoir near Govenlock, Saskatchewan</b>	373	<b>1966-P</b>	--	--	--	--	--	--	--
<b>06144270</b>	<b>Spangler Ditch near Govenlock, Saskatchewan</b>	--	<b>1966-P</b>	--	--	--	--	--	--	--
06144300	Lodge Creek below Spangler Project, near Govenlock, Sask.	--	1963-66	--	--	--	--	--	--	--
<b>06144350</b>	<b>Middle Creek near Saskatchewan boundary</b>	118	<b>1963-P</b>	<b>1952, 1963-P</b>	--	--	--	--	--	--
06144360	Middle Creek Reservoir near Govenlock	130	1966-95	--	--	--	--	--	--	--
<b>06144395</b>	<b>Middle Creek below Middle Creek Reservoir, near Govenlock, Saskatchewan</b>	149	<b>1972-P</b>	1974-78, 1983, 1986-87	--	--	--	--	--	--
06144400	Middle Creek near Battle Creek, Saskatchewan	177	1963-72	1963-71, 1994	--	--	--	--	--	--
<b>06144440</b>	<b>Middle Creek near Govenlock, Saskatchewan</b>	253	<b>1986-P</b>	<b>1986-P</b>	--	--	--	--	--	--
<b>06144450</b>	<b>Middle Creek above Lodge Creek, near Govenlock, Sask.</b>	276	<b>1962-66, 1986-P</b>	<b>1986-P</b>	--	--	--	--	--	--
06144500	Lodge Creek at international boundary	753	1910-52	1911-15, 1917-52	--	--	--	--	--	--
06145000	McRae Creek at international boundary	59.0	1927-52	1927-28, 1930-33, 1935-47, 1950-52	--	--	--	--	--	--

**Table 10.** Montana active and discontinued streamflow-gaging, water-quality, and crest-stage gage stations (active stations in bold print)--Continued

Station number	Station name	Drainage area (square miles)	Period of record (by water year)							
			Discharge or contents		Water quality					
			Daily or monthly	Annual peak	Daily			Periodic		
					Specific conductance	Water temperature	Sediment	Chemistry	Sediment	Biology
<u>Part 6--Missouri River Basin--Continued</u>										
<b>06145500</b>	<b>Lodge Creek below McRae Creek, at international boundary</b>	825	<b>1951-P</b>	<b>1952-P</b>	--	--	--	1960,1964, 1973, 1977-80, 1987-89	--	--
06146000	North Chinook Canal near Havre	--	1921-24, 1928-68	--	--	--	--	--	--	--
06146500	Reser Ditch near Chinook	--	1905-06	--	--	--	--	--	--	--
06147000	West Fork Ditch near Chinook	--	1905-07	--	--	--	--	--	--	--
06147500	Lodge Creek at Chinook	1,175	1906-08	--	--	--	--	--	--	--
<b>06147950</b>	<b>Gaff Ditch near Merryflat, Saskatchewan</b>	--	<b>1972-P</b>	--	--	--	--	--	--	--
06148000	Battle Creek above Cypress Lake west inflow canal, near West Plains, Saskatchewan	270	1939-66	1939-66	--	--	--	1960	--	--
<b>06148500</b>	<b>Cypress Lake west inflow canal near West Plains, Sask.</b>	--	<b>1939-P</b>	--	--	--	--	--	--	--
<b>06148700</b>	<b>Cypress Lake west inflow canal drain near Oxarat, Sask.</b>	--	<b>1963-P</b>	--	--	--	--	--	--	--
<b>06149000</b>	<b>Cypress Lake west outflow near West Plains, Sask.</b>	--	<b>1940-P</b>	--	--	--	--	1960	--	--
<b>06149100</b>	<b>Vidora Ditch near Consul, Saskatchewan</b>	--	<b>1963-P</b>	--	--	--	--	--	--	--
<b>06149200</b>	<b>Richardson Ditch near Consul, Saskatchewan</b>	--	<b>1963-P</b>	--	--	--	--	--	--	--
<b>06149300</b>	<b>McKinnon Ditch near Consul Saskatchewan</b>	--	<b>1963-P</b>	--	--	--	--	--	--	--
<b>06149400</b>	<b>Nashlyn Canal near Consul, Saskatchewan</b>	--	<b>1963-P</b>	--	--	--	--	--	--	--
<b>06149500</b>	<b>Battle Creek at international boundary</b>	997	<b>1917-P</b>	<b>1917-P</b>	--	--	--	1960,1964, 1972-74, 1987-89	--	1972
06150000	Woodpile Coulee near international boundary	60.2	1927-77	1927-30, 1932-47, 1950-63, 1965-76, 1986	--	--	--	--	--	--
06150500	East Fork Battle Creek near international boundary	89.5	1927-76	1927-33, 1935-63, 1965-67, 1969, 1971-76, 1986	--	--	--	--	--	--
06151000	Lyons Creek at international boundary	66.7	1927-94	1927-30, 1932, 1934-47, 1950-52, 1954-63, 1965-94	--	--	--	--	--	--
<b>06151500</b>	<b>Battle Creek near Chinook</b>	1,623	<b>1905-21, 1984-P</b>	<b>1905-14, 1917-21, 1952, 1984-P</b>	--	--	--	--	--	--

**Table 10.** Montana active and discontinued streamflow-gaging, water-quality, and crest-stage gage stations (active stations in bold print)--Continued

Station number	Station name	Drainage area (square miles)	Period of record (by water year)							
			Discharge or contents		Water quality					
			Daily or monthly	Annual peak	Daily			Periodic		
Specific conductance	Water temperature	Sediment			Chemistry	Sediment	Biology			
<u>Part 6--Missouri River Basin--Continued</u>										
06152000	Cook Canal near Chinook	--	1905-19	--	--	--	--	--	--	--
06152500	Matheson Canal near Chinook	--	1905-21, 1928-49, 1951-56	--	--	--	--	--	--	--
06153000	Paradise Valley Canal near Chinook	--	1903-19	--	--	--	--	--	--	--
<b>06153400</b>	<b>Fifteenmile Creek tributary near Zurich</b>	1.60	--	<b>1974-P</b>	--	--	--	--	--	--
06153500	Harlem Canal near Zurich	--	1904-21	--	--	--	--	--	--	--
06154000	Milk River Canal A near Harlem	--	1905, 1910-20, 1986-87	--	--	--	--	--	--	--
<b>06154100</b>	<b>Milk River near Harlem</b>	9,822	<b>1959-69, 1983-P</b>	<b>1952, 1960-69, 1978, 1983-P</b>	--	--	--	1959-69 1994	--	--
06154140	Fifteenmile Creek tributary near Harlem	2.31	1983-92	1983-92	--	--	--	--	--	--
06154150	White Bear Creek below Fifteenmile Creek, near Dodson	--	--	--	--	--	--	1982-84	--	--
<b>06154350</b>	<b>Peoples Creek tributary near Lloyd</b>	2.51	--	<b>1974-P</b>	--	--	--	--	--	--
06154390	Peoples Creek near Cleveland	--	--	--	--	--	--	1982-84	--	--
<b>06154400</b>	<b>Peoples Creek near Hays</b>	220	<b>1966-P</b>	<b>1967-P</b>	--	--	--	1960-61, 1963,1994	--	--
<b>06154410</b>	<b>Little Peoples Creek near Hays</b>	13	<b>1973-P</b>	<b>1973-P</b>	--	--	--	1977-2002	1977-85 1988-2002	1977-85
06154430	Lodge Pole Creek at Lodge Pole	19.5	1987-2000	1987-2000	--	--	--	1982-84, 1988-92, 1994	1988-92	--
06154490	Willow Creek near Dodson	5.16	1983-92	1983-92	--	--	--	--	--	--
06154500	Peoples Creek near Dodson	670	1918-22, 1951-73, 1982-88	1952-66, 1968-73, 1982-88	--	--	--	1982-88	--	--
<b>06154510</b>	<b>Kuhr Coulee tributary near Dodson</b>	1.25	1983-92	<b>1983-P</b>	--	--	--	--	--	--
<b>06154550</b>	<b>Peoples Creek below Kuhr Coulee, near Dodson</b>	675	<b>1918-21, 1951-73, 1982-P</b>	<b>1989-P</b>	--	--	--	<b>1989-92, 1994, 1999-P</b>	--	--
<b>06155000</b>	<b>Nelson Reservoir near Saco</b>	--	<b>1928-95</b>	--	--	--	--	--	--	--
06155005	Dodson North Canal near Dodson	--	--	--	--	1973	--	--	--	--
<b>06155030</b>	<b>Milk River near Dodson</b>	11,192	<b>1983-P</b>	<b>1983-P</b>	--	--	--	1994	--	--
06155100	Black Coulee near Malta	6.64	--	1956-67, 1986	--	--	--	--	--	--
06155200	Alkali Creek near Malta	162	--	1956-59, 1961-73, 1986	--	--	--	--	--	--
06155300	Disjardin Coulee near Malta	4.84	--	1956-2002	--	--	--	--	--	--

**Table 10.** Montana active and discontinued streamflow-gaging, water-quality, and crest-stage gage stations (active stations in bold print)--Continued

Station number	Station name	Drainage area (square miles)	Period of record (by water year)							
			Discharge or contents		Water quality					
			Daily or monthly	Annual peak	Daily			Periodic		
					Specific conductance	Water temperature	Sediment	Chemistry	Sediment	Biology
<u>Part 6--Missouri River Basin--Continued</u>										
06155400	South Fork Taylor Coulee near Malta	5.08	--	1956-73, 1986	--	--	--	--	--	--
06155500	Milk River at Malta	11,762	1902-22, 1952	1903-09, 1911-13, 1915-22, 1952	--	--	--	--	--	--
<b>06155600</b>	<b>Murphy Coulee tributary near Hogeland</b>	2.62	--	<b>1974-P</b>	--	--	--	--	--	--
<b>06155900</b>	<b>Milk River at Cree Crossing, near Saco</b>	13,118	<b>2000-P</b>	<b>2000-P</b>	--	--	--	--	--	--
06156000	Whitewater Creek near international boundary	458	1927-80	1927-33, 1935-79	--	--	--	1965, 1977-80	--	--
<b>06156100</b>	<b>Lush Coulee near Whitewater</b>	9.58	--	<b>1972, 1974-P</b>	--	--	--	--	--	--
<b>06156500</b>	<b>Belanger Creek diversion canal near Vidora, Saskatchewan</b>	--	<b>1946-P</b>	--	--	--	--	--	--	--
<b>06157000</b>	<b>Cypress Lake near Vidora, Saskatchewan</b>	107	<b>1939-P</b>	--	--	--	--	--	--	--
<b>06157500</b>	<b>Cypress Lake east outflow canal near Vidora, Saskatchewan</b>	--	<b>1940, 1943-P</b>	--	--	--	--	--	--	--
06158000	Frenchman River above Eastend Reservoir, near Ravenscrag, Saskatchewan	601	1912-18, 1917, 1937-67	1913-15, 1917, 1937-66	--	--	--	1960	--	--
<b>06158500</b>	<b>Eastend Canal at Eastend, Saskatchewan</b>	--	<b>1937-P</b>	--	--	--	--	--	--	--
<b>06159000</b>	<b>Eastend Reservoir at Eastend, Saskatchewan</b>	619	<b>1937-P</b>	--	--	--	--	--	--	--
06159500	Frenchman River below Eastend Reservoir, near Eastend, Saskatchewan	619	1909-16, 1918-31, 1935-36, 1939-91	1909, 1911-15, 1918-31, 1940-91	--	--	--	--	--	--
06160500	Frenchman River at Morrison's, near Eastend, Saskatchewan	800	1937-55	1939-52	--	--	--	1960	--	--
06160600	Frenchman River below Eastern Irrigation Project, near Eastend, Saskatchewan	835	1937-55, 1962-75	1939-52, 1962-75	--	--	--	--	--	--
06161000	Frenchman River at 50-mile, near Bracken, Saskatchewan	1,248	1914-31, 1935-55	1914-17, 1919-31, 1936-52	--	--	--	--	--	--
<b>06161300</b>	<b>Huff Lake pumping canal near Val Marie, Saskatchewan</b>	--	<b>1963-P</b>	--	--	--	--	--	--	--
<b>06161500</b>	<b>Huff Lake gravity canal near Val Marie, Saskatchewan</b>	--	<b>1946-P</b>	--	--	--	--	--	--	--
<b>06162000</b>	<b>Huff Lake near Val Marie, Saskatchewan</b>	1,274	<b>1940-P</b>	--	--	--	--	--	--	--
<b>06162500</b>	<b>Newton Lake main canal near Val Marie, Saskatchewan</b>	--	<b>1937-P</b>	--	--	--	--	--	--	--
<b>06163000</b>	<b>Newton Lake near Val Marie, Saskatchewan</b>	1,349	<b>1937-P</b>	--	--	--	--	--	--	--
06163050	Frenchman River below Newton Lake, near Val Marie, Sask.	1,349	1976-94	--	--	--	--	--	--	--
06163400	Denniel Creek near Val Marie, Saskatchewan	251	1963-77	1963-76	--	--	--	--	--	--
06163500	Frenchman River below Val Marie, Saskatchewan	1,725	1937-53, 1963-76	1937-52, 1962-67, 1969-75	--	--	--	1960	--	--

**Table 10.** Montana active and discontinued streamflow-gaging, water-quality, and crest-stage gage stations (active stations in bold print)--Continued

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			Discharge or contents		Water quality					
			Daily or monthly	Annual peak	Daily		Periodic			
				Specific conductance	Water temperature	Sediment	Chemistry	Sediment	Biology	
<u>Part 6--Missouri River Basin--Continued</u>										
<b>06164000</b>	<b>Frenchman River at international boundary</b>	2,120	<b>1917-P</b>	<b>1917-P</b>	--	--	--	1960,1964 1973, 1987-89	--	--
06164500	Frenchman Canal near Saco	--	1921, 1928-68	--	--	--	--	--	--	--
<b>06164510</b>	<b>Milk River at Juneburg Bridge, near Saco</b>	17,670	<b>1978-P</b>	<b>1978-P</b>	--	--	--	1978-96	--	--
06164590	Beaver Creek near Zortman	10.1	1983-92	1984-92	--	--	--	1984,1994	--	--
<b>06164600</b>	<b>Beaver Creek tributary near Zortman</b>	3.89	--	<b>1974-P</b>	--	--	--	--	--	--
06164615	Little Warm Creek at reservation boundary, near Zortman	6.31	1983-92	1983-92	--	--	--	1983-90	--	--
06164620	Little Warm Creek near Lodge Pole	--	--	--	--	--	--	1982-83	--	--
<b>06164623</b>	<b>Little Warm Creek tributary near Lodge Pole</b>	2.42	1983-92	<b>1983-P</b>	--	--	--	1994	--	--
06164630	Big Warm Creek near Zortman	8.58	1983-87	1983-87	--	--	--	1983-84	--	--
06164640	Big Warm Creek near Lodge Pole	--	--	--	--	--	--	1982-83	--	--
06164800	Beaver Creek above Dix Creek, near Malta	929	1967-69, 1976-82	1967-69, 1974, 1976-82, 1986	--	--	--	--	--	--
06165000	Beaver Creek near Malta	1,010	1917-21	--	--	--	--	--	--	--
<b>06165200</b>	<b>Guston Coulee near Malta</b>	2.06	--	<b>1974-P</b>	--	--	--	--	--	--
06165500	Beaver Creek overflow near Bowdoin	--	1903-13	1903-06, 1909, 1912	--	--	--	--	--	--
<b>06166000</b>	<b>Beaver Creek below Guston Coulee, near Saco (Beaver Creek near Bowdoin)</b>	1,208	<b>1920-21, 1981-P</b>	<b>1982-93, 1995-P</b>	--	--	--	1980-85	--	--
06166500	Beaver Creek near Saco	1,224	1903-06, 1908-13	--	--	--	--	--	--	--
06167000	Beaver Creek near Brady's Ranch, at Ashfield	1,327	1918	--	--	--	--	--	--	--
06167100	Beaver Creek above dam, near Saco	1,338	--	--	--	--	--	1982-83, 1985	--	--
06167500	Beaver Creek near Hinsdale	1,785	1918-21, 1952	--	--	--	--	--	--	--
06168000	Bowray Ditch near Barnard	--	1914	--	--	--	--	--	--	--
06168500	Rock Creek at international boundary	241	1914-16, 1927-62	1927-61	--	--	--	--	--	--
06169000	Horse Creek at international boundary	73.5	1914-62	1915-33, 1935-61	--	--	--	--	--	--
<b>06169500</b>	<b>Rock Creek below Horse Creek, near international boundary</b>	328	<b>1916-26, 1956-P</b>	<b>1917, 1919-26, 1952, 1957-P</b>	--	--	--	1964,1965, 1977-96	1979-96	1979-96
06169600	South Creek tributary near Opheim	2.15	1983-87	1983-87	--	--	--	--	--	--

**Table 10.** Montana active and discontinued streamflow-gaging, water-quality, and crest-stage gage stations (active stations in bold print)--Continued

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			Discharge or contents		Water quality					
			Daily or monthly	Annual peak	Daily			Periodic		
					Specific conductance	Water temperature	Sediment	Chemistry	Sediment	Biology
<u>Part 6--Missouri River Basin--Continued</u>										
06169700	South Creek tributary No. 2 near Opheim	1.62	1983-87	1983-87	--	--	--	--	--	--
06169800	South Creek tributary No. 3 near international boundary	.32	1983-87	1983-87	--	--	--	--	--	--
06170000	McEachern Creek at international boundary	182	1924-77	1924-76	--	--	--	1965, 1978-80	--	--
06170050	Rock Creek below McEachern Creek, near international boundary	650	1983-87	1983-87	--	--	--	--	--	--
06170080	Starbuck Coulee near international boundary	4.16	1983-87	1983-87	--	--	--	--	--	--
06170200	Willow Creek near Hinsdale	283	1965-73	1965-73, 1979	--	--	--	--	--	--
06170500	Rock Creek Canal near Hinsdale	--	1918-20	--	--	--	--	--	--	--
06171000	Rock Creek near Hinsdale	1,313	1906-07, 1912-20	1906-07, 1912, 1914-20, 1952	--	--	--	--	--	--
06171500	Milk River at Hinsdale	20,897	1908-14, 1952	--	--	--	--	--	--	--
06172000	Milk River near Vandalia	20,926	1915-25, 1928-39, 1952	1915, 1917-25, 1929-39, 1952	--	--	--	1970-73	--	--
06172000	Milk River at Vandalia	20,944	1970-73, 1983-86	1970-73, 1983-87	--	--	--	--	--	--
06172200	Buggy Creek near Tampico	105	1958-67	1958-67, 1972, 1982	--	--	--	--	--	--
<b>06172300</b>	<b>Unger Coulee near Vandalia</b>	11.1	--	<b>1958-P</b>	--	--	--	--	--	--
<b>06172310</b>	<b>Milk River at Tampico</b>	21,078	<b>1973-77, 1987-P</b>	<b>1974-77, 1988-P</b>	--	--	--	1974-77	--	--
06172350	Mooney Coulee near Tampico	14.3	--	1961-75, 1982	--	--	--	--	--	--
06172400	Milk River tributary No. 2 near Glasgow	1.79	--	1958-60	--	--	--	--	--	--
06172500	Sheepshed Reservoir	11.3	1955-67	--	--	--	--	--	--	--
06173000	Halfway Reservoir	16.2	1955-62	--	--	--	--	--	--	--
06173300	Willow Creek tributary near Fort Peck	0.86	--	1972, 1974-91	--	--	--	--	--	--
06173500	Burnett Northwest Reservoir	5.0	1954-59, 1960-67	--	--	--	--	--	--	--
06174000	Willow Creek near Glasgow	538	1954-87	1954-87, 1993	--	--	--	--	1960-64	--
06174200	Milk River near Glasgow	21,965	1952	--	--	--	--	1969-73	--	1969-73
<b>06174300</b>	<b>Milk River tributary No. 3 near Glasgow</b>	1.82	--	<b>1974-P</b>	--	--	--	--	--	--

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Station number	Station name	Drainage area (square miles)	Period of record (by water year)							
			Discharge or contents		Water quality					
			Daily or monthly	Annual peak	Daily		Periodic			
				Specific conductance	Water temperature	Sediment	Chemistry	Sediment	Biology	
<u>Part 6--Missouri River Basin--Continued</u>										
<b>06174500</b>	<b>Milk River at Nashua</b>	22,332	<b>1939-P</b>	<b>1940-P</b>	--	<b>2000-P</b>	--	<b>1950-53, 1959-94, 1999-P</b>	<b>1974-94, 1999-P</b>	1974-94
06174550	Middle Fork Porcupine Creek near Baylor	--	--	--	--	--	--	1982-83	--	--
<b>06174600</b>	<b>Snow Coulee at Opheim</b>	3.11	--	<b>1972, 1974-P</b>	--	--	--	--	--	--
06174700	West Fork Porcupine Creek near Baylor	--	--	--	--	--	--	1982-83	--	--
06175000	Porcupine Creek at Nashua	725	1908-24, 1982-92	1909, 1912-21, 1923-24, 1939, 1982-93	--	--	--	1982-89	--	--
06175400	Frazer Reservoir outlet near Frazer	--	--	--	--	--	--	1960-63, 1966-97, 1969-72	--	--
06175500	Little Porcupine Creek at Frazer	280	1909-16, 1918-19	--	--	--	--	--	--	--
06175505	Little Porcupine Creek below diversion, at Frazer	--	--	--	--	--	--	1982-83	--	--
06175540	Prairie Elk Creek near Oswego	352	1975-85	1976-85	--	--	--	1976-79	1976-79	--
06175550	East Fork Sand Creek near Vida	8.51	--	1963-77	--	--	--	--	--	--
06175580	Sand Creek near Wolf Point	201	--	--	--	--	--	1976-77	1976-77	--
06175600	West Fork Wolf Creek near Lustre	6.57	--	1956-67	--	--	--	--	--	--
06175700	East Fork Wolf Creek near Lustre	9.61	--	1956-2002	--	--	--	--	--	--
06175800	Wolf Creek tributary near Wolf Point	2.46	--	1955-67	--	--	--	--	--	--
06175900	Wolf Creek tributary No. 2 near Wolf Point	6.10	--	1955-84	--	--	--	--	--	--
06176000	Wolf Point ditch at Wolf Point	--	1909-10	--	--	--	--	--	--	--
06176500	Wolf Creek near Wolf Point	251	1908-14, 1950-53, 1982-92	1910-12, 1950-54, 1956-70, 1972-73, 1982-93	--	--	--	1982-84	--	--
06176950	Missouri River tributary No. 6 near Wolf Point	0.53	--	1973-91	--	--	--	--	--	--
<b>06177000</b>	<b>Missouri River near Wolf Point</b>	82,290	<b>1928-P</b>	<b>1929-P</b>	--	<b>1979-85, 2002-P</b>	--	<b>1949-51, 1961-62, 1965-68, 1970-73, 2002-P</b>	<b>2002-P</b>	--
<b>06177020</b>	<b>Tule Creek tributary near Wolf Point</b>	1.91	--	<b>1974-P</b>	--	--	--	--	--	--
06177025	Tule Creek near Poplar	--	--	--	--	--	--	1982	--	--
06177050	East Fork Duck Creek near Brockway	12.4	--	1955-2002	--	--	--	--	--	--
06177100	Duck Creek near Brockway	54.0	--	1957-73	--	--	--	--	--	--



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			Daily or monthly	Annual peak	Daily		Periodic			
				Specific conductance	Water temperature	Sediment	Chemistry	Sediment	Biology	
<u>Part 6--Missouri River Basin--Continued</u>										
06177150	Redwater River at Brockway	216	--	1957-73, 1986	--	--	--	1980-83	--	--
06177200	Tusler Creek near Brockway	90.2	--	1957-72	--	--	--	--	--	--
06177250	Tusler Creek tributary near Brockway	3.17	--	1957-73, 1986	--	--	--	--	--	--
06177300	Redwater River tributary near Brockway	0.29	--	1954,1957, 1959-73	--	--	--	--	--	--
06177350	South Fork Dry Ash Creek near Circle	5.74	--	1955-60, 1962-72, 1986	--	--	--	--	--	--
06177400	McCune Creek near Circle	29.9	1982-85	1955-58, 1960-73, 1982-86	--	--	--	--	--	--
<b>06177500</b>	<b>Redwater River at Circle</b>	547	<b>1929-72, 1974-P</b>	<b>1929-30, 1932-72, 1975-P</b>	--	--	--	1975-85	1975-85	--
06177520	Horse Creek near Circle	101	--	--	--	--	--	1977-79, 1982	1977-79	--
06177650	Redwater River near Richey	1,071	1982-86	1983-85	1982-85	--	--	1982-85	1982-84	--
<b>06177700</b>	<b>Cow Creek tributary near Vida</b>	1.71	1982-85	<b>1963-P</b>	--	--	--	--	--	--
06177720	West Fork Sullivan Creek near Richey	14.8	--	1972, 1974-92	--	--	--	--	--	--
06177800	Gady Coulee near Vida	0.91	--	1962-91	--	--	--	--	--	--
<b>06177820</b>	<b>Horse Creek tributary near Richey</b>	0.63	--	<b>1974-P</b>	--	--	--	--	--	--
06177825	Redwater River near Vida	1,974	1975-85	1976-85	--	--	--	1976-85	1976-85	--
<b>06178000</b>	<b>Poplar River at international boundary</b>	358	<b>1931-P</b>	<b>1931, 1933-P</b>	--	--	--	<b>1964-65, 1976-P</b>	<b>1977-P</b>	1977-78
06178150	Poplar River near Scobey	572	--	--	--	--	--	1975-80	1977-79	1977-78
<b>06178500</b>	<b>East Poplar River at international boundary</b>	541	<b>1931-P</b>	<b>1931-32, 1935-43, 1945-P</b>	<b>1982-P</b>	--	--	<b>1964-65, 1975-P</b>	<b>1975-P</b>	1977-81
06179000	East Fork Poplar River near Scobey	722	1935-40, 1975-79	1975-79	--	--	--	1975-95	1977-95	1977-78
<b>06179100</b>	<b>Butte Creek tributary near Four Buttes</b>	1.60	--	<b>1972, 1974-P</b>	--	--	--	--	--	--
06179200	Poplar River above West Fork, near Bredette	1,745	--	--	--	--	--	1976-81, 1985-93	1977-81	1977-78
06179500	West Fork Poplar River at international boundary	139	1931-53	1931-33, 1935-37, 1939-52	--	--	--	1976-83	1977-79	1977-78
06180000	West Fork Poplar River near Richland	428	1935-49	1935-49, 1990,1994	--	--	--	--	--	--

**Table 10.** Montana active and discontinued streamflow-gaging, water-quality, and crest-stage gage stations (active stations in bold print)--Continued

Station number	Station name	Drainage area (square miles)	Period of record (by water year)							
			Discharge or contents		Water quality					
			Daily or monthly	Annual peak	Daily		Periodic			
Specific conductance	Water temperature	Sediment			Chemistry	Sediment	Biology			
<u>Part 6--Missouri River Basin--Continued</u>										
06180200	West Fork Poplar River near Four Buttes	732	--	--	--	--	--	1975-76	--	--
06180400	West Fork Poplar River near Bredette	1,010	--	--	--	--	--	1976-93	1977-84	1977-78
06180500	Poplar River near Bredette	2,940	1934-47	1934-47	--	--	--	--	--	--
06180600	Poplar River above Slims Coulee, near Poplar	--	--	--	--	--	--	1991-93	--	--
<b>06181000</b>	<b>Poplar River near Poplar</b>	3,174	<b>1908-24, 1947-69, 1975-79, 1982-P</b>	<b>1909,1915, 1921,1923, 1946, 1948-63, 1965-69, 1975-79, 1982-P</b>	--	<b>2000-P</b>	--	<b>1975-81, 1987-94, 1999-P</b>	<b>1975-81, 1987-94, 1999-P</b>	1975-78, 1987-94
06181200	Missouri River tributary No. 2 near Brockton	1.60	--	1962-76	--	--	--	--	--	--
06181500	Big Muddy Creek at international boundary	29.0	1949-52	--	--	--	--	--	--	--
06181995	Beaver Creek at international boundary	149	1977-94	1978-94	--	--	--	1977-91	1977-91	1977-78
06182000	Beaver Creek near international boundary	224	1949-53	--	--	--	--	--	--	--
06182500	Big Muddy Creek at Daleview	279	1947-72	1948-72, 1975	--	--	--	--	--	--
06182700	Middle Fork Big Muddy Creek near Flaxville	3.12	--	1972, 1974-83	--	--	--	--	--	--
06183000	Big Muddy Creek at Plentywood	850	1948-53	1948-53, 1955-67	--	--	--	--	--	--
06183100	Box Elder Creek near Plentywood	9.40	--	1956-73, 1976	--	--	--	--	--	--
06183200	Box Elder Creek at dam site, near Plentywood	19.9	--	1953,1955, 1957-63	--	--	--	--	--	--
06183300	Marron Creek tributary near Plentywood	6.08	--	1955-2002	--	--	--	--	--	--
06183400	Spring Creek at Highway 16, near Plentywood	16.9	--	1956-73, 1976	--	--	--	--	--	--
<b>06183450</b>	<b>Big Muddy Creek near Antelope</b>	967	<b>1979-P</b>	<b>1979-P</b>	--	--	--	1979-93	1979-87	--
06183500	Big Muddy Creek at Reserve	1,044	1920-25, 1950-53	1920-21, 1923-24, 1950-53	--	--	--	--	--	--
<b>06183700</b>	<b>Big Muddy Creek diversion canal near Medicine Lake</b>	--	<b>1985-P</b>	--	--	--	--	--	--	--
<b>06183750</b>	<b>Lake Creek near Dagmar</b>	101	<b>1985-89, 1995-P</b>	<b>1986-89, 1996-P</b>	--	--	--	--	--	--
<b>06183800</b>	<b>Cottonwood Creek near Dagmar</b>	126	<b>1985-89, 1995-P</b>	<b>1986-89, 1996-P</b>	--	--	--	--	--	--
<b>06183850</b>	<b>Sand Creek near Dagmar</b>	122	<b>1985-89, 1995-P</b>	<b>1986-89, 1995-P</b>	--	--	--	--	--	--
06183900	Wolf Creek near Reserve	--	--	--	--	--	--	1982-84	--	--
06184000	Wolf Creek near Medicine Lake	165	1918-19	--	--	--	--	--	--	--

**Table 10.** Montana active and discontinued streamflow-gaging, water-quality, and crest-stage gage stations (active stations in bold print)--Continued

Station number	Station name	Drainage area (square miles)	Period of record (by water year)							
			Discharge or contents		Water quality					
			Daily or monthly	Annual peak	Daily		Periodic			
				Specific conductance	Water temperature	Sediment	Chemistry	Sediment	Biology	
<u>Part 6--Missouri River Basin--Continued</u>										
<b>06184200</b>	<b>Lost Creek tributary near Homestead</b>	1.90	--	<b>1972, 1974-P</b>	--	--	--	--	--	--
06184400	Smoke Creek near Flaxville	--	--	--	--	--	--	1982	--	--
06184500	Smoke Creek near Poplar	283	1918	--	--	--	--	--	--	--
06185000	Big Muddy Creek near Culbertson	2,447	1908-21	1909-14, 1916-21	--	--	--	--	--	--
06185100	Big Muddy Creek tributary near Culbertson	7.38	--	1963-77	--	--	--	--	--	--
06185110	Big Muddy Creek near mouth, near Culbertson	2,684	1982-92	1982-92	--	--	--	1982-89	--	--
06185150	Hardscrabble Creek near Culbertson	121	--	--	--	--	--	1981-83	1981-83	--
06185200	Missouri River tributary No. 3 near Culbertson	1.23	--	1963-77	--	--	--	--	--	--
06185300	Missouri River tributary No. 4 near Bainville	11.6	--	1963-77	--	--	--	--	--	--
<b>06185400</b>	<b>Missouri River tributary No. 5 at Culbertson</b>	3.67	--	<b>1963-P</b>	--	--	--	--	--	--
<b>06185500</b>	<b>Missouri River near Culbertson</b>	91,557	<b>1941-51, 1958-P</b>	<b>1942-51, 1959-P</b>	--	<b>2002-P</b>	1972-76	<b>1965-86, 1992-94, 1997-P</b>	<b>1972-86, 1997-P</b>	<b>1969-86, 2003</b>
<u>Part 6--Yellowstone River Basin</u>										
06186000	Yellowstone Lake at Bridge Bay, Yellowstone National Park	1,006	1921-86	--	--	--	--	--	--	--
<b>06186500</b>	<b>Yellowstone River at Yellowstone Lake outlet, Yellowstone National Park</b>	991	<b>1922-82, 1984-86, 1989-P</b>	<b>1923-86, 1989-P</b>	1984-85	1984-85	--	--	--	--
06187000	Yellowstone River near Canyon Hotel, Yellowstone National Park	1,157	1913-51	1913-18, 1821-51	--	--	--	--	--	--
06187500	Tower Creek at Tower Falls, Yellowstone National Park	50.4	1922-43	1923-43	--	--	--	--	--	--
06187550	Yellowstone River at Tower Junction, Yellowstone National Park	1,342	1984-86	1984-86	1984-85	1984-85	--	--	--	--
<b>06187915</b>	<b>Soda Butte Creek at park boundary, at Silver Gate</b>	31.2	<b>1999-P</b>	<b>1999-P</b>	--	--	--	1999-2001	1999-2001	2000-2001
<b>06187950</b>	<b>Soda Butte Creek near Lamar Ranger Station, Yellowstone National Park</b>	99	<b>1989-P</b>	<b>1989-P</b>	--	--	--	1989	--	--
<b>06188000</b>	<b>Lamar River near Tower Falls Ranger Station, Yellowstone National Park</b>	660	<b>1922-69, 1985-86, 1988-P</b>	<b>1923-69, 1985-86, 1989-P</b>	--	--	1985-86, 1989-92	1989	1985-86, 1988-92,	--
06188500	East Fork Blacktail Deer Creek near Mammoth, Yellowstone National Park	10.3	1938-41	--	--	--	--	--	--	--
06189000	Blacktail Deer Creek near Mammoth, Yellowstone National Park	15	1938-45, 1989-93	1938-45, 1989-93	--	--	--	1989	--	--
06189500	Bear Creek at Jardine	40.8	1946-49	--	--	--	--	--	--	--
06190000	Lupine Creek near Mammoth, Yellowstone National Park	4.67	1938-41	--	--	--	--	--	--	--
06190370	Gardner River above Mammoth Springs Outflow, near Mammoth, Yellowstone National Park	--	--	--	--	--	--	1988-93	--	--

**Table 10.** Montana active and discontinued streamflow-gaging, water-quality, and crest-stage gage stations (active stations in bold print)--Continued

Station number	Station name	Drainage area (square miles)	Period of record (by water year)								
			Discharge or contents		Water quality						
			Daily or monthly	Annual peak	Daily			Periodic			
Specific conductance	Water temperature	Sediment			Chemistry	Sediment	Biology				
<u>Part 6--Yellowstone River Basin--Continued</u>											
06190415	Mammoth Springs Outflow at Mammoth, Yellowstone National Park	--	--	--	--	--	--	--	1988-94	--	--
06190500	Gardner River at Mammoth, Yellowstone National Park	200	1922-39	1923-38	--	--	--	--	--	--	--
06190525	Gardner River Sinkhole Diversion at Mammoth, Yellowstone National Park	--	--	--	--	--	--	--	1989-92	--	--
06190530	Clematis Creek at Mammoth, Yellowstone National Park	2.71	--	--	--	--	--	--	1990-92	--	--
<b>06190540</b>	<b>Boiling River at Mammoth, Yellowstone National Park</b>	--	<b>1989-94</b> <b>2003</b>	<b>1989-95</b> <b>2003</b>	1989-90	<b>1989-90</b> <b>2003</b>	--	--	1967, 1988-94	--	--
<b>06191000</b>	<b>Gardner River near Mammoth, Yellowstone National Park</b>	202	<b>1938-72,</b> <b>1984-P</b>	<b>1939-72,</b> <b>1984-P</b>	1985	1985	--	--	1988-93	1989	--
06191400	LaDuke Hot Springs near Corwin Springs	--	--	--	--	--	--	--	1988-94	--	--
<b>06191500</b>	<b>Yellowstone River at Corwin Springs</b>	2,619	<b>1889-93,</b> <b>1910-P</b>	<b>1890-93,</b> <b>1911-P</b>	1984-85	1977-81, 1984-85 2002	1985-92	--	1956-57, 1969-74, 1988-90 1999-2001	1965, 1985-92 1999-2001	1969-74 2000-2001
06191800	Big Creek near Emigrant	60.9	1973-79, 1983-85	1974-79, 1983-85	--	--	--	--	--	--	--
06192000	Mill Creek near Pray	148	1951-56	1951-56	--	--	--	--	--	--	--
<b>06192500</b>	<b>Yellowstone River near Livingston</b>	3,551	<b>1897-1905,</b> <b>1928-32,</b> <b>1937-P</b>	<b>1897-1905,</b> <b>1929-32,</b> <b>1938-P</b>	--	<b>2000-P</b>	1985-86	--	<b>1970-94,</b> <b>1999-P</b>	<b>1965,</b> <b>1979-94,</b> <b>1999-P</b>	1979-94
06193000	Shields River near Wilsall	87.8	1935-57	1936-57	--	--	--	--	--	--	--
06193500	Shields River at Clyde Park	543	1921-23, 1929-32, 1934-67	1921-23, 1929-32, 1934-67	--	--	--	--	--	1965	--
06194000	Brackett Creek near Clyde Park	57.9	1921-23, 1934-57	1921-23, 1934-57	--	--	--	--	--	--	--
06194500	Canyon Creek near Chadbourn	21.5	1923	--	--	--	--	--	--	--	--
06195000	Bangtail Creek at Chadbourn	13.3	1923	--	--	--	--	--	--	--	--
06195500	Willow Creek near Chadbourn	29.7	1923	--	--	--	--	--	--	--	--
<b>06195600</b>	<b>Shields River near Livingston</b>	852	<b>1979-P</b>	<b>1979-P</b>	--	<b>2000-P</b>	--	--	<b>1999-P</b>	<b>1999-P</b>	--
06196000	North Fork Big Timber Creek near Big Timber	36.6	1907-12	--	--	--	--	--	--	--	--
06196500	South Fork Big Timber Creek near Big Timber	28.1	1907-11	--	--	--	--	--	--	--	--
06197000	Big Timber Creek near Big Timber	74.9	1912-24	1912-16, 1918-24, 1971	--	--	--	--	--	--	--
06197020	Big Timber Creek near mouth, near Big Timber	--	--	--	--	--	--	--	--	1965	--

**Table 10.** Montana active and discontinued streamflow-gaging, water-quality, and crest-stage gage stations (active stations in bold print)--Continued

Station number	Station name	Drainage area (square miles)	Period of record (by water year)							
			Discharge or contents		Water quality					
			Daily or monthly	Annual peak	Daily			Periodic		
					Specific conductance	Water temperature	Sediment	Chemistry	Sediment	Biology
<b>Part 6--Yellowstone River Basin--Continued</b>										
06197500	Boulder River near Contact	226	1910-16, 1929, 1950-69, 1970-74, 1981-83	1910-16, 1929, 1951-69, 1971-75, 1982-83	--	--	1972	1971-73	1971-73, 1981-83	--
06197800	East Boulder River below Dry Fork Creek, near McLeod	--	--	--	--	--	--	--	1981-83	--
06198000	East Fork Boulder River near McLeod	85.6	1907-10, 1981-83	1908-09, 1982-83	--	--	--	--	1981-83	1982-83
06198450	West Fork Boulder River at West Boulder Reservoir near McLeod	--	--	--	--	--	--	--	1981-83	--
06198500	West Fork Boulder River near Bruffeys	91.6	1904-10	1904-1908, 1910	--	--	--	--	--	--
06199000	West Boulder River at McLeod	135	1907-14	1907-14	--	--	--	--	1981-83	--
06199500	Boulder River near McLeod	476	1912-14	--	--	--	--	--	--	--
<b>06200000</b>	<b>Boulder River at Big Timber</b>	523	<b>1947-53, 1955-P</b>	<b>1947-53, 1955-P</b>	--	<b>2000-P</b>	--	<b>1965, 1999-P</b>	<b>1965, 1981-83, 1999-P</b>	--
06200400	Sweet Grass Creek near Melville	46.3	1907-12	--	--	--	--	--	--	--
06200500	Sweet Grass Creek above Melville	63.8	1913-25, 1937-69	1914-24, 1937-69, 1971, 1975	--	--	--	--	--	--
06201000	Sweet Grass Creek below Melville	143	1907-24, 1937-43, 1946-52	1907-16, 1918-24, 1937-42, 1946-52	--	--	--	--	--	--
06201500	Sweet Grass Creek near Greycliff	368	1941-42	--	--	--	--	--	--	--
06201550	Yellowstone River tributary near Greycliff	2.72	--	1960-74	--	--	--	--	--	--
06201600	Bridger Creek near Greycliff	61.5	--	1960-75	--	--	--	--	--	--
06201650	Work Creek near Reed Point	32.5	--	1959-73, 1978	--	--	--	--	--	--
<b>06201700</b>	<b>Hump Creek near Reed Point</b>	7.61	--	<b>1960-P</b>	--	--	--	--	--	--
06201750	Berry Creek near Columbus	23.5	--	1958-73, 1978	--	--	--	--	--	--
06201800	Stillwater River above Woodbine Creek, near Nye	160	1924-27	--	--	--	--	--	--	--
06202000	Woodbine Creek near Nye	19.4	1924-27	--	--	--	--	--	--	--
06202500	Stillwater River near Nye	180	1929-32	--	--	--	--	--	--	--
06202510	Stillwater River above Nye Creek, near Nye	193	1980-91	1980-91	--	--	--	--	1981-83	1982-83
06202530	Stillwater River above West Fork, at Nye	193	--	--	--	--	--	--	1971-73	--
06202590	West Fork Stillwater River above Cathedral Creek, near Nye	--	--	--	--	--	--	--	1981-83	--
06202597	Castle Creek near Nye	--	--	--	--	--	--	--	1973	--
06202598	West Fork Stillwater River below Castle Creek, near Nye	122	--	--	--	--	--	--	1971-73, 1981-83	--

**Table 10.** Montana active and discontinued streamflow-gaging, water-quality, and crest-stage gage stations (active stations in bold print)--Continued

Station number	Station name	Drainage area (square miles)	Period of record (by water year)							
			Discharge or contents		Water quality					
			Daily or monthly	Annual peak	Daily		Periodic			
				Specific conductance	Water temperature	Sediment	Chemistry	Sediment	Biology	
<u>Part 6--Yellowstone River Basin--Continued</u>										
06202600	Stillwater River at Nye	337	1969-77	1970-76	--	--	--	--	--	--
06202610	Stillwater River at Beehive	371	--	--	--	--	1972-73	1971-73, 1982-83	1973, 1982-83	1982-83
06203000	East Rosebud Creek near Roscoe	105	1920-21	--	--	--	--	--	--	--
06203500	East Rosebud Creek at Roscoe	125	1921-24	--	--	--	--	--	--	--
<b>06204000</b>	<b>Mystic Lake near Roscoe</b>	46.9	<b>1936-P</b>	--	--	--	--	--	--	--
<b>06204050</b>	<b>West Rosebud Creek near Roscoe</b>	52.1	<b>1965-P</b>	<b>1966-P</b>	--	--	--	--	--	--
06204150	Fishtail Creek near Dean	--	--	--	--	--	--	--	1981-83	--
06204220	Butcher Creek near Luther	9.69	--	--	--	--	--	1960	1960-61	--
06204240	Butcher Creek near Roscoe	--	--	--	--	--	--	--	1960-61	--
06204260	Butcher Creek near Fishtail	--	--	--	--	--	--	--	1960-61	--
06204300	Butcher Creek near Absarokee	39.6	1960-62	--	--	--	--	1960	--	--
06204500	Rosebud Creek near Absarokee	394	1935-69	1935-69	--	--	--	--	--	--
06204700	Rosebud Creek at Absarokee	401	1910-14	--	--	--	--	--	--	--
<b>06205000</b>	<b>Stillwater River near Absarokee</b>	975	<b>1910-14, 1935-P</b>	<b>1911-14, 1935-P</b>	--	2001-2002	--	<b>1999-P</b>	<b>1965,1981, 1999-P</b>	--
06205050	Stillwater River near Columbus	--	--	--	--	--	--	--	1982-83	--
06205100	Allen Creek near Park City	7.17	--	1961-2002	--	--	--	--	--	--
06205200	Yellowstone River at Laurel	8,189	--	--	--	--	--	1951-52, 1974-79	1975-78	1974-79
<b>06207500</b>	<b>Clarks Fork Yellowstone River near Belfry</b>	1,154	<b>1921-P</b>	<b>1922-P</b>	--	--	1984	1966-88	1965,1971 1984	--
06207510	Big Sand Coulee at Wyoming-Montana State line	134	1973-81	1973-80	--	--	1973-81	--	--	--
06207520	Silver Tip Creek below Amoco dam, near Belfry	--	--	--	--	--	--	1972	--	--
06207523	Silver Tip Creek below Sinclair oil field, near Belfry	--	--	--	--	--	--	1972	--	--
06207530	Silver Tip Creek above Gobblers Draw, near Belfry	--	--	--	--	--	--	1971	--	--
06207540	Silver Tip Creek near Belfry	88.0	1968-75	1968-75	--	--	1969-72, 1974	1969-75	1970-75	--
06207600	Jack Creek tributary near Belfry	0.85	--	1975-91	--	--	--	--	--	--
06207700	North Fork Bluewater Creek near Bridger	8.1	--	--	--	--	--	--	1960-61, 1964-68	--
06207800	Bluewater Creek near Bridger	28.1	1960-70	1960-70, 1978	--	--	1962-70	1960	1964-65	--
06207850	Bluewater Creek at Sanford Ranch	43.9	--	--	--	--	1964-70	--	1960-61 1964-70	--
06207870	Bluewater Creek near Fromberg	46.6	--	--	--	--	1964-70	1960	1960-61, 1964-68	--
06207900	Bluewater Creek at Fromberg	53.2	1961-64	--	--	--	1962-64	1960,1980	1960-761, 1964-68, 1970,1980	--

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			Discharge or contents		Water quality					
			Daily or monthly	Annual peak	Daily		Periodic			
Specific conductance	Water temperature	Sediment			Chemistry	Sediment	Biology			
<b>Part 6--Yellowstone River Basin--Continued</b>										
06208000	Clarks Fork Yellowstone River at Fromberg	1,940	1905-14	1905-13	--	--	--	--	--	--
06208400	Elbow Creek near Joliet	48.6	1984	1984	--	--	--	1984	1984	--
<b>06208500</b>	<b>Clarks Fork Yellowstone River at Edgar</b>	2,022	<b>1921-69, 1987-P</b>	<b>1922-32, 1934-69, 1987-P</b>	--	<b>2000-P</b>	1972-73	<b>1964-65, 1999-P</b>	<b>1965,1973, 1999-P</b>	<b>2000-P</b>
06208800	Clarks Fork Yellowstone River near Silesia	2,093	1970-87	1970-86	--	--	1984	1984	1984	--
06209000	Glacier Lake near Red Lodge	3.77	1939-47, 1960-64	--	--	--	--	--	--	--
06209010	Rock Creek below Glacier Lake, near Red Lodge	3.89	1960-64	--	--	--	--	--	--	--
<b>06209500</b>	<b>Rock Creek near Red Lodge</b>	105	<b>1932-82, 1985-86, 2000-P</b>	<b>1932, 1934-82, 1985-86, 2000-P</b>	--	2001-2002	--	--	--	--
06210000	West Fork Rock Creek below Basin Creek, near Red Lodge	63.1	1937-57	1938-56	--	--	--	--	--	--
06210500	West Fork Rock Creek near Red Lodge	66.9	1932-44	1932, 1934-44	--	--	--	--	--	--
<b>06211000</b>	<b>Red Lodge Creek above Cooney Reservoir, near Boyd</b>	143	<b>1937-P</b>	<b>1937-P</b>	--	--	--	--	--	--
<b>06211500</b>	<b>Willow Creek near Boyd</b>	53.3	<b>1937-P</b>	<b>1937-P</b>	--	--	--	--	--	--
06212000	Cooney Reservoir near Boyd	206	1937-95	--	--	--	--	--	--	--
<b>06212500</b>	<b>Red Lodge Creek below Cooney Reservoir, near Boyd</b>	210	<b>1937-P</b>	<b>1938-P</b>	--	--	--	--	--	--
06213000	Red Lodge Creek near Boyd	234	1932-37	--	--	--	--	--	--	--
06213500	Rock Creek at Joliet	539	1946-53	1946-53	--	--	--	--	--	--
06214000	Rock Creek at Rockvale	569	1920-22, 1952-40, 1984-90	1921-22, 1932,1934, 1935-40, 1985-90	--	--	--	--	--	--
06214050	Clarks Fork Yellowstone River near Laurel	2,783	--	--	--	--	--	1969-73	--	1969-73
06214100	Yellowstone River near Laurel	11,036	--	--	--	--	--	1969-72	--	1969-72
06214150	Mills Creek at Rapelje	3.32	--	1974-2002	--	--	--	--	--	--
<b>06214500</b>	<b>Yellowstone River at Billings</b>	11,805	<b>1904-05, 1928-P</b>	<b>1904-05, 1918, 1929-P</b>	--	2001-2002	1977-81	<b>1963-93 1999-P</b>	<b>1965, 1975-93 1999-P</b>	<b>1975-93 2000-P</b>
06215000	Pryor Creek above Pryor	39.6	1921-24, 1967-74	1921-24, 1967-74	--	--	--	1987-90	--	--
06215500	Lost Creek near Pryor	9.72	1921-24	1922-24	--	--	--	--	--	--
<b>06216000</b>	<b>Pryor Creek at Pryor</b>	117	<b>1921-24, 1966-P</b>	<b>1922-24, 1967-P</b>	--	--	--	--	--	--
<b>06216200</b>	<b>West Wets Creek near Billings</b>	8.80	--	<b>1955-P</b>	--	--	--	--	--	--
06216300	West Buckeye Creek near Billings	2.64	--	1955-73, 1978	--	--	--	--	--	--

**Table 10.** Montana active and discontinued streamflow-gaging, water-quality, and crest-stage gage stations (active stations in bold print)--Continued

Station number	Station name	Drainage area (square miles)	Period of record (by water year)							
			Discharge or contents		Water quality					
			Daily or monthly	Annual peak	Daily		Periodic			
				Specific conductance	Water temperature	Sediment	Chemistry	Sediment	Biology	
<u>Part 6--Yellowstone River Basin--Continued</u>										
06216500	Pryor Creek near Billings	440	1911-24, 1938-54	1912-24, 1938-53, 1955-73, 1978	--	--	--	--	--	--
06216900	Pryor Creek near Huntley	582	1979-99	1978-99	--	--	--	--	--	--
06217000	Pryor Creek at Huntley	606	1904-17	1905-06, 1908, 1910-15, 1978	--	--	--	--	--	--
<b>06217300</b>	<b>Twelvemile Creek near Shepherd</b>	9.05	--	<b>1973-P</b>	--	--	--	--	--	--
06217500	Yellowstone River at Huntley	12,840	1908-16	1908-16	--	--	--	1951-52, 1971-81	1975-81	1972-81
<b>06217700</b>	<b>North Fork Crooked Creek tributary near Shepherd</b>	6.85	--	<b>1962-P</b>	--	--	--	--	--	--
06217750	Fly Creek at Pompeys Pillar	285	1969-81	1969-81	--	--	--	1969-81	--	--
06217800	Yellowstone River tributary No. 2 near Pompeys Pillar	0.70	--	1962-73	--	--	--	--	--	--
06217950	Buffalo Creek near Custer	221	1980-83	1980-83	--	--	--	--	--	--
06218000	Yellowstone River at Junction (at Custer)	14,427	1906-08	--	--	--	--	1969-70	--	1969-70
06286258	Big Coulee near Lovell, Wyoming	30.1	1970-78	--	--	--	--	--	--	--
06286270	Porcupine Creek near Lovell, Wyoming	135	1964-67	--	--	--	--	--	--	--
06286340	Dry Head Creek near Pryor	58.0	1965-66	--	--	--	--	--	--	--
06286350	Dry Head Creek above Hoodoo Creek, near Pryor	80.0	1966-68	1966-67	--	--	--	--	--	--
06286370	Big Bull Elk Creek near St. Xavier	35.0	1965-68	--	--	--	--	--	--	--
06286390	Black Canyon Creek near St. Xavier	52.0	1965-66	1965-66	--	--	--	--	--	--
06286395	Black Canyon Creek below Three Springs Creek, near St. Xavier	75.0	1966-68	1966-67	--	--	--	--	--	--
<b>06286400</b>	<b>Bighorn Lake near St. Xavier</b>	19,626	<b>1965-P</b>	--	--	--	--	--	--	--
<b>06286490</b>	<b>Bighorn Canal near St. Xavier</b>	--	<b>1966-P</b>	--	--	--	--	--	--	--
06286500	Bighorn Canal below wasteway, near St. Xavier	--	1947-52	--	--	--	--	--	--	--
<b>06287000</b>	<b>Bighorn River near St. Xavier</b>	19,667	<b>1934-P</b>	<b>1935-P</b>	--	1970-79	--	1967-81	--	1969-70
06287500	Soap Creek near St. Xavier	98.3	1911-14, 1939-53, 1968-72, 1978	1939-53, 1963, 1968-72, 1978	--	--	--	--	--	--
06287700	Soap Creek near mouth, near St. Xavier	111	1914-24	1914-18, 1920-24	--	--	--	--	--	--
06288000	Rotten Grass Creek near St. Xavier	147	1911-22, 1968-73	1914-17, 1968-72, 1978	--	--	--	--	--	--
06288200	Beauvais Creek near St. Xavier	100	1967-77	1968-78	--	--	--	1967-78	1968-78	1969-78
06288500	Bighorn River near Hardin	20,722	1904-25, 1928-33	1904-24, 1929-33	--	1968-74	--	1951, 1969-73, 1987-89	--	1970-73



**Table 10.** Montana active and discontinued streamflow-gaging, water-quality, and crest-stage gage stations (active stations in bold print)--Continued

Station number	Station name	Drainage area (square miles)	Period of record (by water year)							
			Discharge or contents		Water quality					
			Daily or monthly	Annual peak	Daily		Periodic			
				Specific conductance	Water temperature	Sediment	Chemistry	Sediment	Biology	
<u>Part 6--Yellowstone River Basin--Continued</u>										
06288960	Little Bighorn River near Parkman, Wyoming	137	1970-72	1972	--	--	--	--	--	--
06288990	West Fork Little Bighorn River near Parkman, Wyoming	38.2	1970-72, 1983-87	--	--	--	--	--	--	--
<b>06289000</b>	<b>Little Bighorn River at State line, near Wyola</b>	182	<b>1939-P</b>	<b>1939-P</b>	--	--	--	1993-2001	1993-2001	1993-2001
06289500	Little Bighorn River near Wyola	251	1912-24	1912-24	--	--	--	1993-2001	1993-2001	1993-2001
<b>06290000</b>	<b>Pass Creek near Wyola</b>	111	<b>1935-56, 1983-P</b>	<b>1935-56, 1978, 1983-P</b>	--	--	--	--	--	--
06290200	Little Bighorn River tributary near Wyola	4.43	--	1973-86	--	--	--	--	--	--
<b>06290500</b>	<b>Little Bighorn River below Pass Creek, near Wyola</b>	428	<b>1939-75, 1977-P</b>	<b>1939-P</b>	--	--	1970-73	1970-75, 1977	1970-73	--
06291000	Owl Creek near Lodge Grass	163	1939-45, 1980-92	1939-42, 1944-45, 1980-92	--	--	--	--	--	--
06291200	Lodge Grass Creek at State Line, near Wyola	16.7	1983-84	1983-89	--	--	--	--	--	--
<b>06291500</b>	<b>Lodge Grass Creek above Willow Creek Diversion, near Wyola</b>	80.7	<b>1939-74, 1983-P</b>	<b>1939-74, 1978, 1983-P</b>	--	--	--	--	--	--
06292000	Lodge Grass Creek near Wyola	88.9	1921-24	--	--	--	--	--	--	--
06292500	Lodge Grass Creek near Lodge Grass	143	1912-16, 1921-24	1912-15, 1921-24	--	--	--	--	--	--
06293000	Lodge Grass Creek at Lodge Grass	170	1916-20	--	--	--	--	--	--	--
<b>06293300</b>	<b>Long Otter Creek near Lodge Grass</b>	11.7	--	<b>1973-P</b>	--	--	--	--	--	--
06293500	Little Bighorn River near Crow Agency	1,181	1912-24, 1928-33, 1938-60	1912, 1914-24, 1929-32, 1938-60	--	--	--	--	--	--
06293900	Little Bighorn River at Crow Agency	1,190	1905-06	--	--	--	--	--	--	--
<b>06294000</b>	<b>Little Bighorn River near Hardin</b>	1,294	<b>1953-P</b>	<b>1953-P</b>	--	--	1970-77	1970-79, 1987-89, 1993-2001	1971-75, 1977, 1993-2001	1993-2001
<b>06294400</b>	<b>Andresen Coulee near Custer</b>	2.35	--	<b>1963-P</b>	--	--	--	--	--	--
<b>06294500</b>	<b>Bighorn River above Tullock Creek, near Bighorn</b>	22,414	<b>1982-P</b>	<b>1982-P</b>	--	<b>2000-P</b>	--	<b>1999-P</b>	<b>1999-P</b>	--
<b>06294600</b>	<b>East Cabin Creek tributary near Hardin</b>	8.63	1982-85	<b>1973-P</b>	--	--	--	--	--	--
06294690	Tullock Creek near Bighorn	446	1975-82	1975-82	--	--	--	--	--	--
06294700	Bighorn River at Bighorn	22,885	1945-81	1945-81	--	--	1960-72	1960-92	1960-72, 1975-92	1975-92
06294800	Unknown Creek near Bighorn	14.6	--	1962-76, 1979,1991	--	--	--	--	--	--
06294840	Yellowstone River at Myers	37,674	--	--	--	--	--	1974-77	--	1975-77

**Table 10.** Montana active and discontinued streamflow-gaging, water-quality, and crest-stage gage stations (active stations in bold print)--Continued

Station number	Station name	Drainage area (square miles)	Period of record (by water year)							
			Discharge or contents		Water quality					
			Daily or monthly	Annual peak	Daily		Periodic			
				Specific conductance	Water temperature	Sediment	Chemistry	Sediment	Biology	
<b>Part 6--Yellowstone River Basin--Continued</b>										
06294850	Buckingham Coulee near Myers	2.63	--	1962-76, 1979,1991	--	--	--	--	--	--
06294900	Middle Fork Froze to Death Creek tributary near Ingomar	1.36	--	1962-76	--	--	--	--	--	--
06294920	East Fork Sarpy Creek near Colstrip	79.2	--	--	--	--	--	1981-83	1981-83	--
<b>06294930</b>	<b>Sarpy Creek tributary near Colstrip</b>	4.44	--	<b>1972-P</b>	--	--	--	--	--	--
06294940	Sarpy Creek near Hysham	453	1973-84	1974-84	--	--	--	1975-84	1975-84	--
06294950	Starved to Death Creek near Sanders	36.9	1980-85	1980-85	--	--	--	--	--	--
06294960	Anderson Creek at Vananda	5.71	--	1973-84, 1991	--	--	--	--	--	--
06294980	East Fork Armells Creek near Colstrip	97.3	--	--	--	--	--	1975-85	1975-85	--
<b>06294985</b>	<b>East Fork Armells Creek tributary near Colstrip</b>	1.87	--	<b>1973-P</b>	--	--	--	--	--	--
06294991	West Fork Armells Creek near Forsyth	148	--	--	--	--	--	1975-77	1975-77	--
06294995	Armells Creek near Forsyth	370	1974-84, 1988-95	1975-84, 1988-95	--	--	--	1975-86, 1988-95	1975-86, 1988-95	--
<b>06295000</b>	<b>Yellowstone River at Forsyth</b>	40,146	<b>1921-23, 1977-P</b>	<b>1921-23, 1978-P</b>	--	--	1978-81	1974-82 1999-2001	1975-82 1999-2001	1975,1978, 1979, 2000-2001
<b>06295020</b>	<b>Short Creek near Forsyth</b>	3.23	--	<b>1962-P</b>	--	--	--	--	--	--
06295050	Little Porcupine Creek near Forsyth	614	--	1958-73, 1975,1978, 1986,1993	--	--	--	--	--	--
06295100	Rosebud Creek near Kirby	35.5	1982-85, 1988	1960-74, 1982-2002	--	--	--	--	--	--
06295110	Rosebud Creek at Kirby	--	--	--	--	--	--	1978-79	1978-79	--
<b>06295113</b>	<b>Rosebud Creek at reservation boundary, near Kirby</b>	123	<b>1980-P</b>	<b>1980-P</b>	--	--	--	<b>1980-84 2003</b>	<b>1980-84 2003</b>	<b>2003</b>
06295130	Rosebud Creek tributary near Busby	1.14	--	1963-77	--	--	--	--	--	--
06295200	Whitedirt Creek near Lame Deer	1.58	--	1959-73	--	--	--	--	--	--
<b>06295250</b>	<b>Rosebud Creek near Colstrip</b>	799	<b>1974-P</b>	<b>1975-P</b>	--	--	--	1975-85	1975-84	--
06295350	Greenleaf Creek near Colstrip	30.5	--	--	--	--	--	1975	1975	--
06295380	Cow Creek near Colstrip	27.2	--	--	--	--	--	1980-85	1980-85	--
06295400	Rosebud Creek above Pony Creek, near Colstrip	961	--	--	--	--	--	1975-78	1975-77	--
06295420	Snider Creek near Brandenberg	11.9	--	--	--	--	--	1978	1978	--
06295500	Rosebud Creek near Rosebud	1,193	1938-43	1938-43	--	--	--	1975-77	1975-77	--
06296000	Rosebud Creek near Forsyth	1,279	1947-54	1948-53, 1655-57, 1959, 1961-67, 1969,1978	--	--	--	--	--	--

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			Discharge or contents		Water quality					
			Daily or monthly	Annual peak	Daily		Periodic			
				Specific conductance	Water temperature	Sediment	Chemistry	Sediment	Biology	
<b>Part 6--Yellowstone River Basin--Continued</b>										
<b>06296003</b>	<b>Rosebud Creek at mouth, near Rosebud</b>	1,302	<b>1974-P</b>	<b>1975-P</b>	--	--	--	<b>1975-86, 1988-93, 1999-P</b>	<b>1975-86, 1988-93, 1999-P</b>	--
<b>06296100</b>	<b>Snell Creek near Hathaway</b>	10.5	1982-85	<b>1963-77, 1979, 1982-P</b>	--	--	--	--	--	--
<b>06296115</b>	<b>Reservation Creek near Miles City</b>	6.29	--	<b>1973-P</b>	--	--	--	--	--	--
06296120	Yellowstone River near Miles City	42,847	--	--	1969-84	--	--	1969-84	1975-84	1974-81
06306000	Tongue River near Acme, Wyoming	894	1939-57	--	--	--	--	--	--	--
06306100	Squirrel Creek near Decker	33.6	1975-85	1976-85	--	--	--	1976-85	1976-85	--
06306250	Prairie Dog Creek near Acme, Wyoming	358	1971-79	--	--	--	--	--	--	--
<b>06306300</b>	<b>Tongue River at State line, near Decker</b>	1,453	<b>1960-P</b>	<b>1961-P</b>	<b>1983-87 2001-P</b>	<b>1966-76 2001-P</b>	--	<b>1966-P</b>	--	1986-88
06306500	Tongue River near Decker	1,585	1928-38	1928-38	--	--	--	--	--	--
06306800	Deer Creek near Decker	47.7	--	--	--	--	--	1975-77	1975-76	--
06306900	Spring Creek near Decker	34.7	--	1958-86	--	--	--	1978,1980	1978,1980	--
06306950	South Fork Leaf Rock Creek near Kirby (Leaf Rock Creek near Kirby)	4.53	1982-85	1958, 1960-96	--	--	--	--	--	--
<b>06307000</b>	<b>Tongue River Reservoir near Decker</b>	1,770	<b>1938-P</b>	--	--	--	--	--	--	--
<b>06307500</b>	<b>Tongue River at Tongue River Dam, near Decker</b>	1,770	<b>1939-P</b>	<b>1939-P</b>	1981-87	--	--	1951, 1976-95	1976-96	--
06307510	Fourmile Creek near Birney	22.3	--	--	--	--	--	1975	1975	--
06307520	Canyon Creek near Birney	50.2	--	1972-91	--	--	--	--	--	--
06307525	Prairie Dog Creek above Jack Creek, near Birney	6.57	1979-83	1979-83	--	--	--	1978-81, 1983	1978-83	--
06307528	Prairie Dog Creek near Birney	19.6	1979-84	1979-84	--	--	--	1978-80, 1983	1978-83	--
06307530	Bull Creek near Birney	45.8	--	--	--	--	--	1975	1975	--
06307540	Hanging Woman Creek at State line, near Otter	90.2	--	--	--	--	--	1980, 1982-83	1980, 1982-83	--
06307560	East Trail Creek near Otter	31.3	1976-81	1977-81	--	--	--	1977-80	1977-78, 1980	--
06307563	Corral Creek near Otter	26.5	--	--	--	--	--	1980-83	1980-83	--
06307567	Horse Creek near Birney	16.0	--	--	--	--	--	1983	1983	--
06307570	Hanging Woman Creek below Horse Creek, near Birney	321	--	--	--	--	--	1978-83, 1986-87	1978-83, 1986-87	--
<b>06307600</b>	<b>Hanging Woman Creek near Birney</b>	470	<b>1974-84, 1986-95 2003</b>	<b>1974-84, 1986-95 2003</b>	1981-83, 1986-87	--	--	<b>1975-95 2003</b>	<b>1975-95 2003</b>	<b>2003</b>
06307610	Tongue River below Hanging Woman Creek, near Birney	2,533	--	--	--	--	--	1974-79	1975-79	1975-79
06307615	Cook Creek near Birney	62.6	--	--	--	--	--	1975-77	1975-77	--

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<b>Part 6--Yellowstone River Basin--Continued</b>										
<b>06307616</b>	<b>Tongue River at Birney Day School, near Birney</b>	2,621	<b>1980-P</b>	<b>1980-P</b>	--	--	--	1980-93	1980-86	--
06307620	Tie Creek near Birney	18.7	--	1973-84, 1991	--	--	--	--	--	--
06307640	Spring Creek near Ashland	1.56	--	1962-76	--	--	--	--	--	--
06307660	Walking Horse Creek near Ashland	3.33	--	1963-78	--	--	--	--	--	--
06307665	Otter Creek near Otter	40.9	--	--	--	--	--	1978-84	1978-84	--
06307670	Bear Creek at Otter	90.4	--	--	--	--	--	1975-76	1975-76	--
<b>06307700</b>	<b>Cow Creek near Fort Howes Ranger Station, near Otter</b>	8.37	--	<b>1972-P</b>	--	--	--	--	--	--
06307717	Otter Creek below Fifteenmile Creek, near Otter	453	1982-86	1982-85	1983-85	--	--	1982-85	1982-85	--
<b>06307720</b>	<b>Brian Creek near Ashland</b>	8.03	--	<b>1973-P</b>	--	--	--	--	--	--
06307725	Otter Creek above Tenmile Creek, near Ashland	466	--	--	--	--	--	1978-81	1978-81	--
06307730	Threemile Creek near Ashland	51.5	--	--	--	--	--	1975	1975	--
06307735	Home Creek near Ashland	58.7	--	--	--	--	--	1977-84	1977-84	--
<b>06307740</b>	<b>Otter Creek at Ashland</b>	707	<b>1973-85, 1988-95 2003</b>	<b>1973-85, 1988-95 2003</b>	1981-85	--	--	<b>1975-85, 1988-95 2003</b>	<b>1975-85, 1988-95 2003</b>	<b>2003</b>
06307760	Stebbins Creek near Ashland	5.41	--	1963-77	--	--	--	--	--	--
06307780	Stebbins Creek at mouth, near Ashland	20.8	--	1963-91	--	--	--	--	--	--
06307800	Tongue River near Ashland	3,830	1956-73	1967-72	--	--	--	--	--	--
06307810	Beaver Creek near Ashland	92.3	--	--	--	--	--	1975-76	1975-76	--
<b>06307830</b>	<b>Tongue River below Brandenburg Bridge, near Ashland</b>	3,948	<b>1973-84, 2000-P</b>	<b>1974-84, 2000-P</b>	<b>2001-P</b>	<b>2001-P</b>	1975-81	<b>1974-81, 2000-P</b>	<b>1975, 1978-81, 2000-P</b>	<b>2003</b>
06307840	Liscom Creek near Ashland	47.6	--	--	--	--	--	1975,1977	1975,1977	--
06307890	Foster Creek near Volborg	116	--	--	--	--	--	1975-77	1975-77	--
06307930	Jack Creek near Volborg	5.47	--	1973-2002	--	--	--	--	--	--
06308000	Tongue River near Miles City	4,539	1929-33	--	--	--	--	--	--	--
06308100	Sixmile Creek tributary near Epsie	0.80	--	1972-91	--	--	--	--	--	--
06308160	Pumpkin Creek near Loesch	102	--	--	--	--	--	1976-79	1976-79	--
06308170	Little Pumpkin Creek near Volborg	101	--	--	--	--	--	1976-77	1976-77	--
06308190	Pumpkin Creek near Volborg	386	--	--	--	--	--	1976-77	1976-77	--
<b>06308200</b>	<b>Basin Creek tributary near Volborg</b>	0.14	--	<b>1955-P</b>	--	--	--	--	--	--
06308300	Basin Creek near Volborg	11.1	--	1955-73	--	--	--	--	--	--
<b>06308330</b>	<b>Deer Creek tributary near Volberg</b>	1.65	--	<b>1973-P</b>	--	--	--	--	--	--
<b>06308340</b>	<b>LaGrange Creek near Volberg</b>	3.66	--	<b>1973-P</b>	--	--	--	--	--	--
06308400	Pumpkin Creek near Miles City	697	1972-85	1973-85	--	--	--	1976-85	1976-85	--
<b>06308500</b>	<b>Tongue River at Miles City</b>	5,379	<b>1938-42, 1946-P</b>	<b>1938-41, 1946-P</b>	--	<b>2000-P</b>	1978-86	<b>1949-94, 1999-P</b>	<b>1975-94, 1999-P</b>	1975-94

**Table 10.** Montana active and discontinued streamflow-gaging, water-quality, and crest-stage gage stations (active stations in bold print)--Continued

Station number	Station name	Drainage area (square miles)	Period of record (by water year)							
			Discharge or contents		Water quality					
			Daily or monthly	Annual peak	Daily		Periodic			
					Specific conductance	Water temperature	Sediment	Chemistry	Sediment	Biology
<b>Part 6--Yellowstone River Basin--Continued</b>										
<b>06309000</b>	<b>Yellowstone River at Miles City</b>	48,253	<b>1922-23, 1928-P</b>	<b>1923, 1929-P</b>	--	--	--	1948-52, 1965	1965	--
06309020	Rock Springs Creek tributary at Rock Springs	0.96	--	1963-78, 1987	--	--	--	--	--	--
06309040	Dry House Creek near Angela	38.6	--	1963-77, 1987	--	--	--	--	--	--
06309060	North Fork Sunday Creek tributary No. 2 near Angela	0.22	--	1962-91	--	--	--	--	--	--
06309075	Sunday Creek near Miles City	714	1975-84	1975-84	--	--	--	--	--	--
06309078	Tree Coulee near Kinsey	4.13	--	1972, 1974-2002	--	--	--	--	--	--
06309079	Muster Creek near Kinsey	28.5	--	--	--	--	--	1978-80	1978-80	1978-80
<b>06309080</b>	<b>Deep Creek near Kinsey</b>	11.5	--	<b>1962-P</b>	--	--	--	--	--	--
06309090	Ash Creek near Locate	6.23	--	1962-76	--	--	--	--	--	--
06309145	Custer Creek near Kinsey	151	--	--	--	--	--	1978-80	1978-80	1978-80
<b>06324500</b>	<b>Powder River at Moorhead</b>	8,086	<b>1929-72, 1974-P</b>	<b>1923, 1929-72, 1975-P</b>	<b>1986-89 2001-P</b>	--	1975-96	<b>1949, 1951-53, 1956-57, 1969-72, 1975-92 2001-P</b>	<b>1975-1997 2001-P</b>	1969-72
06324700	Sand Creek near Broadus	10.2	--	1955-84	--	--	--	--	--	--
06324710	Powder River at Broadus	8,748	1975-92	1976-92	--	--	1976-92	1979, 1988-90	1976-92, 1995	--
<b>06324995</b>	<b>Badger Creek at Biddle</b>	6.06	--	<b>1972-P</b>	--	--	--	--	--	--
06325000	Little Powder River at Biddle	1,541	1938-43	--	--	--	--	--	--	--
06325400	East Fork Little Powder River tributary near Hammond	3.45	--	1974-84	--	--	--	--	--	--
<b>06325500</b>	<b>Little Powder River near Broadus</b>	1,974	1947-53, 1957-72	1947-53, 1956-72, 1978	--	--	--	<b>2002-P</b>	<b>2002-P</b>	--
06325550	Little Powder River at mouth, near Broadus	--	--	--	--	--	--	1978-79, 1988-90 2001-2002	1988-89 2001-2002	--
06325650	Powder River near Powderville	--	--	--	--	--	--	1978-90	1988	--
<b>06325700</b>	<b>Deep Creek tributary near Powderville</b>	3.00	--	<b>1973-P</b>	--	--	--	--	--	--
<b>06325950</b>	<b>Cut Coulee near Mizpah</b>	2.23	--	<b>1973-P</b>	--	--	--	--	--	--
06326000	Powder River near Mizpah	12,132	1928-33	--	--	--	--	1989	--	--
06326050	Mizpah Creek at Olive	129	--	--	--	--	--	1976-79	1976-79	--
06326200	Mizpah Creek near Volberg	510	--	--	--	--	--	1976-79	1976-77	--
06326300	Mizpah Creek near Mizpah	797	1975-86	1975-86	--	--	--	1976-84, 1989-90	1976-84	--

**Table 10.** Montana active and discontinued streamflow-gaging, water-quality, and crest-stage gage stations (active stations in bold print)--Continued

Station number	Station name	Drainage area (square miles)	Period of record (by water year)							
			Discharge or contents		Water quality					
			Daily or monthly	Annual peak	Daily		Periodic			
				Specific conductance	Water temperature	Sediment	Chemistry	Sediment	Biology	
<u>Part 6--Yellowstone River Basin--Continued</u>										
06326400	Meyers Creek near Locate	9.42	--	1962-76, 1982	--	--	--	--	--	--
<b>06326500</b>	<b>Powder River near Locate</b>	13,068	<b>1938-P</b>	<b>1938-P</b>	1951-62, 1975-81, 1988-90	--	1975-84	<b>1948-63, 1975-94, 1999-P</b>	<b>1965, 1974-94, 1999-P</b>	1975-94
06326507	Locate Creek near Ismay	--	--	--	--	--	--	1982-83	1982-83	--
06326510	Locate Creek tributary near Locate	0.91	--	1973-91	--	--	--	--	--	--
06326520	Powder River at mouth, near Terry	13,512	--	--	--	--	--	1978,1989	--	--
06326530	Yellowstone River near Terry	63,447	--	--	--	--	--	1974-83	1975-83	1975-80
06326550	Cherry Creek tributary near Terry	2.52	--	1973-91	--	--	--	--	--	--
06326555	Cherry Creek near Terry	358	1980-81, 1990-94	1980-81, 1990-94	1990-94	--	1990-94	1978-81	1978-81, 1990-94	--
<b>06326580</b>	<b>Lame Jones Creek tributary near Willard</b>	0.51	--	<b>1974-P</b>	--	--	--	--	--	--
06326600	O'Fallon Creek near Ismay	669	1978-92	1962-92	--	--	--	1978-84	1978-84	1978-80
06326650	O'Fallon Creek tributary near Ismay	0.16	--	1962-76	--	--	--	--	--	--
06326700	Deep Creek near Baker	3.79	--	1962-76, 1978	--	--	--	--	--	--
06326800	Pennel Creek tributary near Baker	0.86	--	1962-91	--	--	--	--	--	--
06326850	O'Fallon Creek at Mildred	1,396	1975-78	1976-78	--	--	--	--	--	--
06326900	Yellowstone River tributary No. 4 near Fallon	0.67	--	1962-76	--	--	--	--	--	--
<b>06326940</b>	<b>Spring Creek tributary near Fallon</b>	3.10	--	<b>1972-P</b>	--	--	--	--	--	--
<b>06326950</b>	<b>Yellowstone River tributary No. 5 near Marsh</b>	0.87	--	<b>1962-P</b>	--	--	--	--	--	--
06326952	Clear Creek near Lindsay	101	1982-85, 1988	1982-86	--	--	--	--	--	--
06326953	Clear Creek near Hoyt	138	--	1980	--	--	--	1978-80	1978-80	1978-80
<b>06326960</b>	<b>Timber Fork Upper Sevenmile Creek tributary near Lindsay</b>	1.13	--	<b>1974-P</b>	--	--	--	--	--	--
06326995	Upper Sevenmile Creek near Lindsay	137	--	--	--	--	--	1978-80	1978-80	1978-80
06327000	Upper Sevenmile Creek near Glendive	--	1921-22	--	--	--	--	--	--	--
<b>06327450</b>	<b>Cains Coulee at Glendive</b>	3.72	--	<b>1991-P</b>	--	--	--	--	--	--
<b>06327500</b>	<b>Yellowstone River at Glendive</b>	66,788	<b>1898-1911, 1932-34 2003</b>	<b>1903-10, 1932-34 2003</b>	--	--	--	1950	--	--
<b>06327550</b>	<b>South Fork Horse Creek tributary near Wibaux</b>	1.34	--	<b>1973-P</b>	--	--	--	--	--	--
06327700	Griffith Creek near Glendive	15.5	--	1955-63, 1965-67	--	--	--	--	--	--
<b>06327720</b>	<b>Griffith Creek tributary near Glendive</b>	3.48	--	<b>1965, 1974-P</b>	--	--	--	--	--	--
<b>06327790</b>	<b>Krug Creek tributary No. 2 near Wibaux</b>	0.44	--	<b>1974-P</b>	--	--	--	--	--	--
06327800	Krug Creek tributary near Wibaux	1.74	--	1955-61	--	--	--	--	--	--
06327850	Glendive Creek near Glendive	300	--	--	--	--	--	1978-81	1978-81	--

**Table 10.** Montana active and discontinued streamflow-gaging, water-quality, and crest-stage gage stations (active stations in bold print)--Continued

Station number	Station name	Drainage area (square miles)	Period of record (by water year)							
			Discharge or contents		Water quality					
			Daily or monthly	Annual peak	Daily			Periodic		
					Specific conductance	Water temperature	Sediment	Chemistry	Sediment	Biology
<u>Part 6--Yellowstone River Basin--Continued</u>										
06328000	Deer Creek near Glendive	198	1921-22	--	--	--	--	1978-80	1978-80	1978-80
<b>06328100</b>	<b>Yellowstone River tributary No. 6 near Glendive</b>	2.93	--	<b>1974-P</b>	--	--	--	--	--	--
06328200	Lower Sevenmile Creek near Bloomfield	25.2	1982-85	1983-87	--	--	--	--	--	--
06328400	Thirteenmile Creek tributary near Bloomfield	0.67	--	1972, 1974-91	--	--	--	--	--	--
06328700	Linden Creek at Intake	4.20	--	1958-73, 1980	--	--	--	--	--	--
06328800	Indian Creek at Intake	0.46	--	1958-73	--	--	--	--	--	--
06328900	War Dance Creek near Intake	3.69	--	1958-73, 1980	--	--	--	--	--	--
06329000	Cottonwood Creek near Intake	85.3	--	--	--	--	--	1978-81	1978-81	--
06329200	Burns Creek near Savage	233	1958-67, 1975-84, 1986	1958-67, 1975-84, 1986	--	--	--	1976-79, 1984,1986	1976-79, 1984,1986	--
<b>06329350</b>	<b>Alkali Creek near Sidney</b>	0.49	--	<b>1974-P</b>	--	--	--	--	--	--
<b>06329500</b>	<b>Yellowstone River near Sidney</b>	69,083	<b>1910-31, 1933-P</b>	<b>1911-31, 1934-P</b>	--	--	<b>1972-81, 1983-P</b>	<b>1948-P</b>	<b>1965, 1972-P</b>	1970-95
06329510	Fox Creek tributary near Lambert	5.01	--	1972, 1974-96	--	--	--	--	--	--
06329520	Fox Creek near Lambert	183	--	--	--	--	--	1981-83	1981-83	--
06329540	Lone Tree Creek near Sidney	39.4	--	--	--	--	--	1981-83	1981-83	--
<b>06329570</b>	<b>First Hay Creek near Sidney</b>	29.1	--	<b>1963-P</b>	--	--	--	--	--	--
06333500	Little Missouri River at Alzada	671	1904-07	--	--	--	--	1949-51	--	--
06333850	North Creek near Alzada	1.25	1951	1951-52, 1956-77	--	--	--	--	--	--
06333900	North Creek spreader diversion near Alzada	1.29	1952-56	--	--	--	--	--	--	--
06334000	Little Missouri River near Alzada	904	1911-25, 1928-32, 1935-69	1912-25, 1929-32, 1935-69	--	--	--	--	--	--
06334100	Wolf Creek near Hammond	10.1	--	1955-2002	--	--	--	--	--	--
06334200	Willow Creek near Alzada	122	--	1958-73	--	--	--	--	--	--
<b>06334330</b>	<b>Little Missouri River tributary near Albion</b>	1.49	--	<b>1972-P</b>	--	--	--	--	--	--
06334610	Hawks Nest Creek tributary near Albion	0.92	--	1973-2002	--	--	--	--	--	--
<b>06334625</b>	<b>Coal Creek tributary near Mill Iron</b>	0.64	--	<b>1974-P</b>	--	--	--	--	--	--
06334630	Boxelder Creek at Webster	1,092	1959-73	1960-73, 1975	--	--	--	1972-73	--	--
06334640	North Fork Coal Bank Creek near Mill Iron	15.6	--	1962-76	--	--	--	--	--	--
06334720	Soda Creek tributary near Webster	2.22	--	1962-91	--	--	--	--	--	--
06336447	Duck Creek near Wibaux	46.5	1978-85	1978-85	--	--	--	1979	1978-79	--
06336450	Spring Creek near Wibaux	4.00	1955-73	1956-73	--	--	--	--	--	--

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Specific conductance	Water temperature	Sediment			Chemistry	Sediment	Biology			
<u>Part 12--Kootenai River Basin</u>										
06336500	Beaver Creek at Wibaux	351	1938-69, 1979-83	1872,1921, 1929, 1938-69, 1979-83	--	--	--	1979-84	1979-84	--
06336510	Upper Hay Creek tributary No. 2 near Wibaux	4.1	1978-82	1978-82	--	--	--	--	--	--
06336515	Hay Creek near Wibaux	11.4	1978-82	1978-82	--	--	--	--	--	--
06336545	Little Beaver Creek near Wibaux	96.2	1978-81	1978-81	--	--	--	1979-80	1979-80	--
06336550	Beaver Creek near Wibaux	--	1958-64	--	--	--	--	--	--	--
12300000	Kootenay River at Newgate, British Columbia	7,660	1931-72	1931-71	--	--	--	1949,1965	--	--
<b>12300110</b>	<b>Lake Koocanusa at international boundary</b>	--	--	--	--	--	--	<b>1972-P</b>	--	<b>1972-82, 2003</b>
12300200	Young Creek near Rexford	36.0	1973-75	1974-75	--	--	--	--	--	--
12300400	Cayuse Creek near Trego	5.29	--	1972-84	--	--	--	--	--	--
12300500	Fortine Creek near Trego	110	1947-53	1947-54, 1958, 1960-73	--	--	--	--	--	--
12300800	Deep Creek near Fortine	18.9	--	1954-91	--	--	--	--	--	--
12301000	Grave Creek near Fortine	54.9	1923-24	--	--	--	--	--	--	--
<b>12301300</b>	<b>Tobacco River near Eureka</b>	440	<b>1958-P</b>	<b>1948, 1959-P</b>	--	1971-85	--	1971-76	--	1974-76
12301500	Kootenai River near Rexford	8,420	1929-40, 1968-71	1929-40, 1948, 1968-71	--	--	1968-71	1967-72	1968-71	--
12301550	Pinkham Creek near Rexford	75.7	1973-81	1973-81	--	--	--	--	--	--
12301600	Lake Koocanusa below Pinkham Creek, near Rexford	--	--	--	--	--	--	1972-76	--	1972-76
12301700	Kootenai River tributary near Rexford	0.86	--	1959-70	--	--	--	--	--	--
12301800	Gold Creek near Rexford	6.12	--	1959-69	--	--	--	--	--	--
12301810	Big Creek near Rexford	137	1972-81	1973-82	--	--	--	--	--	--
<b>12301830</b>	<b>Lake Koocanusa at Tenmile Creek, near Libby</b>	--	--	--	--	--	--	<b>1972-P</b>	--	<b>1972-P</b>
12301850	Kootenai River at Worland Bridge, near Libby	8,892	1961-71	1961-71	--	--	--	--	--	--
12301900	Little Jackson Creek near Libby	2.60	--	1961-69	--	--	--	--	--	--
<b>12301919</b>	<b>Lake Koocanusa at Forebay, near Libby</b>	--	--	--	--	--	--	<b>1972-P</b>	--	<b>1972-82, 2003</b>
<b>12301920</b>	<b>Lake Koocanusa near Libby</b>	8,985	<b>1972-P</b>	--	--	--	--	--	--	--
12301921	Libby Dam near Libby	--	--	--	--	--	--	1964	--	--
<b>12301933</b>	<b>Kootenai River below Libby Dam, near Libby</b>	8,985	<b>1972-P</b>	<b>1972-P</b>	--	<b>2001-P</b>	1968-76	<b>1967-P</b>	1968-71	1973-82
12301990	Fisher River above Wolf Creek, near Libby	768	--	--	--	--	--	1967-70	1968-70	--
12301993	Wolf Creek tributary near Libby	2.76	--	1974-84	--	--	--	--	--	--
12301997	Richards Creek near Libby	9.50	--	1973-91	--	--	--	--	--	--
12301999	Wolf Creek near Libby	216	1967-77	1967-77	--	--	1968-70	1967-70	1969-70	--



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<u>Part 12--Kootenai River Basin--Continued</u>										
12302000	Fisher River near Jennings	780	1951-69	1948, 1951-69, 1974	--	--	--	--	--	--
12302050	Peoples Creek near Libby	2.54	--	1961-67, 1976	--	--	--	--	--	--
<b>12302055</b>	<b>Fisher River near Libby</b>	838	<b>1967-P</b>	<b>1948, 1969-P</b>	--	1968-85	1968-76	<b>1967-76, 1999-P</b>	<b>1969-72, 1974-76, 1999-P</b>	1974-76
12302400	Shaughnessy Creek near Libby	1.16	--	1959-91	--	--	--	--	--	--
12302500	Granite Creek near Libby	23.6	1933-34, 1936-44, 1960-69	1933, 1937-44, 1948,1954, 1959-69, 1974	--	--	--	--	--	--
12303000	Kootenai River at Libby	10,240	1911-91	1911-91	--	--	--	1969-72, 1978	--	1969-73
12303100	Flower Creek near Libby	11.1	1960-92	1960-92	--	--	--	--	--	--
12303400	Ross Creek near Troy	23.8	--	1972-91	--	--	--	1971, 1976-78	1976-78	--
12303430	Stanley Creek near Troy	12.8	--	--	--	--	--	1976-78	1976-78	--
12303440	Camp Creek near Troy	11.3	--	1972-91	--	--	--	--	--	--
12303490	Lake Creek near Troy	179	--	--	--	--	--	1976-78	1976-78	--
12303500	Lake Creek at Troy	210	1945-57, 1983-95	1945-57, 1974, 1983-96	--	--	--	--	--	--
12304000	Callahan Creek at Troy	85.8	1911-12, 1914-16	--	--	--	--	--	--	--
12304040	Basin Creek near Yaak	27.4	1990-2000	1990-2000	--	--	--	--	--	--
12304060	Blacktail Creek near Yaak	8.66	--	1964, 1972-84	--	--	--	--	--	--
12304120	Zulu Creek near Yaak	5.27	--	1972-84	--	--	--	--	--	--
12304200	Yaak River near Yaak	493	1957-62	1956-62	--	--	--	--	--	--
12304250	Whitetail Creek near Yaak	2.48	--	1960-74	--	--	--	--	--	--
12304300	Cyclone Creek near Yaak	5.73	--	1960-91	--	--	--	--	--	--
12304400	Fourth of July Creek near Yaak	7.84	--	1960-74	--	--	--	--	--	--
<b>12304500</b>	<b>Yaak River near Troy</b>	766	<b>1910-16, 1956-P</b>	<b>1948,1954, 1956-P</b>	--	<b>1963-85 2000-P</b>	--	<b>1999-P</b>	<b>1999-P</b>	--
<u>Part 12--Pend Oreille River Basin</u>										
12323170	Silver Bow Creek above Blacktail Creek, at Butte	--	1984-94	1984-94	--	--	--	--	--	--
12323200	Blacktail Creek near Butte	14.7	1984-88	1984-88	--	--	--	--	--	--

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			Daily or monthly	Annual peak	Daily		Periodic			
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<u>Part 12--Pend Oreille River Basin--Continued</u>										
12323220	Basin Creek near Butte	37.6	1984-86	--	--	--	--	--	--	--
<b>12323230</b>	<b>Blacktail Creek at Harrison Avenue, at Butte</b>	--	--	--	--	--	--	<b>1993-95, 1997-P</b>	<b>1993-95, 1997-P</b>	--
<b>12323240</b>	<b>Blacktail Creek at Butte</b>	95.4	<b>1988-P</b>	<b>1989-P</b>	--	--	--	--	--	--
12323248	Silver Bow Creek above Wastewater Plant Outflow, at Butte	--	1999-2002	2000-2002	--	--	--	--	--	--
<b>12323250</b>	<b>Silver Bow Creek below Blacktail Creek, at Butte</b>	105	<b>1984-P</b>	<b>1984-P</b>	--	--	--	<b>1993-95, 1997-P</b>	<b>1993-95, 1997-P</b>	--
12323300	Smith Gulch near Silver Bow	4.36	--	1959-2002	--	--	--	--	--	--
12323500	German Gulch Creek near Ramsay	40.6	1955-69	1955-69, 1975	--	--	--	--	--	--
<b>12323600</b>	<b>Silver Bow Creek at Opportunity</b>	284	<b>1988-P</b>	<b>1989-P</b>	--	--	1993-95	<b>1993-95, 1997-P</b>	<b>1993-95, 1997-P</b>	--
<b>12323700</b>	<b>Mill Creek at Opportunity</b>	43.2	<b>2003</b>	<b>2003</b>	--	--	--	<b>2003</b>	<b>2003</b>	--
<b>12323720</b>	<b>Willow Creek at Opportunity</b>		<b>2003</b>	<b>2003</b>	--	--	--	<b>2003</b>	<b>2003</b>	--
<b>12323750</b>	<b>Silver Bow Creek at Warm Springs</b>	394	<b>1972-79, 1994-P</b>	<b>1972-79, 1989, 1993-P</b>	--	--	1993-95	<b>1971, 1993-P</b>	<b>1993-P</b>	--
<b>12323760</b>	<b>Warm Springs Creek near Anaconda</b>	157	<b>1998-P</b>	<b>1998-P</b>	--	--	--	--	--	--
<b>12323770</b>	<b>Warm Springs Creek at Warm Springs</b>	163	<b>1984-P</b>	<b>1984-P</b>	--	<b>2000-P</b>	--	<b>1993-P</b>	<b>1993-P</b>	--
<b>12323800</b>	<b>Clark Fork near Galen</b>	572	<b>1988-P</b>	<b>1989-P</b>	--	1991-2002	--	<b>1971-74 1988-P</b>	<b>1988-P</b>	1971-74
<b>12323850</b>	<b>Lost Creek near Galen</b>	60.5	<b>2003</b>	<b>2003</b>	--	--	--	<b>2003</b>	<b>2003</b>	--
12324000	Racetrack Creek near Anaconda	39.5	1911-13	--	--	--	--	--	--	--
12324100	Racetrack Creek below Granite Creek, near Anaconda	39.5	1914-17, 1957-73	1958-73, 1975	--	--	--	--	--	--
<b>12324200</b>	<b>Clark Fork at Deer Lodge</b>	916	<b>1979-P</b>	<b>1979-P</b>	--	1979-83, 1992-98, 2001-2002	<b>1985-P</b>	<b>1963, 1969-71, 1985-P</b>	<b>1985-P</b>	1969-71
12324250	Cottonwood Creek at Deer Lodge	45.4	--	1964, 1975-91	--	--	--	--	--	--
12324300	Clark Fork near Garrison	1,139	1961-62	--	--	--	--	--	--	--
<b>12324590</b>	<b>Little Blackfoot River near Garrison</b>	407	<b>1973-P</b>	<b>1973-P</b>	--	<b>2000-P</b>	--	<b>1963, 1985-P</b>	<b>1985-P</b>	--
12324600	Clark Fork at Garrison	1,550	--	--	--	--	--	1963, 1969-71	--	1970-71
12324660	Gold Creek at Goldcreek	64.1	1964-66	--	--	--	--	--	--	--
<b>12324680</b>	<b>Clark Fork at Goldcreek</b>	1,704	<b>1978-P</b>	<b>1978-P</b>	--	1992-98	--	<b>1992-P</b>	<b>1993-P</b>	--
12324700	Clark Fork tributary near Drummond	4.61	--	1958-95	--	--	--	--	--	--
12324800	Morris Creek near Drummond	12.6	--	1960-74, 1980	--	--	--	--	--	--
12325000	Georgetown Lake near Philipsburg	50.1	1939-97	--	--	--	--	--	--	--

**Table 10.** Montana active and discontinued streamflow-gaging, water-quality, and crest-stage gage stations (active stations in bold print)--Continued

Station number	Station name	Drainage area (square miles)	Period of record (by water year)							
			Discharge or contents		Water quality					
			Daily or monthly	Annual peak	Daily		Periodic			
Specific conductance	Water temperature	Sediment			Chemistry	Sediment	Biology			
<b>Part 12--Pend Oreille River Basin--Continued</b>										
<b>12325500</b>	<b>Flint Creek near Southern Cross</b>	52.6	<b>1940-98, 2000-P</b>	1941-98	--	--	--	--	--	--
12326000	Trout Creek above main canal, near Philipsburg	4.09	1946-49	--	--	--	--	--	--	--
12326500	Trout Creek near Southern Cross	36.1	1946-51	--	--	--	--	--	--	--
12327000	Trout Creek near Philipsburg	34.9	1939-43, 1945-46	--	--	--	--	--	--	--
12327090	Flint Creek above Fred Burr Creek, near Philipsburg	108	1994-98	1994-98	--	--	--	--	--	--
12327100	Fred Burr Creek near Philipsburg	15.7	1994-96	1994-96	--	--	--	--	--	--
12327500	Marshall Creek near Philipsburg	22.8	1942-43	--	--	--	--	--	--	--
12328000	Marshall Creek at mouth, near Philipsburg	23.2	1939-42	--	--	--	--	--	--	--
12328500	Flint Creek near Philipsburg	192	1939-41	--	--	--	1972-73	--	--	1972-73
12329000	Flint Creek above Maxville Siding, at Maxville	207	1939-41	--	--	--	--	--	--	--
<b>12329500</b>	<b>Flint Creek at Maxville</b>	208	<b>1941-P</b>	<b>1942-P</b>	--	--	--	--	--	--
<b>12330000</b>	<b>Boulder Creek at Maxville</b>	71.3	<b>1939-P</b>	<b>1940-P</b>	--	--	--	--	--	--
12330100	Flint Creek below Boulder Creek, near Maxville	--	--	--	--	--	1971	--	--	--
12330500	Flint Creek near Maxville	325	1946-49	--	--	--	--	--	--	--
12331000	Flint Creek near Hall	325	1939	--	--	--	--	--	--	--
12331100	Flint Creek below Douglas Creek, near Hall	339	1994-98	1995-98	--	--	--	--	--	--
<b>12331500</b>	<b>Flint Creek near Drummond</b>	490	<b>1990-P</b>	<b>1991-P</b>	--	--	--	<b>1972-73, 1985-P</b>	<b>1985-P</b>	1972-73
12331600	Clark Fork at Drummond	2,378	1967-68, 1973-83	1967, 1973-83	--	--	--	1971-74	--	1971-74
12331700	Edwards Gulch at Drummond	4.69	--	1960-62, 1974-91, 1996-2002	--	--	--	--	--	--
<b>12331800</b>	<b>Clark Fork near Drummond</b>	2,501	<b>1993-P</b>	<b>1993-P</b>	--	--	--	<b>1993-P</b>	<b>1993-P</b>	--
12331900	Clark Fork near Clinton	2,629	1979-90, 1992-94	1980-90, 1992-94	--	--	--	1963	--	--
<b>12332000</b>	<b>Middle Fork Rock Creek near Philipsburg</b>	123	<b>1937-P</b>	<b>1938-P</b>	--	--	--	--	--	--
12332500	East Fork Rock Creek Reservoir near Philipsburg	30.3	1939-95	--	--	--	--	--	--	--
12333000	East Fork Rock Creek near Philipsburg	30.3	1935-43	--	--	--	--	--	--	--
12333500	Rock Creek near Quigley	749	1922-27	1922	--	--	--	--	--	--
12334000	Ranch Creek near Quigley	42.7	1922-27	1922-27	--	--	--	--	--	--
12334500	Rock Creek below Ranch Creek, near Quigley	794	1911-12	--	--	--	--	--	--	--
<b>12334510</b>	<b>Rock Creek near Clinton</b>	885	<b>1972-P</b>	<b>1972-P</b>	--	1979-83, 1995-2002	--	<b>1985-P</b>	<b>1985-P</b>	--
<b>12334550</b>	<b>Clark Fork at Turah Bridge, near Bonner</b>	3,641	<b>1985-P</b>	<b>1986-P</b>	--	1992-98	<b>1985-P</b>	<b>1985-P</b>	<b>1985-P</b>	--
12334600	Blackfoot River near Lincoln	15.1	1969-70	1969-70, 1975	--	--	--	1969-70	--	--
12334620	Blackfoot River below First Gulch, near Lincoln	25.9	--	--	--	--	--	1995-97	1995-97	--

**Table 10.** Montana active and discontinued streamflow-gaging, water-quality, and crest-stage gage stations (active stations in bold print)--Continued

Station number	Station name	Drainage area (square miles)	Period of record (by water year)							
			Discharge or contents		Water quality					
			Daily or monthly	Annual peak	Daily			Periodic		
Specific conductance	Water temperature	Sediment			Chemistry	Sediment	Biology			
<u>Part 12--Pend Oreille River Basin--Continued</u>										
12334650	Blackfoot River below Alice Creek, near Lincoln	96.9	1971-75	1971-75	--	--	--	1971-74, 1995-97	1971-73, 1995-97	1973
12334680	Landers Fork near Lincoln	130	--	--	--	--	--	1995-97	1995-97	--
12334700	Blackfoot River below Seven-up Pete Creek, near Lincoln	255	--	--	--	--	--	1973, 1995-97	1995-97	1973, 1995-97
12334800	Blackfoot River at Dalton Mountain Road Bridge, near Lincoln	399	--	--	--	--	--	1973, 1995-97	1995-97	1973, 1995-97
12334900	Blackfoot River at Blackfoot Canyon Campground, near Lincoln	437	--	--	--	--	--	1973	--	1973 1995-97
12335000	Blackfoot River near Helmville	481	1940-54	1941-53, 1964, 1974-75	--	--	--	--	--	--
<b>12335100</b>	<b>Blackfoot River above Nevada Creek, near Helmville</b>	494	<b>2000-P</b>	--	--	2000-2002	--	<b>1995-97</b> <b>2003</b>	<b>1995-97</b> <b>2003</b>	--
<b>12335500</b>	<b>Nevada Creek above Reservoir, near Helmville</b>	116	<b>1939-P</b>	<b>1940-P</b>	--	--	--	<b>1980, 2003</b>	<b>1980,1994-2000,2003</b>	--
12336000	Nevada Creek near Finn	144	1934-39	--	--	--	--	--	--	--
12336500	Nevada Creek Reservoir near Finn	142	1939-95	--	--	--	--	--	--	--
12337000	Nevada Creek near Helmville	165	1946-49	--	--	--	--	--	--	--
12337500	Douglas Creek near Helmville	84.8	1946-47	--	--	--	--	--	--	--
<b>12337800</b>	<b>Nevada Creek at mouth, near Helmville</b>		<b>2002-P</b>	--	--	--	--	<b>2002-P</b>	<b>2002-P</b>	--
12338000	North Fork Blackfoot River near Ovando	228	1921-23	--	--	--	--	--	--	--
12338100	Rock Creek above Salmon Creek, near Ovando	7.60	1998	1998	--	--	--	--	--	--
<b>12338300</b>	<b>North Fork Blackfoot River above Dry Gulch, near Ovando</b>	314	<b>1998-P</b>	<b>1998-P</b>	--	2001-2002	--	1995-97	1995-97	--
12338500	Blackfoot River near Ovando	1,274	1940-63	1941-64, 1975	--	--	--	--	--	--
12338540	Monture Creek above Dunham Creek, near Ovando	64.7	--	1978-91	--	--	--	--	--	--
12338550	Dunham Creek at mouth, near Ovando	31.7	--	1978-91	--	--	--	--	--	--
12338600	Monture Creek at Forest Service boundary, near Ovando	105	--	1964, 1974-91	--	--	--	--	--	--
12338690	Monture Creek near Ovando	140	1973-83	1974-83	--	--	--	--	--	--
12338700	Blackfoot River at Scotty Brown Bridge, near Ovando	1,428	--	--	--	--	--	1995-97	1995-97	1995-97
12339000	Blackfoot River at Clearwater	1,550	1921-23	--	--	--	--	--	--	--
12339300	Deer Creek near Seeley Lake	19.8	--	1974-91	--	--	--	--	--	--
12339450	Clearwater River near Clearwater	345	1975-92	1975-92, 1997	--	--	--	1995-97	1995-97	--
12339500	Clearwater River at Clearwater	391	1921-23	--	--	--	--	--	--	--
12339800	Blackfoot River near Potomac	2,046	1957-65	1957-65	--	--	--	--	--	--
12339900	West Twin Creek near Bonner	7.33	--	1959-91	--	--	--	--	--	--

**Table 10.** Montana active and discontinued streamflow-gaging, water-quality, and crest-stage gage stations (active stations in bold print)--Continued

Station number	Station name	Drainage area (square miles)	Period of record (by water year)							
			Discharge or contents		Water quality					
			Daily or monthly	Annual peak	Specific conductance	Daily Water temperature	Sediment	Chemistry	Periodic Sediment	Biology
<u>Part 12--Pend Oreille River Basin--Continued</u>										
<b>12340000</b>	<b>Blackfoot River near Bonner</b>	2,290	<b>1898-99, 1901, 1903-05 1939-P</b>	<b>1899-1901, 1903-05, 1940-P</b>	--	<b>2000-P</b>	1986-95	<b>1963, 1985-P</b>	<b>1985-P</b>	--
12340200	Marshall Creek near Missoula	5.63	--	1959-73, 1980	--	--	--	--	--	--
<b>12340500</b>	<b>Clark Fork above Missoula</b>	5,999	<b>1929-P</b>	<b>1908, 1930-P</b>	--	1977-83	<b>1986-P</b>	<b>1969-71 1986-P</b>	<b>1986-P</b>	1969-71
12341000	Rattlesnake Creek at Missoula	79.7	1899-1901, 1958-67	1899,1948, 1958-59, 1961-64, 1966-67	--	--	--	--	--	--
12341500	Clark Fork at Missoula	6,084	1898-1907	1899-1907	--	--	--	1963	--	--
12342000	Painted Rocks Lake near Conner	317	1940-95	--	--	--	--	--	--	--
<b>12342500</b>	<b>West Fork Bitterroot River near Conner</b>	317	<b>1941-P</b>	<b>1941-P</b>	--	--	--	<b>2001-P</b>	<b>2001-P</b>	--
12342950	Trapper Creek near Conner	28.5	--	1974-91	--	--	--	--	--	--
12343000	West Fork Bitterroot River near Darby	552	1910-17	1911-17	--	--	--	--	--	--
<b>12343400</b>	<b>East Fork Bitterroot River near Conner</b>	381	<b>1956-72 2001-P</b>	<b>1956-72 2001-P</b>	--	--	--	<b>2001-P</b>	<b>2001-P</b>	--
12343500	East Fork Bitterroot River at Conner	405	1910-16, 1937-57	1937-57	--	--	--	--	--	--
<b>12344000</b>	<b>Bitterroot River near Darby</b>	1,049	<b>1937-P</b>	<b>1938-P</b>	--	<b>2001-P</b>	--	<b>1956, 1997-98 2001-P</b>	<b>1997-98 2001-P</b>	--
12344300	Burke Gulch near Darby	6.50	--	1958-82	--	--	--	--	--	--
12344500	Lake Como near Darby	54.6	1939-99	--	--	--	--	1956	--	--
12345000	Rock Creek near Darby	55.4	1946-53, 1957-59	1948-53, 1958-59	--	--	--	--	--	--
12345500	Rock Creek Canal near Darby	--	1946, 1948-53	--	--	--	--	--	--	--
12345800	Camas Creek near Hamilton	5.05	--	1958-73	--	--	--	--	--	--
12345850	Sleeping Child Creek near Hamilton	65.2	1973-77	1972-91	--	--	--	1956	--	--
12346000	Bitterroot River near Grantsdale	1,414	1902-07	--	--	--	--	--	--	--
<b>12346500</b>	<b>Skalkaho Creek near Hamilton</b>	87.8	<b>1949-53, 1957-79, 2001-P</b>	<b>1948-54, 1958-79, 2001-P</b>	--	--	--	<b>1956,1980, 2001-P</b>	<b>1980, 2001-P</b>	--
12347000	Skalkaho Creek at Brennan's ranch, near Hamilton	96.2	1920-24	1920-24, 1948	--	--	--	--	--	--
12347360	Bitterroot River at Hamilton	--	--	--	--	--	--	1997-98	1997-98	--
12347500	Blodgett Creek near Corvallis	25.9	1947-69	1947-69, 1972	--	--	--	1956	--	--
12348000	Blodgett Creek near Hamilton	28.3	1938-43	1938-43	--	--	--	--	--	--

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Station number	Station name	Drainage area (square miles)	Period of record (by water year)							
			Discharge or contents		Water quality					
			Daily or monthly	Annual peak	Daily			Periodic		
Specific conductance	Water temperature	Sediment			Chemistry	Sediment	Biology			
<u>Part 12--Pend Oreille River Basin--Continued</u>										
12348200	Bitterroot River near Corvallis	1,711	1959-63	--	--	--	--	--	--	--
12348500	Willow Creek near Corvallis	21.9	1920-24, 1957-66	1920-22, 1958-73	--	--	--	1956	--	--
12349000	Willow Creek at Anfinson Ranch, near Corvallis	23.2	1938-43	1938-43	--	--	--	--	--	--
12349500	Fred Burr Creek near Victor	17.7	1947-51	--	--	--	--	--	--	--
12350000	Bear Creek near Victor	26.8	1938-55, 1957-59	1938-54, 1958-59	--	--	--	1956	--	--
12350200	Gash Creek near Victor	3.37	--	1958-73	--	--	--	--	--	--
<b>12350250</b>	<b>Bitterroot River at Bell Crossing, near Victor</b>	1,963	<b>1987-P</b>	<b>1987-P</b>	--	--	--	1997-98	1997-98	--
12350300	Big Creek near Victor	--	--	--	--	--	--	1956	--	--
12350500	Kootenai Creek near Stevensville	28.9	1949-53, 1957-63	1948-53, 1958-73	--	--	--	1956	--	--
12351000	Burnt Fork Bitterroot River near Stevensville	73.2	1920, 1922-24, 1938-62	1920, 1922-24, 1938-73	--	--	--	1956	1965	--
<b>12351200</b>	<b>Bitterroot River near Florence</b>	2,354	<b>1957-66</b> <b>2003</b>	<b>1958-66,</b> <b>1974,1982</b> <b>2003</b>	--	--	--	1956, 1997-98	1997-98	--
12351400	Eightmile Creek near Florence	19.5	1957-63	1958-73	--	--	--	1956	--	--
12351500	Lolo Creek near Lolo	231	1911-15	--	--	--	--	--	--	--
12352000	Lolo Creek above Sleeman Creek, near Lolo	250	1951-60	1951-60, 1972,1974	--	--	--	--	--	--
12352200	Hays Creek near Missoula	4.16	--	1959-66, 1968-74, 1980	--	--	--	--	--	--
<b>12352500</b>	<b>Bitterroot River near Missoula</b>	2,814	<b>1898-1901,</b> <b>1903-04,</b> <b>1989-P</b>	<b>1899-1901,</b> <b>1903-04,</b> <b>1990-P</b>	--	<b>2000-P</b>	--	<b>1997-P</b>	<b>1997-P</b>	--
12352980	Bitterroot River at Maclay Bridge, near Missoula	2,850	--	--	--	--	--	1970-73	--	1970-73
<b>12353000</b>	<b>Clark Fork below Missoula</b>	9,003	<b>1929-P</b>	<b>1930-P</b>	--	1977-82	--	1979-95	1979-95	1979-95
12353250	Ninemile Creek near Alberton	50.2	--	1972, 1974-82	--	--	--	--	--	--
12353280	Ninemile Creek near Huson	170	1973-83	1974-83	--	--	--	--	--	--
12353300	Clark Fork near Alberton	9,272	1959-63	--	--	--	--	1969-71	--	1970-71
12353400	Negro Gulch near Alberton	8.02	--	1959-73, 1984-91	--	--	--	--	--	--
12353450	Fish Creek below West Fork, near Tarkio	242	--	--	--	1985-91	--	--	--	--
12353500	Clark Fork at Tarkio	9,882	1945-49	--	--	--	--	--	--	--
12353650	Clark Fork at Superior	10,210	--	--	--	1985-91	--	--	--	--
12353800	Thompson Creek near Superior	12.2	--	1961-79, 1982	--	--	--	--	--	--

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			Discharge or contents		Water quality					
			Daily or monthly	Annual peak	Daily		Periodic			
					Specific conductance	Water temperature	Sediment	Chemistry	Sediment	Biology
<u>Part 12--Pend Oreille River Basin--Continued</u>										
12353820	Dry Creek near Superior	46.3	1982-86	1982-91	--	--	--	--	--	--
12353850	East Fork Timber Creek near Haugan	2.72	--	1961-75, 1979	--	--	--	--	--	--
12353900	St. Regis River tributary near St. Regis	1.16	1959-61	--	--	--	--	--	--	--
<b>12354000</b>	<b>St. Regis River near St. Regis</b>	303	<b>1910-17, 1958-75, 2002-P</b>	<b>1911-17, 1934,1948, 1954, 1959-75, 2002-P</b>	--	1985-91	--	--	--	--
12354100	North Fork Little Joe Creek near St. Regis	14.7	--	1960-74	--	--	--	--	--	--
<b>12354500</b>	<b>Clark Fork at St. Regis</b>	10,709	<b>1910-P</b>	<b>1911-23, 1929-P</b>	--	2002	--	<b>1999-P</b>	--	--
12354700	Clark Fork near Paradise	10,794	--	--	--	1985-91	--	--	--	--
<b>12355000</b>	<b>Flathead River at Flathead, British Columbia</b>	427	<b>1929-95, 1999-P</b>	<b>1929-94, 2000-P</b>	--	1975-91	1975-79, 1985-91,	<b>1949-50, 1965,1970, 1975-93, 1999-P</b>	<b>1965,1970, 1975-93, 1999-P</b>	1970, 1975-93
12355100	Starvation Creek near Flathead, British Columbia	16.4	1986-87	1986-87	--	--	--	--	--	--
12355150	Tuchuck Creek near Flathead, British Columbia	10.1	1986-88	1986-88	--	--	--	--	--	--
12355350	Big Creek at Big Creek Ranger Station, near Columbia Falls	82.1	--	1964, 1973-91	--	--	--	1980	1980	--
<b>12355500</b>	<b>North Fork Flathead River near Columbia Falls</b>	1,548	<b>1910-17, 1929-P</b>	<b>1911-17, 1929-P</b>	1976-79	<b>1976-P</b>	1976-79	<b>1950,1970, 1976-79, 1999-P</b>	<b>1976-79, 1999-P</b>	1970, 1976-79
12355600	Middle Fork Flathead River at Schafer Ranger Station, near Essex	--	--	--	--	--	--	1970	--	1970
12355700	Middle Fork Flathead River near Essex	408	1957-61	1942-43, 1945-53, 1956-61, 1964	--	--	--	--	--	--
12355900	Middle Fork Flathead River above Bear Creek, near Essex	--	--	--	--	--	--	1970	--	1970
12356000	Skyland Creek near Essex	8.09	1946-52	1946-52, 1954, 1959-75	--	--	--	--	--	--
12356500	Bear Creek near Essex	20.4	1946-52	1946-52, 1964, 1975-91	--	--	--	--	--	--
12357000	Middle Fork Flathead River at Essex	510	1940-53, 1956-64	1940-54, 1956-64	--	--	--	--	--	--
12357300	Moccasin Creek near West Glacier	2.38	--	1959-75	--	--	--	--	--	--
12357400	Middle Fork Flathead River tributary at West Glacier	0.14	--	1960-74	--	--	--	--	--	--

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			Discharge or contents		Water quality					
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<u>Part 12--Pend Oreille River Basin--Continued</u>										
12357500	Middle Fork Flathead River at West Glacier	943	1911-23, 1929-33, 1943-48	1911-23, 1929-33, 1944-48	--	--	--	--	--	--
12358000	McDonald Creek at Apgar	175	1912-14	--	--	--	--	--	--	--
<b>12358500</b>	<b>Middle Fork Flathead River near West Glacier</b>	1,128	<b>1939-P</b>	<b>1940-P</b>	--	--	--	<b>1949-50, 1970, 1998-P</b>	<b>1999-P</b>	1970
12358900	South Fork Flathead River above Harrison Creek, near Swan Lake	--	--	--	--	--	--	1970	--	1970
12359000	South Fork Flathead River at Spotted Bear Ranger Station, near Hungry Horse	958	1948-57, 1959-67	1948-57, 1960-67	--	--	--	--	--	--
12359500	Spotted Bear River near Hungry Horse	184	1949-56	1948-56, 1964	--	--	--	--	--	--
<b>12359800</b>	<b>South Fork Flathead River above Twin Creek, near Hungry Horse</b>	1,160	<b>1964-82, 1985-P</b>	<b>1964-82, 1985-P</b>	--	--	--	1970	--	1970
12360000	Twin Creek near Hungry Horse	47.0	1948-56, 1965-67	1948-56, 1964-67	--	--	--	--	--	--
12360500	Lower Twin Creek near Hungry Horse	22.4	1948-56	1948-56	--	--	--	--	--	--
12360600	Soldier Creek near Hungry Horse	4.77	1965-67	1965-66	--	--	--	--	--	--
12361000	Sullivan Creek near Hungry Horse	71.3	1948-56, 1959-76	1948-56, 1960-76	--	--	--	--	--	--
12361500	Graves Creek near Hungry Horse	27.0	1948-56, 1965-67	1948-56, 1964-67	--	--	--	--	--	--
12361600	Canyon Creek near Hungry Horse	5.8	1965-67	1965-66	--	--	--	--	--	--
12361700	Goldie Creek near Hungry Horse	3.29	1965-67	1966	--	--	--	--	--	--
12361880	Wounded Buck Creek near Hungry Horse	13.6	1965-67	1965-66	--	--	--	--	--	--
12361950	Hungry Horse Creek near Hungry Horse	23.3	1969-72	1970	--	--	--	--	--	--
12361960	Emery Creek near Hungry Horse	26.4	1965-67	1965-66	--	--	--	--	--	--
<b>12362000</b>	<b>Hungry Horse Reservoir near Hungry Horse</b>	1,654	<b>1951-P</b>	--	--	--	--	--	--	--
<b>12362500</b>	<b>South Fork Flathead River near Columbia Falls</b>	1,663	<b>1910-16, 1923-P</b>	<b>1911-P</b>	--	<b>1964-68, 1979-P</b>	--	1949-50	--	--
<b>12363000</b>	<b>Flathead River at Columbia Falls</b>	4,464	<b>1922-23, 1928-P</b>	<b>1894, 1922-23, 1928-P</b>	1996-67, 1979-81	<b>1949-50, 1963-67, 1979-P</b>	1965-67	1949-50, 1963-67, 1970, 1979-94	1965, 1967, 1979-94	1979-94
12363500	Flathead River near Kalispell	4,500	--	--	--	--	1968-69	--	1968	--
12363900	Rock Creek near Olney	3.61	--	1961-75	--	--	--	--	--	--
12363920	Stillwater River at Olney	146	1973-82	1973-82	--	--	--	--	--	--
12364000	Logan Creek at Tally Lake, near Whitefish	183	1931-34, 1936-42, 1945-47	1936-42, 1945-47	--	--	--	--	--	--
12364500	Logan Creek near Whitefish	199	1931	--	--	--	--	--	--	--



**Table 10.** Montana active and discontinued streamflow-gaging, water-quality, and crest-stage gage stations (active stations in bold print)--Continued

Station number	Station name	Drainage area (square miles)	Period of record (by water year)						
			Discharge or contents		Water quality				
			Daily or monthly	Annual peak	Daily		Periodic		
Specific conductance	Water temperature	Sediment			Chemistry	Sediment	Biology		
Part 12--Pend Oreille River Basin--Continued									
<b>12365000</b>	<b>Stillwater River near Whitefish</b>	524	<b>1930-50, 1972-P</b>	<b>1931-50, 1964, 1973-P</b>	--	--	--	--	--
12365500	Stillwater River near Kalispell	338	1907,1922, 1928-31	--	--	--	--	--	--
12365800	Swift Creek near Whitefish	78.0	1973-81	1973-81	--	--	--	--	--
<b>12366000</b>	<b>Whitefish River near Kalispell</b>	170	<b>1928-50, 1972-P</b>	<b>1929-50, 1964, 1973-P</b>	--	--	--	<b>1999-P</b>	<b>1999-P</b>
<b>12366100</b>	<b>Trumbull Creek near Columbia Falls</b>	9.0	--	<b>1997-P</b>	--	--	--	--	--
12367000	Ashley Creek near Kila	44.2	1916	--	--	--	--	--	--
12367500	Ashley Creek near Kalispell	201	1931-50, 1972-74	1931-32, 1935-50, 1973-74	--	--	--	1969-70	--
12367800	Ashley Creek below Kalispell	--	--	--	--	--	--	1969-70	--
12368500	Flathead River at Therriault Ferry, near Kalispell	--	1934-45	--	--	--	--	--	--
12369000	Flathead River near Bigfork	6,300	1909-12, 1928-37, 1939-45	--	--	--	--	--	1969-71
12369200	Swan River near Condon	69.1	1973-92	1973-92	--	--	--	--	--
12369250	Holland Creek near Condon	22.3	--	1974-91	--	--	--	--	--
12369650	North Fork Lost Creek near Swan Lake	13.0	--	1982-91	--	--	--	--	--
<b>12370000</b>	<b>Swan River near Bigfork</b>	671	<b>1910-11, 1922-P</b>	<b>1922-P</b>	--	<b>2000-P</b>	--	<b>1999-P</b>	<b>1999-P</b>
12370500	Dayton Creek near Proctor	18.5	--	1959-91	--	--	--	--	--
12370900	Teepee Creek near Polson	2.18	1983-87	1960-74, 1980, 1983-87	--	--	--	1983-85	1983-85
<b>12371000</b>	<b>Turtle Lake near Polson</b>	--	<b>1939-P</b>	--	--	--	--	--	--
12371100	Hell Roaring Creek near Polson	6.22	1917-32	1917-32, 1948, 1959-67, 1980	--	--	--	--	--
12371500	Flathead Lake at Somers	7,086	1900, 1908-98	--	--	--	--	--	--
<b>12371550</b>	<b>Flathead Lake at Polson</b>	7,086	<b>1999-P</b>	--	--	--	--	1969-71	--
<b>12372000</b>	<b>Flathead River near Polson</b>	7,096	<b>1907-P</b>	<b>1894, 1908-P</b>	--	1977-83	--	--	--
<b>12372500</b>	<b>Little Bitterroot Lake near Marion</b>	31.8	<b>1939-P</b>	--	--	--	--	--	--
12373000	Little Bitterroot River near Marion	31.8	1910-16	--	--	--	--	--	--
<b>12373500</b>	<b>Hubbart Reservoir near Niarada</b>	114	<b>1939-P</b>	--	--	--	--	--	--

**Table 10.** Montana active and discontinued streamflow-gaging, water-quality, and crest-stage gage stations (active stations in bold print)--Continued

Station number	Station name	Drainage area (square miles)	Period of record (by water year)							
			Discharge or contents		Water quality					
			Daily or monthly	Annual peak	Daily		Periodic			
				Specific conductance	Water temperature	Sediment	Chemistry	Sediment	Biology	
<u>Part 12--Pend Oreille River Basin--Continued</u>										
12374000	Little Bitterroot River near Hubbart	134	1909-16	--	--	--	--	--	--	--
<b>12374250</b>	<b>Mill Creek above Bassoo Creek, near Niarada</b>	19.6	<b>1983-P</b>	<b>1983-P</b>	--	--	--	1983-85	1983-85	--
12374300	Mill Creek near Niarada	28.2	--	1959-73	--	--	--	--	--	--
12374500	Little Bitterroot River near Niarada	223	1908-10, 1916-17	--	--	--	--	--	--	--
12374800	Cromwell Creek near Niarada	14.3	1983-89	1983-89	--	--	--	1983-85	1983-85	--
12374900	Garden Creek near Hot Springs	3.57	--	1959-73	--	--	--	--	--	--
<b>12375000</b>	<b>Upper Dry Fork Reservoir near Lonepine</b>	8.53	<b>1940-P</b>	--	--	--	--	--	--	--
<b>12375500</b>	<b>Dry Fork Reservoir near Lonepine</b>	17.8	<b>1939-P</b>	--	--	--	--	--	--	--
12375800	Little Bitterroot River near Perma	--	--	--	--	--	--	1987-92	1987-92	--
<b>12375900</b>	<b>South Crow Creek near Ronan</b>	7.57	<b>1982-P</b>	<b>1983-P</b>	--	--	--	1983-85	1983-85	--
12376000	Crow Creek near Ronan	46.1	1906-17	1907-11, 1913-17	--	--	--	--	--	--
12376500	Mud Creek near Ronan	30.4	1908-11	--	--	--	--	--	--	--
<b>12376700</b>	<b>Lower Crow Reservoir near Charlo</b>	--	<b>1939-P</b>	--	--	--	--	--	--	--
12376900	Crow Creek at mouth, near Ronan	--	--	--	--	--	--	1987-92	1987-92	--
12377000	Crow Creek at Lozeaus ranch, near Ronan	139	1911-16	--	--	--	--	--	--	--
<b>12377150</b>	<b>Mission Creek above reservoir, near St. Ignatius</b>	12.4	<b>1982-P</b>	<b>1982-P</b>	--	--	--	1983-85	1983-86	--
<b>12377200</b>	<b>Mission Reservoir near St. Ignatius</b>	--	<b>1939-P</b>	--	--	--	--	--	--	--
<b>12377300</b>	<b>St. Mary's Lake near St. Ignatius</b>	--	<b>1939-P</b>	--	--	--	--	--	--	--
12377500	Dry Creek near St. Ignatius	24.7	1908-16	1909-16	--	--	--	--	--	--
<b>12377900</b>	<b>Pablo Reservoir near Polson</b>	--	<b>1939-P</b>	--	--	--	--	--	--	--
12378000	Mission Creek near St. Ignatius	74.8	1906-17	1907-17	--	--	--	--	--	--
<b>12378200</b>	<b>McDonald Reservoir near Charlo</b>	--	<b>1939-P</b>	--	--	--	--	--	--	--
<b>12378300</b>	<b>Kicking Horse Reservoir near Charlo</b>	--	<b>1939-P</b>	--	--	--	--	--	--	--
<b>12378400</b>	<b>Ninepipe Reservoir near Charlo</b>	--	<b>1939-P</b>	--	--	--	--	--	--	--
12378500	Post Creek at Fitzpatrick's ranch, near Ronan	28.4	1906-11	--	--	--	--	--	--	--
12379000	Post Creek at Deschamp's ranch, near Ronan	29.7	1911	--	--	--	--	--	--	--
12379500	Post Creek near St. Ignatius	47.6	1911-17	--	--	--	--	--	--	--
12379600	Mission Creek at National Bison Range, at Moiese	236	--	--	--	--	--	1987-92	1987-92	--
<b>12380000</b>	<b>Upper Jocko Lake near Arlee</b>	2.99	<b>1968-P</b>	--	--	--	--	--	--	--
<b>12380500</b>	<b>Lower Jocko Lake near Arlee</b>	7.39	<b>1939-P</b>	--	--	--	--	--	--	--
12381000	Jocko River above South Fork, near Jocko	14.9	1912-16	--	--	--	--	--	--	--
<b>12381400</b>	<b>South Fork Jocko River near Arlee</b>	56.0	<b>1982-P</b>	<b>1983-P</b>	--	--	--	1983-86	1983-86	--
12381500	Jocko River below South Fork, near Jocko	72.3	1912-16	--	--	--	--	--	--	--
12382000	Middle Fork Jocko River near Jocko	19.5	1912-16	--	--	--	--	--	--	--
12382500	Falls Creek near Jocko	3.57	1912-16	--	--	--	--	--	--	--
12383000	Jocko River near Jocko	140	1918-19	--	--	--	--	--	--	--

**Table 10.** Montana active and discontinued streamflow-gaging, water-quality, and crest-stage gage stations (active stations in bold print)--Continued

Station number	Station name	Drainage area (square miles)	Period of record (by water year)							
			Discharge or contents		Water quality					
			Daily or monthly	Annual peak	Daily		Periodic			
					Specific conductance	Water temperature	Sediment	Chemistry	Sediment	Biology
<u>Part 12--Pend Oreille River Basin--Continued</u>										
<b>12383500</b>	<b>Big Knife Creek near Arlee</b>	6.88	<b>1910-16, 1983-P</b>	<b>1982-P</b>	--	--	--	1983-85	1983-85	--
12384000	Big Knife Creek near Jocko	7.44	1909-11	--	--	--	--	--	--	--
12384500	Jocko River below Big Knife Creek, near Jocko	154	1909-16	--	--	--	--	--	--	--
12386000	East Finley Creek near Jocko	5.48	1909-16	--	--	--	--	--	--	--
12386500	Indian Ditch near Jocko	--	1909-16	--	--	--	--	--	--	--
12387000	Finley Creek near Jocko	36.7	1909-16	--	--	--	--	--	--	--
12387100	Agency Creek near Jocko	4.00	1909-16	--	--	--	--	--	--	--
12387200	Blodgett Creek near Jocko	5.48	1909	--	--	--	--	--	--	--
<b>12387450</b>	<b>Valley Creek near Arlee</b>	15.3	<b>1983-P</b>	<b>1983-P</b>	--	--	--	1983-85	1983-85	--
12387500	Valley Creek near Ravalli	64.1	1909-10	--	--	--	--	--	--	--
12388000	Jocko River at Ravalli	348	1907-11	--	--	--	--	--	--	--
<b>12388200</b>	<b>Jocko River at Dixon</b>	380	<b>1990-P</b>	<b>1990-P</b>	--	--	--	1987-92	1987-92	--
<b>12388400</b>	<b>Revais Creek below West Fork, near Dixon</b>	23.4	<b>1983-P</b>	<b>1983-P</b>	--	--	--	1983-85, 1991-92	1983-85, 1991-92	--
12388500	Revais Creek near Dixon	26.3	1911-19	1911-16, 1918-19	--	--	--	--	--	--
12388650	Camas Creek near Hot Springs	4.46	1983-87	1983-87	--	--	--	1983-85	1983-85	--
<b>12388700</b>	<b>Flathead River at Perma</b>	8,795	<b>1984-P</b>	<b>1984-P</b>	--	<b>2000-P</b>	--	<b>1971-73, 1984-92, 1997-P</b>	<b>1984-92, 1999-P</b>	1971-73
<b>12389000</b>	<b>Clark Fork near Plains</b>	19,958	<b>1910-P</b>	<b>1912-P</b>	--	--	--	1969-70	--	1969-70
12389150	McGregor Creek tributary near Marion	2.55	--	1972-82	--	--	--	--	--	--
12389200	Thompson River near Marion	104	--	--	--	--	--	1975-76	1975-76	1975-76
12389300	Thompson River ab Little Thompson River, near Thompson Falls	321	--	--	--	--	--	1975-76	1975-76	1975-76
12389400	Little Thompson River near Thompson Falls	129	--	--	--	--	--	1975-76	1975-76	1975-76
12389450	West Fork Thompson River near Thompson Falls	35.7	--	--	--	--	--	1975-76	1975-76	1975-76
<b>12389500</b>	<b>Thompson River near Thompson Falls</b>	642	<b>1911-16, 1956-P</b>	<b>1948, 1956-P</b>	--	--	--	1975-76	1975-76	1975-76
<b>12390000</b>	<b>Thompson Falls Reservoir at Thompson Falls</b>	20,968	<b>1939-P</b>	--	--	--	--	--	--	--
12390500	Prospect Creek near Thompson Falls	145	1911	--	--	--	--	--	--	--
<b>12390700</b>	<b>Prospect Creek at Thompson Falls</b>	182	<b>1956-P</b>	<b>1956-P</b>	--	--	--	--	--	--
12391000	Clark Fork at Thompson Falls	21,113	1952-59	1952-59	--	--	--	1963, 1969-73	--	1970-73
12391100	White Pine Creek near Trout Creek	8.75	--	1974-84	--	--	--	--	--	--
12391200	Canyon Creek near Trout Creek	8.64	--	1972, 1974-91	--	--	--	--	--	--
<b>12391300</b>	<b>Noxon Rapids Reservoir near Noxon</b>	21,833	<b>1959-P</b>	--	--	--	--	--	--	--
<b>12391400</b>	<b>Clark Fork below Noxon Rapids Dam, near Noxon</b>	21,833	<b>1960-P</b>	<b>1960-P</b>	--	--	--	--	--	--
12391420	Rock Creek near Noxon	32	--	--	--	--	--	1998	1998	--

**Table 10.** Montana active and discontinued streamflow-gaging, water-quality, and crest-stage gage stations (active stations in bold print)--Continued

Station number	Station name	Drainage area (square miles)	Period of record (by water year)							
			Discharge or contents		Water quality					
			Daily or monthly	Annual peak	Daily			Periodic		
					Specific conductance	Water temperature	Sediment	Chemistry	Sediment	Biology
<u>Part 12--Pend Oreille River Basin--Continued</u>										
12391430	Skeleton Creek near Noxon	2.10	--	1973-84	--	--	--	--	--	--
12391500	Bull River near Heron	45.7	--	--	--	--	--	1971	--	--
12391525	Snake Creek near Noxon	3.11	--	1972-84	--	--	--	--	--	--
12391550	Bull River near Noxon	139	1973-82	1973-82	--	--	--	--	--	--

WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003 STATION RECORDS, SURFACE WATER AND WATER QUALITY  
SASKATCHEWAN RIVER BASIN

05014300 SWIFTCURRENT CREEK ABOVE SWIFTCURRENT LAKE, AT MANY GLACIER, MT

LOCATION.--Lat 48°47'43", long 113°40'45" (NAD 27), in NE<sup>1</sup>/<sub>4</sub> sec.15, T.35 N., R.16 W., Glacier County, Hydrologic Unit 10010002, Glacier National Park, on left bank .7 mi upstream of inlet to Swiftcurrent Lake at Many Glacier, and 12 mi southwest of Babb.

DRAINAGE AREA.--14.5 mi<sup>2</sup>.

PERIOD OF RECORD.--May 1, 2003 to October 31, 2003.

GAGE.--Water-stage recorder. Elevation of gage is 4,920 ft (NGVD 29).

REMARKS.--Seasonal records good. No regulation or diversion upstream from station. Several observations of water temperature and specific conductance were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 2003  
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1					e90	331	128	38	12	8.1		
2					e90	319	125	37	12	7.5		
3					e95	245	112	36	12	7.2		
4					e100	197	92	36	11	7.1		
5					e90	175	86	33	11	6.9		
6					e85	174	77	31	10	6.9		
7					e80	167	71	28	12	6.9		
8					e75	196	71	27	13	6.6		
9					e70	243	67	26	15	7.0		
10					e65	231	67	26	14	6.7		
11					e60	289	68	25	14	6.6		
12					e60	285	72	24	14	8.3		
13					e70	261	78	22	13	8.7		
14					e90	237	73	20	12	7.8		
15					e150	202	65	20	11	7.2		
16					e200	183	62	20	12	9.9		
17					e160	179	64	21	12	11		
18					e130	203	67	21	11	7.7		
19					e100	222	61	22	9.4	7.7		
20					e80	220	60	21	9.8	13		
21					e75	188	61	20	9.4	52		
22					e75	149	59	18	9.8	46		
23					e100	130	58	16	8.7	39		
24					e200	117	58	14	9.1	32		
25					e300	105	55	15	10	29		
26					e700	110	52	15	8.2	24		
27					e450	129	47	13	7.9	20		
28					395	133	45	13	8.3	28		
29					476	128	42	15	8.0	32		
30					422	125	40	15	8.3	27		
31					287	---	39	13	---	23		
TOTAL					5420	5873	2122	701	327.9	510.8		
MEAN					175	196	68.5	22.6	10.9	16.5		
MAX					700	331	128	38	15	52		
MIN					60	105	39	13	7.9	6.6		
AC-FT					10750	11650	4210	1390	650	1010		

STATISTICS OF MONTHLY MEAN DATA FOR 2003 SEASON

MEAN	175	196	68.5	22.6	10.9	16.5
MAX	175	196	68.5	22.6	10.9	16.5
(WY)	2003	2003	2003	2003	2003	2004
MIN	175	196	68.5	22.6	10.9	16.5
(WY)	2003	2003	2003	2003	2003	2004

SUMMARY STATISTICS

FOR 2003 SEASON

HIGHEST DAILY MEAN	700	May 26
LOWEST DAILY MEAN	6.6	Oct 8
MAXIMUM PEAK FLOW	a900	May 26
MAXIMUM PEAK STAGE	a3.76	May 26

a--About, from highwater mark.  
e--Estimated.

SASKATCHEWAN RIVER BASIN

05014500 SWIFTCURRENT CREEK AT MANY GLACIER, MT

LOCATION.--Lat 48°47'57", long 113°39'21" (NAD 27), in SE<sup>1</sup>/<sub>4</sub> sec.11, T.35 N., R.16 W., Glacier County, Hydrologic Unit 10010002, Glacier National Park, on right bank 100 ft upstream from outlet of Swiftcurrent Lake at Many Glacier, and 11 mi southwest of Babb.

DRAINAGE AREA.--30.9 mi<sup>2</sup>.

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.

REVISED RECORDS.--WSP 1508: 1918(M), 1943. WDR MT-75-1: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 4,876.78 ft (NGVD 29). Prior to May 23, 1916, nonrecording gage on left bank of lake opposite present gage and at present elevation, and May 23, 1916, to June 15, 1918, nonrecording gage at present site and elevation.

REMARKS.--Records good. No regulation or diversion upstream from station. Bureau of Reclamation satellite telemeter at station. Several observations of water temperature and specific conductance were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	41	25	34	28	58	24	212	132	653	308	109	37
2	43	25	34	24	57	21	186	133	701	294	105	36
3	41	23	33	28	51	22	143	151	617	262	101	35
4	41	22	30	32	46	20	119	155	515	223	98	34
5	43	22	29	32	43	21	102	146	439	207	96	34
6	47	21	28	28	40	22	90	136	417	197	92	35
7	51	21	26	26	35	23	79	124	397	182	87	37
8	57	23	26	25	35	24	71	116	420	180	84	40
9	64	25	25	23	31	26	71	107	525	171	83	45
10	61	26	23	21	30	28	85	99	506	170	82	44
11	64	27	24	20	28	30	106	94	567	171	78	42
12	64	27	21	21	27	32	139	96	576	177	77	44
13	57	29	22	22	26	34	154	112	540	190	72	44
14	53	30	31	21	26	50	158	154	516	185	67	38
15	52	28	44	21	25	59	154	269	461	173	64	35
16	51	27	50	19	24	64	145	349	421	167	63	35
17	47	24	49	19	26	65	135	295	409	166	64	35
18	42	23	44	18	26	71	127	236	436	167	65	31
19	39	22	35	17	23	71	122	190	494	163	68	28
20	38	28	33	17	24	62	122	160	502	154	69	27
21	37	36	33	17	24	56	133	149	456	151	66	27
22	36	42	31	17	24	60	163	150	369	148	62	27
23	34	47	30	19	23	73	216	205	313	144	57	24
24	33	47	26	18	21	73	272	422	278	145	51	25
25	32	41	24	19	21	66	336	723	252	142	50	23
26	31	42	26	28	22	60	353	1120	253	137	48	21
27	31	41	30	43	24	57	299	933	288	126	47	23
28	28	38	30	48	23	52	230	786	311	119	47	25
29	27	36	33	42	---	48	185	879	309	116	46	25
30	25	35	29	39	---	46	152	926	304	113	43	24
31	24	---	30	43	---	105	---	651	---	111	39	---
TOTAL	1334	903	963	795	863	1465	4859	10198	13245	5359	2180	980
MEAN	43.0	30.1	31.1	25.6	30.8	47.3	162	329	442	173	70.3	32.7
MAX	64	47	50	48	58	105	353	1120	701	308	109	45
MIN	24	21	21	17	21	20	71	94	252	111	39	21
AC-FT	2650	1790	1910	1580	1710	2910	9640	20230	26270	10630	4320	1940
CFSM	1.39	0.97	1.01	0.83	1.00	1.53	5.24	10.6	14.3	5.59	2.28	1.06
IN.	1.61	1.09	1.16	0.96	1.04	1.76	5.85	12.28	15.95	6.45	2.62	1.18

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1912 - 2003, BY WATER YEAR (WY)\*

	MEAN	MAX	(WY)	MIN	(WY)
	83.9	243	1948	19.5	1988
	71.2	237	2000	13.0	1988
	36.9	99.8	1981	13.6	1979
	32.7	177	1918	10.1	1979
	26.8	68.4	1995	6.93	1985
	30.3	96.2	1986	9.71	1975
	105	340	1934	16.9	1975
	376	656	1928	205	1955
	489	822	1975	193	1926
	260	519	1916	114	1944
	117	207	1916	57.4	1988
	85.7	236	1968	32.5	2001

SUMMARY STATISTICS

FOR 2002 CALENDAR YEAR

FOR 2003 WATER YEAR

WATER YEARS 1912 - 2003\*\*

ANNUAL TOTAL	57137	43144	
ANNUAL MEAN	157	118	
HIGHEST ANNUAL MEAN			184 1991
LOWEST ANNUAL MEAN			86.4 2001
HIGHEST DAILY MEAN	1200 May 30	1120 May 26	4130 Jun 8 1964
LOWEST DAILY MEAN	15 Jan 3	17 Jan 19	a0.00 Nov 14 1976
ANNUAL SEVEN-DAY MINIMUM	15 Feb 15	18 Jan 18	4.6 Nov 13 1976
MAXIMUM PEAK FLOW		1180 May 27	b6700 Jun 8 1964
MAXIMUM PEAK STAGE		4.90 May 27	c10.00 Jun 8 1964
ANNUAL RUNOFF (AC-FT)	113300	85580	101900
ANNUAL RUNOFF (CFSM)	5.07	3.83	4.55
ANNUAL RUNOFF (INCHES)	68.79	51.94	61.87
10 PERCENT EXCEEDS	494	308	389
50 PERCENT EXCEEDS	52	47	64
90 PERCENT EXCEEDS	22	23	17

\*--Only for complete months of operation (records incomplete most years prior to 1959).

\*\*--For complete water years only.

a--Result of pumping operations, Nov. 14-16, 1976.

b--From rating curve extended above 1,100 ft<sup>3</sup>/s, on basis of flow-over-dam computation.

c--From floodmarks.

## SASKATCHEWAN RIVER BASIN

05015500 LAKE SHERBURNE AT SHERBURNE, MT

(International gaging station)

LOCATION.--Lat 48°49'42", long 113°31'16" (NAD 27), in SE<sup>1</sup>/<sub>4</sub>SE<sup>1</sup>/<sub>4</sub>SE<sup>1</sup>/<sub>4</sub> sec.35, T.36 N., R.15 W., Glacier County, Hydrologic Unit 10010002, Blackfeet Indian Reservation, in gatehouse at dam on Swiftcurrent Creek, 4.5 mi southwest of Babb.

DRAINAGE AREA.--64.1 mi<sup>2</sup>.

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 September 1952 (monthend contents and daily elevations). October 1952 to current year (monthend contents only). 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.

REVISED RECORDS.--W 1983: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 4,709.45 ft (NGVD 29). Prior to May 7, 1931, nonrecording gage at present site, and May 8, 1931, to Sept. 30, 1974, water-stage recorder at present site, all at elevation 9.45 ft lower.

REMARKS.--Reservoir is formed on a 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. The following capacity figures are from capacity table effective Jan. 1, 1983; see previous reports for superseded figures. Usable capacity, 64,790 acre-ft between gage height 29.3 ft, 9.3 ft, above lowest outlet gage sill, and 88.00 ft, spillway crest. Streambed above gates prevents withdrawal of storage to sill elevation. Dead storage, 3,060 acre-ft below gage height, 29.30 ft. Figures given herein represent usable contents. Water is used for irrigation on Milk River project of Bureau of Reclamation. Bureau of Reclamation satellite telemeter at station.

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

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 65,480 acre-ft, June 30, 1986, gage height, 88.40 ft; no usable contents at times.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 56,800 acre-ft, June 30, gage height, 83.11 ft; minimum, 895 acre-ft, Oct. 15, gage height, 30.88 ft.

## MONTHEND ELEVATION AND CONTENTS AT 2400 HOURS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

Date	Elevation (feet)	Contents (acre-feet)	Change in Contents (acre-feet)
Sept. 30	41.07	8,120	--
Oct. 31	34.51	3,220	-4,900
Nov. 30	38.16	5,850	+2,630
Dec. 31	41.38	8,370	+2,520
CALENDAR YEAR 2002			-3,550
Jan. 31	44.14	10,680	+2,310
Feb. 28	46.48	12,740	+2,060
Mar. 31	51.66	17,590	+4,850
Apr. 30	50.20	16,180	-1,410
May 31	63.45	30,210	+14,030
June 30	83.05	56,720	+26,510
July 31	69.52	37,460	-19,260
Aug. 31	43.83	10,410	-27,050
Sept. 30	36.72	4,780	-5,630
WATER YEAR 2003			-3,340

SASKATCHEWAN RIVER BASIN

05016000 SWIFTCURRENT CREEK AT SHERBURNE, MT

LOCATION.--Lat 48°49'49", long 113°30'59" (NAD 27), in NW<sup>1</sup>/<sub>4</sub>SW<sup>1</sup>/<sub>4</sub>SW<sup>1</sup>/<sub>4</sub> sec.36, T.36 N., R.15 W., Glacier County, Hydrologic Unit 10010002, Blackfoot Indian Reservation, on left bank 1,200 ft downstream from outlet of Lake Sherburne Dam at Sherburne and 4.2 mi southwest of Babb.  
 DRAINAGE AREA.--64.6 mi<sup>2</sup>.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--July 1912 to November 1915 (no winter records), March 1916 to October 1923, May 1924 to September 1981 (no winter records), March 1984 to current year (seasonal records only). Monthly discharge only for some periods, published in WSP 1308, 1728. Published as "at Sherburne Lake" 1912-14.

REVISED RECORDS.--WSP 1388: Drainage area. WSP 1508: 1935.

GAGE.--Water-stage recorder. Elevation of gage is 4,730.26 ft (NGVD 29). Prior to Aug. 10, 1920, nonrecording gages at two sites within 1,000 ft of present site at different elevations. Aug. 10, 1920, to May 17, 1921, nonrecording gage at present site and May 18, 1921, to Sept. 30, 1975, water-stage recorder at present site, all at elevation 9.45 ft lower.

REMARKS.--Water-discharge records good except those for estimated daily discharges, which are poor. Flow regulated by Lake Sherburne (see preceding page). U.S. Geological Survey satellite telemeter at station.

AVERAGE DISCHARGE.--7 years (1916-23), 199 ft<sup>3</sup>/s, 144,200 acre-ft/yr, unadjusted.

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 2003  
 DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			e2.0	e3.0	184	44	407	594	367	e0.30		
2			e2.0	15	166	44	405	589	360	e0.30		
3			e2.0	15	167	45	406	584	352	e0.30		
4			e2.0	43	167	45	405	580	344	e0.30		
5			e1.7	66	191	46	405	601	321	e0.30		
6			e1.7	104	223	46	406	610	303	e0.30		
7			e1.3	131	240	46	405	605	296	e0.30		
8			e1.3	178	253	46	460	599	291	e0.30		
9			e1.3	213	252	47	494	592	284	e0.25		
10			e1.5	212	251	47	549	585	278	e0.25		
11			e1.5	270	249	48	634	625	258	e0.25		
12			e1.7	305	207	48	669	640	206	e0.25		
13			e5.0	303	181	48	665	631	154	e0.25		
14			e4.0	359	181	48	662	625	153	e0.25		
15			e3.5	416	182	48	603	616	123	e0.25		
16			e3.0	429	226	49	563	605	104	e0.25		
17			e3.0	425	253	49	570	594	101	e0.25		
18			e3.0	422	255	49	519	584	e0.50	e0.25		
19			e3.0	419	294	49	517	576	e0.50	e0.25		
20			e3.5	417	319	50	512	549	e0.50	e0.25		
21			e3.5	414	316	50	535	527	e0.50	e0.20		
22			e3.0	411	335	50	574	518	e0.50	e0.20		
23			e3.0	410	384	50	611	509	e0.40	e0.20		
24			e3.0	409	379	75	627	500	e0.40	e0.20		
25			e3.0	409	323	186	625	413	e0.40	e0.20		
26			e3.0	411	295	217	621	344	e0.40	e0.20		
27			e3.0	377	199	304	617	380	e0.40	e0.20		
28			e3.0	302	80	357	613	396	e0.40	703		
29			e3.0	240	41	357	608	390	e0.40	801		
30			e3.0	215	42	386	603	383	e0.40	590		
31			e3.0	---	43	---	599	376	---	330		
TOTAL			81.5	8343.0	6878	2974	16889	16720	4300.70	2430.80		
MEAN			2.63	278	222	99.1	545	539	143	78.4		
MAX			5.0	429	384	386	669	640	367	801		
MIN			1.3	3.0	41	44	405	344	0.40	0.20		
AC-FT			162	16550	13640	5900	33500	33160	8530	4820		

STATISTICS OF MONTHLY MEAN DATA FOR SEASONS 1924 - 2003\*

MEAN	78.1	220	355	373	435	526	362	98.2	a169	b86.1
MAX	407	644	1033	973	970	756	792	477	495	172
(WY)	1981	1963	1972	1975	1982	1937	1975	1951	2000	2000
MIN	0.000	0.54	11.0	17.9	134	76.1	0.16	0.011	4.91	.048
(WY)	1954	1967	1987	1963	1956	1988	1992	1975	2002	1966

SUMMARY STATISTICS

FOR 2003 SEASON

SEASONS 1924 - 2003\*

HIGHEST DAILY MEAN	801	Oct 29	2340	Jun 12 1964
LOWEST DAILY MEAN	0.20	Sep 21	0.00	Oct 3 1935
MAXIMUM PEAK FLOW	1630	Jul 17	2510	Jun 7 1995
MAXIMUM PEAK STAGE	7.48	Jul 17	8.63	Jun 7 1995

\*--During periods of seasonal operation (May 1924 to September 1981, March 1984 to current year).  
 a--Based upon 4 years of record (water years 1966, 1998, 2000, and 2002).  
 b--Based upon 2 years of record (water years 1966 and 2000).  
 e--Estimated.



## SASKATCHEWAN RIVER BASIN

05016000 SWIFTCURRENT CREEK AT SHERBURNE, MT--Continued

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--1990-92, 1996 to current year.

REMARKS.--Unpublished records of instantaneous water temperature and specific conductance are available in files of the District office.

## WATER QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

Date	Time	Instantaneous discharge, cfs (00061)	Specific conductance, uS/cm 25 degC (00095)	Temperature, air, deg C (00020)	Temperature, water, deg C (00010)	Suspnd. sediment, sieve diameter percent <.063mm (70331)	Suspended sediment concentration mg/L (80154)	Suspended sediment load, tons/d (80155)
OCT 2002								
03...	1105	437	131	7.5	6.5	86	15	18
APR 2003								
08...	1315	214	138	9.5	1.5	67	77	44
MAY								
22...	1105	316	137	8.0	8.0	93	9	7.7
JUN								
17...	1320	49	96	25.0	13.0	99	4	.53
JUL								
01...	1300	410	138	30.0	13.5	75	7	7.7
29...	1520	607	111	25.0	18.5	59	4	6.6
SEP								
17...	1330	104	88	8.5	8.0	82	4	1.1

SASKATCHEWAN RIVER BASIN

05017500 ST. MARY RIVER NEAR BABB, MT

LOCATION.--Lat 48°50'00", long 113°25'08" (NAD 27), in NW<sup>1</sup>/<sub>4</sub>NW<sup>1</sup>/<sub>4</sub>SE<sup>1</sup>/<sub>4</sub> sec.34, T.36 N., R.14 W., Glacier County, Hydrologic Unit 10010002, Blackfoot Indian Reservation, on right bank 0.7 mi upstream from outlet of Lower St. Mary Lake and 2.0 mi southeast of Babb.

DRAINAGE AREA.--276 mi<sup>2</sup>.

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" in 1901-02, and as "below Swiftcurrent Creek, at Babb" 1910-15. Records published as "near Babb" for April 1902 to September 1915, May 1929 to September 1950 at sites about 1.5 mi downstream not equivalent because flow of Swiftcurrent Creek not included 1902-15 and because diversion by St. Mary Canal not included 1929-50.

REVISED RECORDS.--WSP 1308: 1913-14, 1920, 1922-24. WSP 1508: 1902.

GAGE.--Water-stage recorder. Elevation of gage is 4,468.13 ft (NGVD 29). Prior to Oct. 1, 1915, water-stage recorder or nonrecording gages at several sites about 3.8 mi downstream at different elevations. Oct. 1, 1915, to Sept. 30, 1925, water-stage recorder or nonrecording gages at several sites within 1.5 mi downstream at different elevations.

REMARKS.--Records good. Entire flow of Swiftcurrent Creek below Lake Sherburne is diverted into Lower St. Mary Lake upstream from station. Flow of Swiftcurrent Creek regulated by Lake Sherburne (station number 05015500) since 1919. October 1950 to September 1976, monthly discharge and runoff figures adjusted for change in contents in Lake Sherburne. Bureau of Reclamation satellite telemeter at station. Several observations of water temperature and specific conductance were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	661	97	69	82	87	82	241	1130	2890	1510	1030	531
2	643	93	69	80	91	78	285	1050	2820	1550	1010	520
3	637	90	68	77	95	81	331	974	2710	1540	997	506
4	609	91	68	76	98	81	361	936	2520	1500	986	496
5	591	91	73	75	104	82	395	898	2340	1420	966	486
6	580	91	77	76	109	90	420	890	2170	1370	961	470
7	561	87	78	71	109	103	445	876	2010	1320	949	458
8	502	83	76	66	113	105	455	860	1900	1290	929	452
9	434	80	75	68	111	107	494	852	1900	1280	918	453
10	376	78	75	71	112	108	517	837	1940	1270	907	443
11	342	75	76	73	110	109	543	802	1990	1300	893	434
12	328	75	77	76	108	112	593	764	1990	1350	900	423
13	321	77	81	78	106	128	656	722	1960	1370	900	402
14	307	75	80	79	104	147	702	686	1930	1380	893	381
15	284	76	77	80	103	166	762	697	1900	1370	875	361
16	255	73	77	78	99	172	816	754	1860	1300	862	328
17	228	77	75	79	98	174	847	844	1820	1270	852	305
18	208	80	73	77	98	171	866	953	1790	1220	843	290
19	192	79	70	77	93	168	870	1000	1820	1180	830	252
20	178	80	66	76	95	165	864	1020	1920	1150	808	225
21	166	75	64	75	95	162	858	1020	1960	1120	789	202
22	157	73	64	74	94	163	865	996	1890	1130	768	188
23	147	68	62	74	92	171	884	1030	1740	1140	751	171
24	138	66	62	72	91	173	917	1120	1580	1160	726	159
25	130	64	59	71	87	171	1030	1330	1440	1160	703	151
26	124	64	61	76	85	173	1170	1810	1370	1160	633	145
27	121	64	65	77	84	178	1310	2310	1320	1140	596	130
28	118	67	65	79	82	178	1350	2570	1370	1110	576	122
29	116	71	73	79	---	173	1320	2650	1430	1090	568	116
30	109	69	73	80	---	175	1230	2880	1480	1070	555	111
31	101	---	80	83	---	200	---	2950	---	1050	545	---
TOTAL	9664	2329	2208	2355	2753	4346	22397	38211	57760	39270	25519	9711
MEAN	312	77.6	71.2	76.0	98.3	140	747	1233	1925	1267	823	324
MAX	661	97	81	83	113	200	1350	2950	2890	1550	1030	531
MIN	101	64	59	66	82	78	241	686	1320	1050	545	111
AC-FT	19170	4620	4380	4670	5460	8620	44420	75790	114600	77890	50620	19260

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1951 - 2003, BY WATER YEAR (WY)\*

MEAN	378	256	148	110	104	158	479	1636	2459	1600	1015	713
MAX	1323	1281	722	302	249	457	977	2573	4807	2697	1413	1291
(WY)	1952	2000	1996	1981	1996	1981	1988	1957	1975	1954	1976	1959
MIN	67.4	45.0	33.5	37.2	33.8	38.6	85.0	670	1289	687	320	119
(WY)	2002	1988	1953	2001	2001	2001	1975	1955	1992	1977	1988	1988

SUMMARY STATISTICS	FOR 2002 CALENDAR YEAR	FOR 2003 WATER YEAR	WATER YEARS 1951 - 2003*
ANNUAL TOTAL	338439	216523	
ANNUAL MEAN	927	593	757
HIGHEST ANNUAL MEAN			1073
LOWEST ANNUAL MEAN			442
HIGHEST DAILY MEAN	5670	Jun 30	2950
LOWEST DAILY MEAN	45	Jan 2	59
ANNUAL SEVEN-DAY MINIMUM	47	Jan 1	62
MAXIMUM PEAK FLOW			2960
MAXIMUM PEAK STAGE		4.98	May 31
INSTANTANEOUS LOW FLOW			b12.96
ANNUAL RUNOFF (AC-FT)	671300	429500	548600
10 PERCENT EXCEEDS	2900	1430	1890
50 PERCENT EXCEEDS	377	290	357
90 PERCENT EXCEEDS	71	74	74

\*--During periods of operation 1951 to current.

a--From rating curve extended above 6,000 ft<sup>3</sup>/s on basis of slope-area measurement of peak flow.

b--From highwater mark in well.

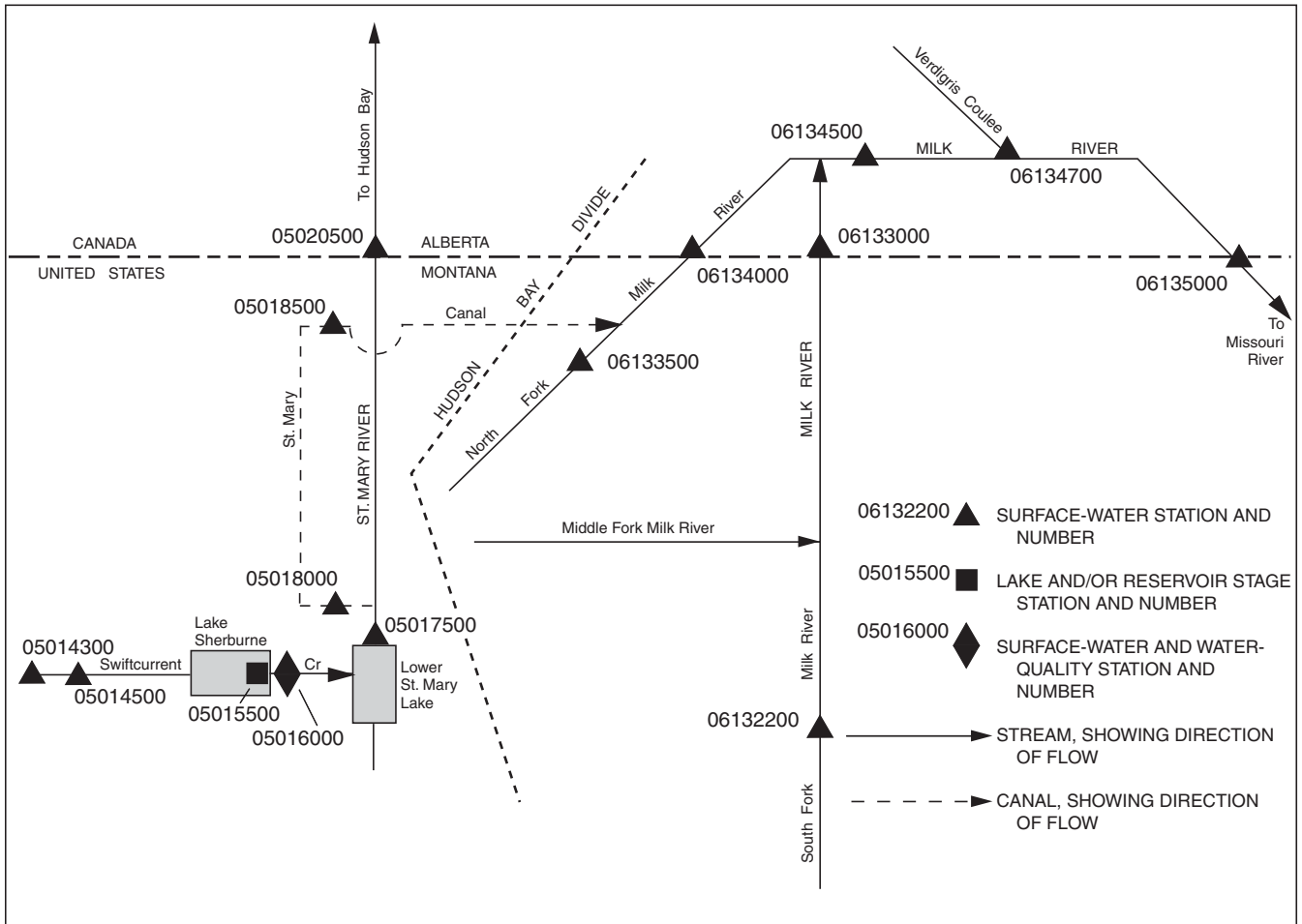


Figure 9. Schematic diagram showing diversion from St. Mary River in Part 5 to Milk River in Part 6.

## SASKATCHEWAN RIVER BASIN

## 05018000 ST. MARY CANAL AT INTAKE, NEAR BABB, MT

LOCATION.--Lat 48°51'10", long 113°24'57" (NAD 27), in SE<sup>1</sup>/<sub>4</sub>NW<sup>1</sup>/<sub>4</sub>NE<sup>1</sup>/<sub>4</sub> sec.27, T.36 N., R.14 W., Glacier County, Hydrologic Unit 10010002, Blackfoot Indian Reservation, on right bank of canal 500 ft upstream from St. Mary intake structure, and 1.0 mi east of Babb.

PERIOD OF RECORD.--July 1918 to November 1951, May 1997 to current season (seasonal records only).

GAGE.--Water-stage recorder. Elevation of gage is 4,470 ft (NGVD 29). Prior to April 17, 1919, staff gage at site 300 ft upstream at different elevation.

REMARKS.--Records good except those for estimated daily discharges, which are poor. 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 downstream from Havre, Montana. Bureau of Reclamation satellite telemeter at station. Several observations of water temperature and specific conductance were made during the year.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 871 ft<sup>3</sup>/s, May 26, 27, 1936; no flow at times most seasons.

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 2003  
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			e1.0	6.2	623	714	708	687	430	11		
2			e1.5	6.2	618	711	711	686	406	11		
3			e1.2	5.7	616	709	711	686	372	10		
4			e1.0	5.6	614	706	710	685	371	9.6		
5			e1.0	5.4	613	700	708	685	342	9.2		
6			e1.0	5.3	570	694	706	685	306	8.9		
7			e1.0	152	493	688	704	684	305	5.7		
8			e1.0	431	354	680	702	683	305	e1.5		
9			e1.0	489	272	648	702	682	305	e1.4		
10			e1.0	495	270	648	701	682	304	e1.2		
11			e1.0	467	267	650	703	677	291	e1.1		
12			e1.2	445	315	679	706	679	219	e1.1		
13			e2.0	456	354	701	705	679	138	e1.0		
14			e5.0	457	386	700	699	679	138	e1.1		
15			e4.0	456	419	699	699	679	138	e1.1		
16			3.1	455	420	696	698	672	138	e1.0		
17			3.3	456	422	697	700	677	137	e1.3		
18			2.5	456	427	711	698	676	74	e1.1		
19			2.5	457	427	714	695	670	17	e1.0		
20			2.5	458	427	727	694	643	16	e1.0		
21			8.0	490	427	728	693	605	16	e1.0		
22			12	511	456	725	693	592	15	e1.0		
23			10	512	571	721	692	584	15	e1.0		
24			9.6	512	599	713	694	583	14	e1.0		
25			7.0	514	607	708	694	550	13	e1.0		
26			6.0	520	623	704	694	467	13	e1.1		
27			7.7	540	657	701	693	440	12	e1.0		
28			7.1	597	700	702	692	438	12	e1.0		
29			6.9	630	710	705	690	436	11	e1.3		
30			7.3	627	712	705	689	434	11	e1.0		
31			7.8	---	717	---	688	431	---	e1.0		
TOTAL			127.2	11617.4	15686	20984	21672	19136	4884	91.7		
MEAN			4.10	387	506	699	699	617	163	2.96		
MAX			12	630	717	728	711	687	430	11		
MIN			1.0	5.3	267	648	688	431	11	1.0		
AC-FT			252	23040	31110	41620	42990	37960	9690	182		

e--Estimated.

## SASKATCHEWAN RIVER BASIN

05018500 ST. MARY CANAL AT ST. MARY CROSSING, NEAR BABB, MT

(International gaging station)

LOCATION.--Lat 48°56'50", long 113°22'28" (NAD 27), in NE<sup>1</sup>/<sub>4</sub>SW<sup>1</sup>/<sub>4</sub>SW<sup>1</sup>/<sub>4</sub> sec.19, T.37 N., R.13 W., Glacier County, Hydrologic Unit 10010002, Blackfeet Indian Reservation, on left bank 50 ft upstream from inlet of St. Mary siphon, 6.6 mi northeast of Babb, and 9 mi 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. Elevation of gage is 4,450 ft (NGVD 29). Prior to June 14, 1951, water-stage recorder at several sites 0.8 mi downstream at different elevations.

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 downstream from Havre, Mt. Bureau of Reclamation satellite telemeter at station. Several observations of water temperature and specific conductance were made during the year.

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

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 767 ft<sup>3</sup>/s, June 19, 28, 1936; no flow at times each season.

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 2003  
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			0.00	0.00	569	643	636	618	403	0.00		
2			0.00	0.00	569	639	636	614	392	0.00		
3			0.00	0.00	565	636	639	614	345	0.00		
4			0.00	0.00	562	632	639	614	343	0.00		
5			0.00	0.00	562	629	636	611	326	0.00		
6			0.00	0.00	537	625	632	611	278	0.00		
7			0.00	60	470	622	632	611	277	0.00		
8			0.00	357	357	618	632	607	277	0.00		
9			0.00	441	247	593	629	607	275	0.00		
10			0.00	445	244	586	629	607	275	0.00		
11			0.00	431	242	586	629	607	271	0.00		
12			0.00	399	268	600	629	604	226	0.00		
13			0.00	413	321	629	629	604	138	0.00		
14			0.00	413	339	629	625	604	135	0.00		
15			0.00	413	385	625	625	604	134	0.00		
16			0.00	413	385	625	625	600	134	0.00		
17			0.00	413	385	622	625	600	133	0.00		
18			0.00	413	392	636	625	604	105	0.00		
19			0.00	413	396	639	622	597	18	0.00		
20			0.00	417	392	646	622	583	3.4	0.00		
21			0.00	434	392	650	618	544	2.0	0.00		
22			0.00	466	406	650	622	537	1.7	0.00		
23			0.00	466	509	646	622	526	1.1	0.00		
24			0.00	470	547	643	618	526	0.92	0.00		
25			0.00	470	554	636	618	512	0.71	0.00		
26			0.00	473	565	632	618	445	0.28	0.00		
27			0.00	484	593	632	618	413	0.14	0.00		
28			0.00	530	629	632	618	410	0.04	0.00		
29			0.00	569	639	632	618	410	0.00	0.00		
30			0.00	572	639	636	614	410	0.00	0.00		
31			0.00	---	643	---	618	406	---	0.00		
TOTAL			0.00	10375.00	14303	18849	19398	17260	4495.29	0.00		
MEAN			0.000	346	461	628	626	557	150	0.000		
MAX			0.00	572	643	650	639	618	403	0.00		
MIN			0.00	0.00	242	586	614	406	0.00	0.00		
AC--FT			0.00	20580	28370	37390	38480	34240	8920	0.00		



## SASKATCHEWAN RIVER BASIN

## 05020500 ST. MARY RIVER AT INTERNATIONAL BOUNDARY--Continued

SUMMARY STATISTICS	WATER YEARS 1902 - 1916*		WATER YEARS 1917 - 2003**	
ANNUAL MEAN	1002		673	
HIGHEST ANNUAL MEAN	1353		1285	1927
LOWEST ANNUAL MEAN	646		316	1941
HIGHEST DAILY MEAN	28000	Jun 5 1908	17000	Jun 9 1964
LOWEST DAILY MEAN	70	Feb 5 1914	16	Nov 29 1936
ANNUAL SEVEN-DAY MINIMUM	75	Feb 1 1914	27	Nov 26 1936
MAXIMUM PEAK FLOW	c40000	Jun 5 1908	23300	Jun 21 1975
MAXIMUM PEAK STAGE	f12.75	Jun 5 1908	d13.46	Jun 21 1975
ANNUAL RUNOFF (AC-FT)	726000		491600	
10 PERCENT EXCEEDS	2470		1700	
50 PERCENT EXCEEDS	538		338	
90 PERCENT EXCEEDS	150		106	

\*--Before St. Mary Canal diversions.

\*\*--Post operation of St. Mary Canal.

a--Gage height, 6.35 ft.

b--Backwater from ice jam.

c--Gage height, 12.75 ft, from rating curve extended above 6,000 ft<sup>3</sup>/s.

d--From floodmarks

e--Estimated.

f--From floodmarks at site and datum then in use.

RED ROCK RIVER BASIN

06006000 RED ROCK CREEK ABOVE LAKES, NEAR LAKEVIEW, MT

LOCATION.--Lat 44°36'56", long 111°37'42" (NAD 27), in NE<sup>1</sup>/<sub>4</sub>SE<sup>1</sup>/<sub>4</sub>NW<sup>1</sup>/<sub>4</sub> sec. 17, T.14 S., R.1 E., Beaverhead County, Hydrologic Unit 10020001, on right bank 0.2 mi downstream from Red Rock Lakes National Wildlife Refuge boundary, 9.1 mi east of Lakeview, and at river mile 2,602.2.

DRAINAGE AREA.--39.2 mi<sup>2</sup>.

PERIOD OF RECORD.--July 1997 to current year (seasonal records only).

GAGE.--Water-stage recorder. Elevation of gage is 6,670 ft (NGVD 29).

REMARKS.--Seasonal records good. Diversion for use by Wildlife Refuge about 1.5 mi upstream from station. Several observations of water temperature and specific conductance were made during the year. U.S. Geological Survey satellite telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 2003  
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1				20	18	122	34	25	18	17		
2				21	17	112	33	25	18	17		
3				15	21	103	30	24	18	17		
4				13	25	91	30	25	18	17		
5				13	22	83	30	25	18	17		
6				14	22	77	29	24	19	17		
7				14	20	73	29	23	18	17		
8				14	18	71	29	23	19	17		
9				17	18	73	28	23	18	17		
10				22	18	73	27	22	19	19		
11				26	18	70	27	22	18	17		
12				25	20	64	26	21	18	18		
13				22	21	56	26	21	18	18		
14				22	20	55	26	21	18	17		
15				24	20	50	25	21	18	17		
16				18	23	50	25	22	19	17		
17				17	24	47	24	22	19	17		
18				18	26	46	24	22	19	17		
19				17	23	47	24	21	19	17		
20				17	22	46	25	20	19	17		
21				16	22	44	24	20	18	17		
22				16	23	45	24	20	18	17		
23				23	28	44	24	20	18	17		
24				18	42	45	23	19	18	16		
25				20	70	43	24	19	18	16		
26				20	97	42	29	19	18	16		
27				18	108	39	31	19	17	16		
28				19	117	38	28	19	17	16		
29				21	135	36	26	19	17	17		
30				21	129	35	26	19	17	12		
31				---	129	---	25	19	---	e12		
TOTAL				561	1316	1820	835	664	544	516		
MEAN				18.7	42.5	60.7	26.9	21.4	18.1	16.6		
MAX				26	135	122	34	25	19	19		
MIN				13	17	35	23	19	17	12		
AC-FT				1110	2610	3610	1660	1320	1080	1020		

STATISTICS OF MONTHLY MEAN DATA FOR SEASONS 1997 - 2003

MEAN	26.9	57.4	94.4	58.2	36.4	29.6	26.0
MAX	35.6	90.3	192	110	56.7	43.0	37.6
(WY)	2000	1998	1999	1999	1999	1997	1998
MIN	18.7	37.8	30.5	24.7	19.3	17.4	16.3
(WY)	2003	2002	2001	2001	2001	2001	2002

SUMMARY STATISTICS

FOR 2003 SEASON

SEASONS 1997 - 2003

HIGHEST DAILY MEAN	135	May 31	270	Jun 22 1999
LOWEST DAILY MEAN	12	Oct 30	12	Oct 30 2003
MAXIMUM PEAK FLOW	149	May 31	b293	Jun 10 1997
MAXIMUM PEAK STAGE	4.19	May 31	5.34	Jun 22 1999
INSTANTANEOUS LOW FLOW	a9.2	Oct 30	c8.9	Oct 25 2001

a--Gage height, 2.43 ft, result of freezeup.

b--Gage height, 3.93 ft, from crest-stage gage at miscellaneous site downstream.

c--Gage height, 2.48 ft, result of freezeup.

e--Estimated.



## RED ROCK RIVER BASIN

## 06012500 RED ROCK RIVER BELOW LIMA RESERVOIR, NEAR MONIDA, MT

LOCATION.--Lat 44°39'22", long 112°22'14" (NAD 27), in NE<sup>1</sup>/<sub>4</sub>SE<sup>1</sup>/<sub>4</sub>SE<sup>1</sup>/<sub>4</sub> sec. 31, T.13 S., R.6 W., Beaverhead County, Hydrologic Unit 10020001, on right bank just downstream from Lima Reservoir, 7 mi northwest of Monida, and at river mile 2,542.1.

DRAINAGE AREA.--570 mi<sup>2</sup>.

PERIOD OF RECORD.--January 1911 to December 1918, April 1919, May 1925 to October 1933, April 1934 to September 1935, May 1936 to October 1938, May 1939 to September 1969, seasonal records only June 1974 to September 1982 and April 1985 to current year. Monthly discharge only for some periods, published in WSP 1309. Prior to October 1950, published as "below Red Rock Reservoir".

REVISED RECORDS.--WSP 1309: 1935. WSP 1389: 1912, 1934. WSP 1559: Drainage area.

GAGE.--Water-stage recorder and sharp-crested weir. Elevation of gage is 6,530 ft (NGVD 29), estimated from spillway elevation based on Montana Department of Natural Resources and Conservation elevation. Prior to Oct. 1, 1978, at elevation 1.00 ft higher. See WSP 1709 for history of nonrecording gage changes prior to May 8, 1939.

REMARKS.--Seasonal records good. Flow regulated by Lima Reservoir (station number 06012000). No storage during 1934. Diversions for irrigation of about 10,000 acres upstream from reservoir. Bureau of Reclamation satellite telemeter at station. Several observations of water temperature and specific conductance were made during the year.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of May 1984 reached a discharge of 1,500 ft<sup>3</sup>/s, gage height, 5.15 ft, from floodmarks.

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 2003  
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1				0.00	27	614	123	22	5.0	3.6		
2				0.00	28	612	77	21	4.9	3.6		
3				0.00	28	610	24	21	4.1	4.2		
4				0.00	28	609	25	21	3.0	4.5		
5				0.00	28	608	27	21	2.5	4.6		
6				0.00	27	607	28	20	2.1	4.8		
7				0.00	27	601	28	19	1.6	4.9		
8				0.00	27	596	30	18	1.9	4.9		
9				0.00	27	594	30	19	2.6	4.9		
10				0.00	27	590	30	19	3.1	5.0		
11				0.00	27	586	30	11	3.5	5.1		
12				0.00	27	583	30	7.0	3.4	5.5		
13				0.00	27	576	29	6.5	3.6	5.5		
14				0.00	27	571	29	7.1	3.5	5.6		
15				0.00	27	567	29	7.8	3.1	5.2		
16				0.00	27	551	29	7.8	3.4	6.3		
17				0.00	27	541	29	7.8	1.9	6.3		
18				0.00	27	540	29	7.9	1.6	5.9		
19				0.00	27	532	28	7.8	2.0	5.6		
20				0.00	59	522	28	7.8	2.1	5.6		
21				0.00	130	514	28	7.9	2.3	5.6		
22				0.00	130	504	26	7.9	2.5	5.7		
23				0.00	192	493	24	7.4	2.5	5.8		
24				0.00	250	484	23	7.1	2.7	5.8		
25				e15	332	473	23	7.5	2.8	5.9		
26				27	372	460	23	7.3	3.0	5.9		
27				27	373	444	22	7.1	3.6	6.0		
28				27	371	426	22	6.6	3.6	6.6		
29				27	455	294	23	6.3	3.6	6.4		
30				27	503	127	23	6.3	3.7	6.3		
31					583	---	22	5.7	---	6.4		
TOTAL				150.00	4267	15829	971	356.6	89.2	168.0		
MEAN				5.00	138	528	31.3	11.5	2.97	5.42		
MAX				27	583	614	123	22	5.0	6.6		
MIN				0.00	27	127	22	5.7	1.6	3.6		
AC-FT				298	8460	31400	1930	707	177	333		

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1911 - 1969 AND SEASONS 1974 - 2003\*

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
MEAN	21.5	19.9	18.8	91.7	337	460	288	192	133	79.7	54.0	28.0
MAX	57.9	55.3	48.0	571	948	754	652	513	384	430	353	97.6
(WY)	1928	1928	1918	1913	1917	1917	1982	1982	1995	1917	1913	1926
MIN	0.00	0.00	0.00	0.00	26.2	4.62	0.63	0.00	0.00	0.00	0.00	0.00
(WY)	1932	1932	1932	1980	1934	1934	1934	1934	1937	1932	1932	1932

SUMMARY STATISTICS	FOR 2003 SEASON		WATER YEARS 1911 - 1969*				SEASONS 1974 - 2003*		
ANNUAL MEAN			143						
HIGHEST ANNUAL MEAN			271						
LOWEST ANNUAL MEAN			59.5						
HIGHEST DAILY MEAN	614	Jun 1	a2500				May 15 1933	946	May 28 1975
LOWEST DAILY MEAN	.00	Apr 1	0.00				Oct 1 1931	.00	Oct 9 1978
ANNUAL SEVEN-DAY MINIMUM			0.00						
MAXIMUM PEAK FLOW	641	May 31	a2500				May 15 1933	b946	May 28 1975
MAXIMUM PEAK STAGE	3.57	May 31	6.40				May 15 1933	4.00	Jun 26 1981
ANNUAL RUNOFF (AC-FT)			103300						
10 PERCENT EXCEEDS			449						
50 PERCENT EXCEEDS			56						
90 PERCENT EXCEEDS			8.0						

\*--During periods of operation (January 1911 to December 1918, April 1919, May 1925 to October 1933, April 1934 to September 1935, May 1936 to October 1938, May 1939 to September 1969, June 1974 to September 1982, April 1985 to current year; seasonal records beginning water year 1974).

a--Observed, estimated by dam tender; released to prevent dam failure.

b--Gage height, 3.38 ft, datum then in use.

e--Estimated.

## MISSOURI RIVER BASIN

## 06015300 CLARK CANYON RESERVOIR NEAR GRANT, MT

LOCATION.--Lat 45°00'06", long 112°51'27" (NAD 27), in SE<sup>1</sup>/<sub>4</sub>SW<sup>1</sup>/<sub>4</sub> sec 32, T.9 S., R.10 W., Beaverhead County, Hydrologic Unit 10020001, in shaft house near left end of dam on Beaverhead River, 1.5 mi upstream from Clark Canyon Creek, 10 mi east of Grant, and at river mile 2,483.9.

DRAINAGE AREA.--2,321 mi<sup>2</sup>.

PERIOD OF RECORD.--May 1964 to current year (monthend contents only). Records of daily elevations are in files of Helena district.

GAGE.--Water-stage recorder in shaft house. Elevation of gage is 5,455 ft (NGVD 29) (levels by Bureau of Reclamation).

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). Capacity table effective Oct. 1, 2001. Elevations are referenced to the National Geodetic Vertical Datum of 1929. Usable capacity, 253,400 acre-ft between elevation 5,470.60 ft, invert of outlet works, and 5,560.40 ft, top of flood control. Dead storage, 1,060 acre-ft, below elevation 5,470.60 ft. Normal operating level, 174,400 acre-ft at elevation 5,546.10 ft. Minimum operating level, 1,060 acre-ft at elevation 5,470.60 ft. Figures given herein represent usable contents. Total contents published in previous water-supply papers and annual reports for May 1964 to September 1975. Water is used for irrigation, flood control, and recreation.

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

EXTREMES FOR PERIOD OF RECORD.--Maximum daily contents, 283,000 acre-ft, June 25, 1984, elevation, 5,564.70 ft; minimum since normal operating level was reached, 9,660 acre-ft, Aug. 18, 19, 2003, elevation, 5,490.01 ft

EXTREMES FOR CURRENT YEAR.--Maximum contents, 71,940 acre-ft, May 15, elevation, 5,522.15 ft; minimum, 9,660 acre-ft, Aug. 18, 19, elevation, 5,490.01 ft.

## MONTHEND ELEVATION AND CONTENTS AT 2400 HOURS, SEPTEMBER 2002 TO SEPTEMBER 2003

Date	Elevation (feet)	Contents (acre-feet)	Change in Contents (acre-feet)
Sept. 30	5,595.69	15,840	--
Oct. 31	5,501.38	23,910	+8,070
Nov. 30	5,506.90	33,670	+9,760
Dec. 31	5,510.90	41,990	+8,320
CALENDAR YEAR 2002			-17,570
Jan. 31	5,514.14	49,550	+7,560
Feb. 28	5,516.78	56,290	+6,740
Mar. 31	5,520.05	65,510	+9,220
Apr. 30	5,521.63	70,320	+4,810
May 31	5,519.47	63,810	-6,510
June 30	5,509.77	39,540	-24,270
July 31	5,494.64	14,560	-24,980
Aug. 31	5,490.48	10,100	-4,460
Sept. 30	5,494.82	14,780	+4,680
WATER YEAR 2003			-1,060



## MISSOURI RIVER BASIN

## 06016000 BEAVERHEAD RIVER AT BARRETTS, MT--Continued

SUMMARY STATISTICS	WATER YEARS 1908-1986**		WATER YEARS 1908-1964***		WATER YEARS 1965-1986****	
ANNUAL MEAN	441		401		543	
HIGHEST ANNUAL MEAN	1101	1984	738	1913	1101	1984
LOWEST ANNUAL MEAN	168	1934	168	1934	293	1967
HIGHEST DAILY MEAN	3640	Jun 19 1908	3640	Jun 23 1908	2930	Jun 23 1984
LOWEST DAILY MEAN	80	Jan 22 1962	80	Jan 22 1962	110	Jan 29 1975
ANNUAL SEVEN-DAY MINIMUM	81	Sep 11 1934	81	Sep 11 1934	119	Jan 28 1975
MAXIMUM PEAK FLOW	3720	Jun 2 1908	3720	Jun 20 1908	3000	Jun 22 1984
MAXIMUM PEAK STAGE	6.10	Jun 2 1908	6.10	Jun 20 1908	5.04	Jun 22 1984
INSTANTANEOUS LOW FLOW	b69	Jan 30 1939	b69	Jan 30 1939		
ANNUAL RUNOFF (AC-FT)	319200		290500		3933700	
10 PERCENT EXCEEDS	830		676		1000	
50 PERCENT EXCEEDS	344		330		454	
90 PERCENT EXCEEDS	177		179		190	

\*--Seasonal records after 1986 water year.

\*\*--Annual record.

\*\*\*--Prior to Clark Canyon Dam construction.

\*\*\*\*--After Clark Canyon Dam construction.

a--Gage height, 0.41 ft.

b--Gage height, 0.33 ft.

## MISSOURI RIVER BASIN

## 06017000 BEAVERHEAD RIVER AT DILLON, MT

LOCATION.--Lat 45°13'05", long 112°39'18" (NAD 27), in NW<sup>1</sup>/<sub>4</sub>NE<sup>1</sup>/<sub>4</sub>NW<sup>1</sup>/<sub>4</sub> sec.24, T.7 S., R.9 W., Beaverhead County, Hydrologic Unit 10020002, on right bank 0.2 mi downstream from West Side Canal and county road bridge, at Dillon, and at river mile 2,456.1.

DRAINAGE AREA.--2,895 mi<sup>2</sup>.

PERIOD OF RECORD.--August to September 1907 (gage heights only), October 1950 to September 1952, September 1963 to September 1971, April 2002 to current year (seasonal records only).

GAGE.--Water-stage recorder. Elevation of gage is 5,100 ft (NGVD 29). Prior to Sept. 30, 1952, nonrecording gages at same site at different elevation.

REMARKS.--Seasonal records good. Some regulation by Lima Reservoir (station number 06012000) and nearly complete regulation by Clark Canyon Reservoir (station number 06015300) since August 1964. Diversions for irrigation of about 125,500 acres, of which about 23,000 acres lies downstream from station. Bureau of Reclamation satellite telemeter at station. Several observations of water temperature and specific conductance were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 2003  
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1				140	107	235	114	164	85	91		
2				149	126	231	119	164	98	84		
3				144	120	184	114	168	109	89		
4				135	125	195	165	197	100	95		
5				129	126	181	183	182	95	84		
6				126	105	195	182	152	93	77		
7				126	96	221	178	134	94	81		
8				119	91	203	174	139	94	82		
9				84	88	189	154	129	95	91		
10				99	85	219	178	114	94	99		
11				116	82	222	184	127	94	97		
12				118	83	240	217	126	88	96		
13				118	95	248	220	130	88	98		
14				131	90	226	216	120	93	100		
15				131	82	223	212	139	89	104		
16				124	78	227	213	133	89	107		
17				108	89	243	217	126	88	109		
18				85	88	227	222	130	93	111		
19				76	89	221	243	120	87	108		
20				69	105	234	271	110	86	108		
21				68	96	277	288	99	88	106		
22				68	103	240	251	98	82	109		
23				74	128	200	234	94	76	107		
24				74	211	172	237	93	74	114		
25				77	153	130	251	95	75	113		
26				90	180	115	239	93	82	112		
27				83	169	108	208	88	82	114		
28				71	173	88	176	88	83	114		
29				78	200	84	173	86	82	116		
30				79	226	87	170	88	87	125		
31				---	234	---	164	85	---	124		
TOTAL				3089	3823	5865	6167	3811	2663	3165		
MEAN				103	123	196	199	123	88.8	102		
MAX				149	234	277	288	197	109	125		
MIN				68	78	84	114	85	74	77		
AC-FT				6130	7580	11630	12230	7560	5280	6280		

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1951 - 1971 AND SEASONS 2002 - 2003\*

	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967
MEAN	372	385	388	401	295	372	245	232	315	297	457	429					
MAX	462	539	606	1078	742	1157	493	475	796	680	700	613					
(WY) DAILY MEAN	1971	1971	1969	1969	1969	1964	1971	1965	1965	1966	1966	1966					
MIN	221	218	204	102	110	126	67.1	123	88.8	102	230	226					
(WY)	1967	1967	1967	2002	2002	2002	1951	2003	2003	2004	1965	1967					

SUMMARY STATISTICS FOR 2003 SEASON SEASONS 2002 - 2003 WATER YEARS 1951 - 1971\*

ANNUAL MEAN										370		
HIGHEST ANNUAL MEAN										523		1971
LOWEST ANNUAL MEAN										183		1967
HIGHEST DAILY MEAN				288	Jul 21		288	Jul 21 2003		1700		Jun 21 1964
LOWEST DAILY MEAN				68	Apr 21		52	Jun 13 2002		18		Jun 19 1952
ANNUAL SEVEN-DAY MINIMUM										32		Jul 27 1951
MAXIMUM PEAK FLOW				317	Jul 21		317	Jul 21 2003		1740		Jun 21 1964
MAXIMUM PEAK STAGE				4.56	Jul 21		4.56	Jul 21 2003		6.63		Jun 21 1964
INSTANTANEOUS LOW FLOW										a18		Jun 19 1952
ANNUAL RUNOFF (AC-FT)										267800		
10 PERCENT EXCEEDS										615		
50 PERCENT EXCEEDS										357		
90 PERCENT EXCEEDS										134		

\*--During periods of operation (October 1950 to September 1952, September 1963 to September 1971, April 2002 to current year (seasonal records only).

a--Observed.

MISSOURI RIVER BASIN

06018500 BEAVERHEAD RIVER NEAR TWIN BRIDGES, MT

LOCATION.--Lat 45°23'01", long 112°27'07" (NAD 27), in SW<sup>1</sup>/<sub>4</sub>NW<sup>1</sup>/<sub>4</sub>SE<sup>1</sup>/<sub>4</sub> sec.22, T.5 S., R.7 W., Madison County, Hydrologic Unit 10020002, on left bank at downstream side of bridge on State Highway 41, 11.5 mi upstream from Ruby River, 12.7 mi southwest of Twin Bridges, 14.5 mi northeast of Dillon, and at river mile 2,430.4.

DRAINAGE AREA.--3,619 mi<sup>2</sup>.

WATER-DISCHARGE RECORDS

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

REVISED RECORDS.--WSP 1309: 1938(M), 1945(M). WSP 1559: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 4,809.15 ft (NGVD 29). Prior to Feb. 17, 1949, nonrecording gage at bridge 0.5 mi upstream at different elevation. Feb. 17, 1949, to June 28, 1951, nonrecording gage at present site and elevation.

REMARKS.--Water-discharge records good. Flow partly regulated by Lima Reservoir (station number 06012000) and Clark Canyon Reservoir (station number 06015300) since August 1964. Diversions upstream from 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 downstream from station including 600 acres in Ruby River drainage. Bureau of Reclamation satellite telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	164	219	238	204	231	214	227	185	112	87	87	87
2	169	220	238	203	247	202	246	228	129	101	81	80
3	175	227	242	213	243	213	246	226	102	82	93	89
4	171	237	244	211	228	202	226	222	78	90	111	83
5	170	235	244	212	211	208	217	241	76	105	119	81
6	171	227	243	206	211	216	212	215	63	92	115	100
7	183	231	228	204	201	221	211	197	78	91	98	93
8	186	237	210	201	222	217	199	183	79	81	94	102
9	185	242	210	184	209	221	184	159	64	62	99	119
10	188	240	220	171	215	230	166	154	63	37	107	123
11	184	238	218	187	212	248	180	146	76	49	91	134
12	180	235	216	206	209	272	179	143	80	68	102	134
13	174	237	220	210	215	300	177	151	94	67	87	125
14	181	239	227	207	215	376	197	136	104	71	84	118
15	189	240	235	209	212	416	217	122	100	71	81	117
16	191	242	236	190	214	345	214	113	114	63	92	114
17	190	242	236	183	216	337	195	109	97	70	92	127
18	194	241	201	194	213	297	186	107	100	67	102	143
19	192	239	186	203	211	275	170	105	90	80	132	160
20	195	241	181	211	212	258	157	111	93	91	123	170
21	195	246	210	209	210	251	144	92	220	120	93	148
22	196	248	208	185	214	247	138	78	257	115	93	136
23	206	253	208	210	163	247	139	65	248	112	83	121
24	213	252	190	208	166	251	145	119	227	105	76	101
25	212	230	131	205	166	239	147	90	193	119	69	102
26	208	222	151	206	198	236	181	94	164	149	70	101
27	207	238	199	219	197	226	171	87	161	153	62	104
28	209	241	220	220	198	219	151	82	143	119	59	113
29	226	251	214	214	---	215	145	84	124	114	60	124
30	203	244	194	219	---	213	167	80	99	104	81	135
31	203	---	212	220	---	221	---	116	---	91	87	---
TOTAL	5910	7134	6610	6324	5859	7833	5534	4240	3628	2826	2823	3484
MEAN	191	238	213	204	209	253	184	137	121	91.2	91.1	116
MAX	226	253	244	220	247	416	246	241	257	153	132	170
MIN	164	219	131	171	163	202	138	65	63	37	59	80
AC-FT	11720	14150	13110	12540	11620	15540	10980	8410	7200	5610	5600	6910

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1935 - 2003, BY WATER YEAR (WY)

MEAN	445	549	484	409	423	473	476	313	385	281	247	382
MAX	1328	1065	852	725	707	799	1251	1117	1615	1586	1581	1691
(WY)	1985	1985	1984	1976	1984	1972	1969	1984	1984	1984	1984	1984
MIN	32.4	238	208	173	199	207	95.5	40.8	24.2	28.0	25.8	28.1
(WY)	1938	2003	2002	1937	2002	2002	1961	1937	1940	1937	1937	1937

SUMMARY STATISTICS

FOR 2002 CALENDAR YEAR

FOR 2003 WATER YEAR

WATER YEARS 1935 - 2003

ANNUAL TOTAL	60546	62205	
ANNUAL MEAN	166	170	405
HIGHEST ANNUAL MEAN			1097
LOWEST ANNUAL MEAN			165
HIGHEST DAILY MEAN	253	Nov 23	416
LOWEST DAILY MEAN	29	Jun 20	37
ANNUAL SEVEN-DAY MINIMUM	54	Jun 16	61
MAXIMUM PEAK FLOW			465
MAXIMUM PEAK STAGE			4.95
INSTANTANEOUS LOW FLOW			a35
ANNUAL RUNOFF (AC-FT)	120100	123400	293600
10 PERCENT EXCEEDS	235	241	720
50 PERCENT EXCEEDS	180	186	386
90 PERCENT EXCEEDS	83	82	98

MISSOURI RIVER BASIN

06018500 BEAVERHEAD RIVER NEAR TWIN BRIDGES, MT--Continued

SUMMARY STATISTICS	FOR WATER YEARS 1935-1964*		WATER YEARS 1965-2003**	
ANNUAL MEAN	391		416	
HIGHEST ANNUAL MEAN	642	1948	1097	1984
LOWEST ANNUAL MEAN	170	1937	165	2002
HIGHEST DAILY MEAN	b3130	Jun 12 1944	2180	Jun 25 1984
LOWEST DAILY MEAN	7.0	May 25 1940	28	Jun 24 1990
ANNUAL SEVEN-DAY MINIMUM	8.7	May 13 1974	31	Jun 23 1990
MAXIMUM PEAK FLOW	b3130	Jun 12 1944	2200	Jun 25 1984
MAXIMUM PEAK STAGE	6.76	Jun 12 1944	7.88	Jun 25 1984
INSTANTANEOUS LOW FLOW	c7.0	May 25 1940	d28	Jun 24 1990
ANNUAL RUNOFF (AC-FT)	283100		301500	
10 PERCENT EXCEEDS	648		780	
50 PERCENT EXCEEDS	410		362	
90 PERCENT EXCEEDS	60		124	

\*--Prior to construction of Clark Canyon Dam.  
 \*\*--After construction of Clark Canyon Dam.  
 a--Gage height, 3.11 ft.  
 b--Observed gage height, 6.76 ft, site and datum then in use.  
 c--Observed, site and datum then in use.  
 d--Gage height, 3.01 ft.

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1950-51, 1962-81, 1986, May 1999 to current year.

PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: July 1962 to September 1979, October 1999 to current year.

SUSPENDED-SEDIMENT DISCHARGE: July 1962 to September 1974.

INSTRUMENTATION: Temperature probe installed Aug. 18, 1999.

REMARKS.--Unpublished records of instantaneous water temperature and specific conductance are available in files of the District office.

EXTREMES FOR PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: Maximum, 27.0°C, July 20, 2003; minimum, 0.0°C on many days during winter months.

SEDIMENT CONCENTRATION: Maximum daily mean, 670 mg/L, June 8, 1964; minimum daily mean, 5 mg/L, Sep. 22, 23, 1964, May 17, 18, 1973.

SEDIMENT LOAD: Maximum daily, 1,200 tons, June 8, 1964; minimum daily 1.6 tons, July 28, 1968.

EXTREMES FOR CURRENT YEAR.--

WATER TEMPERATURE: Maximum, 27.0°C, July 20; minimum, 0.0°C on many days October through March.

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

Date	Time	Instantaneous discharge, cfs (00061)	pH, water, unfltrd field, std units (00400)	Specific conductance, wat unfltrd uS/cm 25 degC (00095)	Temperature, air, deg C (00020)	Temperature, water, deg C (00010)	Ammonia + org-N, water, unfltrd mg/L as N (00625)	Nitrite + nitrate, water, fltrd, mg/L as N (00631)	Nitrite, water, fltrd, mg/L as N (00613)
APR 2003									
24...	2015	145	8.2	743	13.0	14.0	.49	.712	.013
MAY									
20...	0930	104	8.4	712	5.0	9.0	.28	.233	.007
JUN									
05...	0915	82	7.8	701	18.0	15.0	.40	.040	E.002
JUL									
29...	1045	114	8.4	746	23.0	20.0	.45	.025	.003

Date	Ortho-phosphate, water, fltrd, mg/L as P (00671)	Phosphorus, water, unfltrd mg/L (00665)	Suspnd. sediment, sieve diametr percent <.063mm (70331)	Suspended sediment concentration, mg/L (80154)	Suspended sediment load, tons/d (80155)
APR 2003					
24...	E.006	.041	77	37	14
MAY					
20...	<.007	.011	88	3	.84
JUN					
05...	<.007	.018	83	24	5.3
JUL					
29...	<.007	.021	53	24	7.4

E--Estimated.

## MISSOURI RIVER BASIN

06018500 BEAVERHEAD RIVER NEAR TWIN BRIDGES, MT--Continued

## WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003--Continued

Date	Time	Hardness, water, unfltrd mg/L as CaCO3 (00900)	Calcium water, fltrd, mg/L (00915)	Magnesium, water, fltrd, mg/L (00925)	Potassium, water, fltrd, mg/L (00935)	Sodium adsorption ratio (00931)	Sodium, water, fltrd, mg/L (00930)	Alkalinity, water flt fxd end lab, mg/L as CaCO3 (29801)	Chloride, water, fltrd, mg/L (00940)	Fluoride, water, fltrd, mg/L (00950)	Silica, water, fltrd, mg/L (00955)
MAY 2003											
20...	0930	320	75.7	32.0	6.76	.8	32.5	218	25.7	.5	18.5
JUL 29...	1045	370	76.4	43.5	7.56	.7	32.2	222	23.2	.6	28.8

Date	Sulfate water, fltrd, mg/L (00945)	Residue sum of constituents mg/L (70301)	Residue water, fltrd, tons/ acre-ft (70303)	Residue water, fltrd, tons/d (70302)	Arsenic water, unfltrd ug/L (01002)	Cadmium water, unfltrd ug/L (01027)	Chromium, water, unfltrd recover ug/L (01034)	Copper, water, unfltrd recover ug/L (01042)	Lead, water, unfltrd recover ug/L (01051)	Nickel, water, unfltrd recover ug/L (01067)	Zinc, water, unfltrd recover ug/L (01092)
MAY 2003											
20...	131	454	.62	128	5	<.2	<.8	2.4	.07	.99	E1
JUL 29...	140	486	.66	150	6	E.02	<.8	2.4	.12	1.92	E2

E--Estimated.

## WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	9.5	6.0	7.5	0.5	0.0	0.0	3.0	0.5	1.5	1.0	0.5	0.5
2	9.5	4.0	7.0	0.5	0.0	0.0	4.5	2.0	3.0	1.0	0.5	0.5
3	9.0	6.5	7.5	0.5	0.0	0.5	3.5	3.0	3.5	1.0	0.5	0.5
4	11.0	7.5	9.5	1.0	0.5	0.5	3.5	2.5	3.0	1.0	0.5	0.5
5	10.5	8.5	9.0	1.0	0.5	0.5	3.0	1.0	2.0	3.0	1.0	2.0
6	13.0	8.5	10.5	3.5	0.5	2.0	3.0	1.0	2.0	2.0	0.5	1.0
7	11.5	8.0	10.0	4.0	2.0	3.0	1.5	0.5	1.0	1.5	0.0	0.5
8	11.5	7.0	9.0	5.0	2.5	3.5	0.5	0.5	0.5	1.0	0.0	0.5
9	12.0	7.5	10.0	4.0	3.0	3.5	0.5	0.5	0.5	0.5	0.0	0.5
10	11.0	7.5	9.5	4.5	2.5	3.5	0.5	0.5	0.5	0.5	0.0	0.5
11	9.5	7.0	8.0	4.5	2.0	3.0	1.5	0.5	1.0	0.5	0.0	0.5
12	9.0	4.5	6.5	3.5	2.0	3.0	2.0	0.5	1.5	0.5	0.5	0.5
13	9.0	4.0	6.5	5.5	3.0	4.0	2.5	1.0	1.5	1.0	0.5	0.5
14	9.5	5.0	7.5	4.0	2.5	3.5	4.0	2.5	3.0	2.0	0.5	1.0
15	9.5	5.0	7.0	3.5	1.5	2.5	4.0	2.0	3.5	2.5	0.5	1.5
16	9.5	5.5	7.5	4.0	2.0	3.0	2.5	1.5	2.0	0.5	0.0	0.5
17	9.5	5.0	7.5	4.5	2.0	3.0	3.0	1.0	2.0	0.5	0.0	0.5
18	9.5	5.5	7.5	3.0	1.5	2.5	1.0	0.5	0.5	0.5	0.0	0.5
19	9.0	4.5	7.0	4.0	1.5	2.5	0.5	0.5	0.5	0.5	0.0	0.5
20	10.0	6.0	8.0	6.5	3.5	5.0	0.5	0.5	0.5	1.0	0.5	0.5
21	10.5	6.5	8.5	6.5	3.5	5.0	0.5	0.5	0.5	1.5	0.0	1.0
22	9.0	3.5	6.0	6.5	4.5	5.5	0.5	0.5	0.5	0.5	0.0	0.5
23	5.0	2.0	3.5	5.5	1.5	3.5	1.0	0.5	0.5	1.0	0.5	0.5
24	6.5	2.0	4.5	1.5	0.0	1.0	0.5	0.5	0.5	1.0	0.5	0.5
25	6.5	2.0	4.5	0.5	0.0	0.0	0.5	0.0	0.5	3.0	0.5	2.0
26	6.0	2.0	4.0	0.5	0.0	0.0	0.5	0.0	0.5	4.5	2.5	3.5
27	5.5	1.5	4.0	1.5	0.0	1.0	1.0	0.5	0.5	4.5	3.5	4.0
28	6.0	4.0	5.0	3.0	0.5	2.0	1.0	0.5	0.5	4.0	2.0	3.0
29	4.5	0.0	2.0	3.5	1.5	2.5	1.0	0.5	0.5	2.5	1.0	2.0
30	0.0	0.0	0.0	3.0	1.0	2.0	1.0	0.5	0.5	4.5	1.5	3.0
31	0.5	0.0	0.0	---	---	---	1.0	0.5	0.5	5.0	3.0	4.0
MONTH	13.0	0.0	6.5	6.5	0.0	2.5	4.5	0.0	1.5	5.0	0.0	1.0



MISSOURI RIVER BASIN

06018500 BEAVERHEAD RIVER NEAR TWIN BRIDGES, MT--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003--Continued

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	FEBRUARY			MARCH			APRIL			MAY		
1	5.0	3.5	4.5	1.5	0.0	0.5	9.5	7.0	8.5	13.0	9.0	11.0
2	3.5	2.5	3.0	1.0	0.0	0.5	8.0	6.0	7.0	13.0	8.0	10.5
3	3.0	1.0	1.5	0.5	0.0	0.5	9.0	4.0	6.0	11.0	8.5	9.5
4	3.0	0.5	1.5	1.5	0.0	0.5	9.5	3.0	6.0	12.5	7.0	9.5
5	1.0	0.0	0.5	1.0	0.0	0.0	9.0	3.5	6.5	12.5	7.5	10.0
6	0.5	0.0	0.5	1.5	0.0	0.5	10.0	4.5	7.0	13.0	8.0	10.5
7	0.5	0.0	0.5	1.5	0.0	0.5	10.5	4.0	7.0	15.5	8.0	11.5
8	1.5	0.0	0.5	1.5	0.0	0.5	13.0	5.0	9.0	14.5	9.5	11.5
9	1.5	0.0	0.5	5.5	1.0	3.0	13.0	7.0	10.0	11.5	7.0	9.0
10	3.0	0.5	1.5	7.0	3.5	5.5	14.5	8.0	11.0	14.5	6.5	10.0
11	3.5	0.0	2.0	8.0	4.0	6.0	14.0	8.0	11.0	14.5	8.5	11.5
12	3.5	0.0	1.5	7.5	4.5	6.0	14.5	8.5	11.5	13.5	9.0	11.5
13	2.0	0.5	1.0	9.5	4.5	7.0	12.5	9.0	11.0	17.0	9.0	13.0
14	4.0	1.5	2.5	8.5	6.0	7.5	11.5	8.5	10.0	18.5	10.5	14.5
15	6.0	2.5	4.0	6.5	4.0	5.5	10.0	8.0	9.0	18.5	13.0	15.5
16	4.0	1.5	3.0	8.0	5.5	6.5	12.0	5.0	8.5	16.0	11.0	14.0
17	4.5	1.0	2.5	6.5	4.0	5.0	10.0	6.5	8.5	16.5	9.0	12.5
18	4.0	1.0	2.5	6.0	3.0	4.5	10.5	7.0	8.5	13.0	8.5	10.0
19	3.5	0.0	2.0	8.5	2.5	5.5	14.5	6.5	10.0	14.5	6.0	10.0
20	3.0	0.5	2.0	9.5	3.5	6.5	15.5	8.0	11.5	15.5	8.5	12.0
21	4.0	1.0	2.5	8.5	5.0	6.5	14.5	8.5	12.0	16.0	11.5	13.5
22	5.0	1.5	3.5	9.0	5.0	7.0	15.5	10.0	13.0	18.5	10.5	14.5
23	1.5	0.0	0.0	10.0	6.0	8.0	13.5	10.5	11.5	21.5	13.5	17.0
24	0.5	0.0	0.0	8.0	3.5	6.0	14.5	9.5	12.0	22.5	14.5	18.5
25	0.5	0.0	0.0	6.0	3.5	5.0	13.0	8.5	10.5	20.0	15.5	18.0
26	0.5	0.0	0.0	5.5	4.0	4.5	8.5	6.5	7.5	21.0	14.5	18.0
27	1.0	0.0	0.5	5.5	2.5	4.0	13.0	4.0	8.0	22.5	14.5	18.5
28	1.5	0.0	0.5	9.0	2.0	5.5	11.5	7.5	9.0	24.0	16.0	20.0
29	---	---	---	10.5	4.0	7.5	8.0	6.0	7.0	23.5	17.5	21.0
30	---	---	---	10.0	6.0	8.0	15.5	6.0	10.0	21.5	17.0	19.0
31	---	---	---	10.0	7.0	9.0	---	---	---	21.5	14.5	18.0
MONTH	6.0	0.0	1.5	10.5	0.0	4.5	15.5	3.0	9.5	24.0	6.0	13.5
	JUNE			JULY			AUGUST			SEPTEMBER		
1	20.5	15.0	17.5	24.5	18.0	21.5	25.0	17.5	21.5	21.0	14.5	18.0
2	19.5	14.0	17.0	23.5	17.5	20.5	24.5	18.5	22.0	20.5	14.5	17.5
3	20.0	12.5	16.0	23.5	16.0	20.0	23.0	20.0	21.0	20.5	14.0	17.5
4	19.5	14.0	17.0	23.0	16.5	20.0	24.0	17.5	20.5	19.5	14.0	17.0
5	20.0	12.5	16.5	23.5	16.5	20.0	23.0	17.5	20.0	18.5	15.5	17.5
6	17.0	12.0	14.5	24.0	16.0	20.0	22.5	16.5	19.5	17.5	15.5	16.5
7	19.0	9.5	14.0	24.5	16.5	20.5	23.5	16.5	20.0	20.0	13.5	17.0
8	20.5	13.0	17.0	23.0	17.5	20.5	21.0	16.5	19.0	18.5	13.5	16.0
9	22.0	15.0	18.0	23.5	16.0	20.0	23.0	16.0	19.5	15.5	10.5	13.5
10	22.0	14.0	18.0	25.5	17.0	21.0	24.0	17.0	20.5	14.5	12.0	13.5
11	22.0	14.5	18.5	26.0	18.0	22.0	22.0	17.5	20.0	15.0	11.0	13.0
12	22.5	14.5	19.0	26.5	19.0	23.0	21.5	17.5	19.5	14.5	11.0	12.5
13	21.0	16.0	18.5	24.5	19.0	22.0	23.5	16.5	19.5	15.5	9.0	12.5
14	21.0	14.5	17.5	25.5	17.0	21.5	23.5	17.5	20.5	15.5	9.5	13.0
15	21.0	14.5	18.0	25.0	18.5	22.0	23.5	18.0	20.5	14.0	10.5	12.5
16	22.0	15.0	18.5	23.5	18.5	21.5	22.5	18.0	20.0	14.0	11.0	12.0
17	23.5	16.0	20.0	25.0	19.5	22.5	19.5	15.0	17.5	12.0	8.5	10.5
18	23.0	17.0	20.5	27.0	19.5	23.0	21.5	14.5	18.0	12.0	7.5	10.0
19	21.5	17.0	19.5	26.0	20.0	23.0	22.5	16.0	19.5	13.0	8.0	10.5
20	19.5	15.5	17.0	27.0	19.5	23.5	23.5	17.5	20.5	15.0	9.0	12.0
21	19.5	13.5	16.0	26.5	19.5	23.0	21.0	16.5	18.5	15.0	9.0	12.5
22	16.5	13.0	14.5	26.0	19.0	23.0	22.0	16.5	19.0	15.5	9.5	12.5
23	17.5	11.0	14.5	25.0	19.0	22.5	22.0	15.5	19.0	15.5	10.0	13.0
24	16.5	12.0	14.0	24.0	19.0	22.0	22.5	16.0	19.0	16.0	10.0	13.0
25	18.0	11.5	14.5	25.0	20.0	22.5	23.0	15.5	19.5	16.5	10.5	14.0
26	21.5	13.0	17.0	24.5	20.0	22.5	22.0	16.5	19.5	17.5	11.5	14.5
27	23.0	15.0	19.0	25.5	18.5	22.0	22.0	17.0	19.0	16.5	11.0	14.0
28	24.5	17.5	21.0	25.5	18.5	22.0	22.0	15.5	18.5	16.0	10.5	13.5
29	24.5	17.5	21.0	25.0	18.5	22.0	19.0	13.5	16.0	14.5	10.5	12.5
30	24.5	17.5	21.0	25.5	18.0	22.0	20.0	12.5	16.5	14.5	8.5	11.5
31	---	---	---	24.5	19.0	22.0	20.5	13.5	17.0	---	---	---
MONTH	24.5	9.5	17.5	27.0	16.0	21.5	25.0	12.5	19.5	21.0	7.5	14.0

## RUBY RIVER BASIN

## 06019500 RUBY RIVER ABOVE RESERVOIR, NEAR ALDER, MT

LOCATION.--Lat 45°11'33", long 112°08'30" (NAD 27), in NW<sup>1</sup>/<sub>4</sub>SE<sup>1</sup>/<sub>4</sub>SW<sup>1</sup>/<sub>4</sub> sec.30, T.7 S., R.4 W., Madison County, Hydrologic Unit 10020003, on right bank at county road bridge, 0.7 mi downstream from Mormon Creek, 4.2 mi upstream from Ruby Dam, 9.3 mi south of Alder, and at river mile 52.1.

DRAINAGE AREA.--534 mi<sup>2</sup>.

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

REVISED RECORDS.--WSP 1309: 1938(M). WSP 1559: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 5,400 ft (NGVD 29). Prior to Oct. 1, 1938, nonrecording gage at bridge 2.0 mi upstram at different elevation. Oct. 1, 1938, to Aug. 5, 1955, water-stage recorder at site 2.2 mi upstream at different elevation. Aug. 6, 1955 to Sept. 30, 1997, water-stage recorder 2.3 mi upstream at different elevation.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Diversion for irrigation of about 3,000 acres upstream from station. U. S. Geological Survey satellite telemeter at station. Several observations of water temperature and specific conductance were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	110	e80	96	e90	99	e85	113	167	901	148	79	94
2	109	e85	98	e92	97	e88	121	175	689	148	78	92
3	107	e88	97	e95	90	e92	115	166	525	146	85	90
4	108	91	98	e95	e85	e90	104	187	445	141	114	91
5	108	92	96	e92	e85	e90	104	199	399	138	110	90
6	106	93	95	e90	e87	e95	109	196	369	142	99	91
7	103	96	89	e90	e90	94	101	181	334	141	93	96
8	102	97	89	e88	93	96	101	175	309	135	91	96
9	100	97	90	e85	95	96	102	179	314	132	95	99
10	98	97	88	e80	94	100	114	177	323	132	95	99
11	97	96	88	e85	94	123	128	173	293	122	95	102
12	98	96	89	89	92	155	140	180	264	127	87	102
13	96	97	91	84	95	187	154	193	249	125	85	100
14	98	96	93	86	99	173	167	203	249	119	85	101
15	98	96	95	89	98	134	178	239	240	115	91	100
16	97	95	93	89	97	133	154	284	231	113	102	100
17	97	96	e85	e85	95	115	141	295	219	111	101	106
18	96	95	e80	e80	96	114	149	302	218	104	96	114
19	95	96	e82	86	95	106	144	264	216	100	93	109
20	94	97	e85	89	95	103	143	232	207	99	93	103
21	95	97	e88	90	98	107	141	220	262	93	92	92
22	97	99	e90	89	98	105	148	225	230	90	93	92
23	95	104	e85	91	97	107	167	281	208	89	90	93
24	92	97	e80	90	e90	101	185	406	193	92	86	95
25	91	88	e75	91	e70	102	196	592	192	98	87	95
26	90	91	e80	92	e80	106	219	803	182	111	89	96
27	89	95	e90	95	e85	100	186	920	176	110	96	96
28	96	99	e95	94	e85	100	182	905	171	103	102	98
29	96	99	e92	90	---	98	166	1010	165	101	102	95
30	84	97	e90	93	---	102	161	1080	159	96	103	88
31	e82	---	e92	94	---	105	---	1110	---	82	98	---
TOTAL	3024	2842	2774	2768	2574	3402	4333	11719	8932	3603	2905	2915
MEAN	97.5	94.7	89.5	89.3	91.9	110	144	378	298	116	93.7	97.2
MAX	110	104	98	95	99	187	219	1110	901	148	114	114
MIN	82	80	75	80	70	85	101	166	159	82	78	88
AC-FT	6000	5640	5500	5490	5110	6750	8590	23240	17720	7150	5760	5780

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1938 - 2003, BY WATER YEAR (WY)

	1938	1939	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
MEAN	122	122	111	103	102	110	165	418	471	194	121	115																																																						
MAX	185	177	170	158	135	181	288	1010	1117	482	235	171																																																						
(WY)	1984	1984	1948	1948	1971	1960	1962	1984	1984	1975	1975	1984																																																						
MIN	83.4	87.8	80.3	69.8	79.2	84.3	94.6	187	136	74.8	59.3	73.3																																																						
(WY)	1940	1940	1940	1943	1942	1945	1945	2002	1987	1961	1940	1988																																																						

SUMMARY STATISTICS FOR 2002 CALENDAR YEAR FOR 2003 WATER YEAR WATER YEARS 1938 - 2003

ANNUAL TOTAL	44605	51791	
ANNUAL MEAN	122	142	180
HIGHEST ANNUAL MEAN			336
LOWEST ANNUAL MEAN			119
HIGHEST DAILY MEAN	784	Jun 2	1110
LOWEST DAILY MEAN	70	Aug 2	70
ANNUAL SEVEN-DAY MINIMUM	74	Aug 15	83
MAXIMUM PEAK FLOW			1260
MAXIMUM PEAK STAGE			5.55
INSTANTANEOUS LOW FLOW			b34
ANNUAL RUNOFF (AC-FT)	88470	102700	130300
10 PERCENT EXCEEDS	201	219	352
50 PERCENT EXCEEDS	96	98	119
90 PERCENT EXCEEDS	84	87	90

a--Site and datum then in use.

b--Gage height, 1.99 ft, site and datum then in use.

e--Estimated.

RUBY RIVER BASIN

06020600 RUBY RIVER BELOW RESERVOIR, NEAR ALDER, MT

LOCATION.--Lat 45°14'32", long 112°06'36" (NAD 27), in SE<sup>1</sup>/<sub>4</sub>SE<sup>1</sup>/<sub>4</sub>NE<sup>1</sup>/<sub>4</sub> sec.8, T.7 S., R.4 W., Madison County, Hydrologic Unit 10020003, on right bank 0.2 mi downstream from Ruby Dam, 5.7 mi south of Alder, and at river mile 47.8.

DRAINAGE AREA.--596 mi<sup>2</sup>.

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

REVISED RECORDS.--1985 (M).

GAGE.--Water-stage recorder. Elevation of gage is 5,286.63 ft (NGVD 29) (levels by U.S. Army Corps of Engineers).

REMARKS.--Records good except those for December to February, which are fair. Flow regulated by Ruby River Reservoir (station number 06020500). Diversions for irrigation of about 3,500 acres upstream from station. U. S. Geological Survey satellite telemeter at station. Several observations of water temperature and specific conductance were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	65	34	29	e23	22	23	28	140	978	266	356	300
2	56	31	29	e23	22	24	28	156	805	287	353	297
3	56	28	26	e23	22	24	28	162	634	321	351	294
4	55	28	23	e23	22	24	28	169	503	333	348	290
5	47	28	23	e23	22	24	28	182	396	333	334	286
6	45	28	23	e23	22	24	29	189	376	333	324	281
7	45	28	23	e23	22	25	29	184	347	332	323	275
8	45	28	24	e23	22	25	29	174	316	366	320	271
9	42	28	24	e23	22	25	29	170	468	364	320	266
10	37	28	24	e23	22	25	29	171	443	362	318	247
11	37	28	24	e23	22	25	29	171	437	361	314	134
12	37	28	23	e23	22	27	29	174	442	359	301	127
13	37	28	23	e23	22	26	29	178	438	358	299	128
14	38	29	23	e23	22	26	29	187	437	358	272	128
15	38	29	23	e23	22	26	30	204	436	358	256	129
16	38	29	e23	e23	23	26	30	237	435	356	262	117
17	38	29	e23	e23	23	26	30	271	434	355	286	107
18	38	29	e23	e23	23	26	30	286	432	354	284	103
19	37	29	e23	e23	23	27	30	287	432	352	281	93
20	37	29	e23	23	23	27	29	261	431	351	304	94
21	37	29	e23	23	23	27	29	239	410	350	325	95
22	34	29	e23	22	23	27	37	230	395	385	326	95
23	34	29	e23	22	23	27	42	484	344	382	323	96
24	34	29	e23	22	23	27	41	508	339	381	321	96
25	34	29	e23	22	23	27	42	528	337	378	319	87
26	34	29	e23	22	23	27	43	634	322	375	316	69
27	34	29	e23	22	23	27	44	788	307	373	313	63
28	34	29	e23	22	23	27	52	778	307	370	309	63
29	34	29	e23	22	---	27	88	831	284	368	307	63
30	34	29	e23	22	---	28	119	952	241	361	304	63
31	34	---	e23	22	---	28	---	1030	---	358	302	---
TOTAL	1245	866	732	703	629	804	1117	10955	12906	10940	9671	4757
MEAN	40.2	28.9	23.6	22.7	22.5	25.9	37.2	353	430	353	312	159
MAX	65	34	29	23	23	28	119	1030	978	385	356	300
MIN	34	28	23	22	22	23	28	140	241	266	256	63
AC-FT	2470	1720	1450	1390	1250	1590	2220	21730	25600	21700	19180	9440

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1963 - 2003, BY WATER YEAR (WY)

MEAN	121	73.1	54.7	50.6	45.6	56.8	90.2	419	590	352	354	249
MAX	244	222	142	139	92.4	174	192	1035	1209	559	473	399
(WY)	1965	1985	1984	1984	1971	1998	1965	1984	1984	1975	1970	1975
MIN	38.0	28.9	23.6	20.9	21.4	19.3	30.5	189	281	197	222	59.4
(WY)	1986	2003	2003	1989	1991	1991	1991	1963	1987	1992	1985	1994

SUMMARY STATISTICS	FOR 2002 CALENDAR YEAR	FOR 2003 WATER YEAR	WATER YEARS 1963 - 2003
ANNUAL TOTAL	46199	55325	
ANNUAL MEAN	127	152	206
HIGHEST ANNUAL MEAN			352
LOWEST ANNUAL MEAN			128
HIGHEST DAILY MEAN	455	May 22	2500
LOWEST DAILY MEAN	23	Dec 4	15
ANNUAL SEVEN-DAY MINIMUM	23	Dec 12	16
MAXIMUM PEAK FLOW		1100	3010
MAXIMUM PEAK STAGE		5.46	a8.52
INSTANTANEOUS LOW FLOW			b1.4
ANNUAL RUNOFF (AC-FT)	91640	109700	149600
10 PERCENT EXCEEDS	323	369	450
50 PERCENT EXCEEDS	34	37	110
90 PERCENT EXCEEDS	28	23	31

a--From floodmark.  
b--Dam closure; result of discharge measurement.  
e--Estimated.

BIG HOLE RIVER BASIN

06024450 BIG HOLE RIVER BELOW BIG LAKE CREEK, AT WISDOM, MT

LOCATION.--Lat 45°37'07", long 113°27'25" (NAD 27), in SW<sup>1</sup>/<sub>4</sub>SW<sup>1</sup>/<sub>4</sub>NE<sup>1</sup>/<sub>4</sub> sec. 33, T.2 S., R.15 W., Beaverhead County, Hydrologic Unit 10020004, on downstream side of State Highway 43 bridge, 0.3 mi west of Wisdom, 0.6 mi downstream from Big Lake Creek, and at river mile 116.0.

DRAINAGE AREA.--575 mi<sup>2</sup>.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--May 1988 to current year (seasonal records only).

REVISED RECORDS.--WDR-MT-95-1: 1991 (M).

GAGE.--Water-stage recorder. Elevation of gage is 6,040 ft (NGVD 29).

REMARKS.--Seasonal water-discharge records good. Diversions for irrigation of about 66,900 acres upstream from station. U.S. Geological Survey satellite telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 2003  
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1				470	439	1680	22	19	11	18		
2				461	453	1470	16	19	10	18		
3				324	446	1190	14	19	9.6	19		
4				235	525	900	14	21	9.4	19		
5				201	454	653	13	22	9.4	19		
6				189	351	501	13	22	9.5	20		
7				154	301	437	20	21	10	20		
8				161	272	397	25	18	11	21		
9				245	252	418	28	16	11	21		
10				437	235	441	28	14	12	21		
11				598	221	443	40	12	13	22		
12				725	262	425	39	11	13	25		
13				850	281	369	37	11	14	26		
14				717	253	333	38	9.9	13	27		
15				676	242	299	30	9.7	13	27		
16				455	253	274	26	9.4	14	28		
17				425	257	230	27	11	14	28		
18				412	252	187	30	12	14	28		
19				345	264	206	32	12	16	27		
20				369	212	348	30	11	17	26		
21				412	183	487	30	10	19	26		
22				440	160	441	28	12	19	26		
23				491	139	417	24	14	18	26		
24				554	157	280	23	16	18	25		
25				606	269	183	26	14	18	24		
26				632	458	121	32	13	18	25		
27				454	613	93	39	13	17	27		
28				387	723	65	33	13	17	28		
29				349	835	47	28	13	17	e25		
30				426	1010	36	24	12	18	e20		
31				---	1450	---	22	11	---	e15		
TOTAL				13200	12222	13371	831	441.0	422.9	727		
MEAN				440	394	446	26.8	14.2	14.1	23.5		
MAX				850	1450	1680	40	22	19	28		
MIN				154	139	36	13	9.4	9.4	15		
AC-FT				26180	24240	26520	1650	875	839	1440		

STATISTICS OF MONTHLY MEAN DATA FOR SEASONS 1988 - 2003

MEAN	404	491	574	216	63.0	37.7	65.5
MAX	614	1476	1797	739	215	95.4	139
(WY)	1996	1997	1997	1995	1997	1997	1998
MIN	259	71.2	68.9	21.4	1.11	2.42	23.5
(WY)	2001	1992	1994	1988	1988	1988	2004

SUMMARY STATISTICS

FOR 2003 SEASON

SEASONS 1988 - 2003

HIGHEST DAILY MEAN	1680	Jun 01	3830	Jun 7 1991
LOWEST DAILY MEAN	9.4	Aug 16	b0.00	Aug 28 1988
MAXIMUM PEAK FLOW	1780	Jun 01	4200	Jun 6 1995
MAXIMUM PEAK STAGE	5.30	Jun 01	6.37	Jun 6 1995
INSTANTANEOUS LOW FLOW	a8.5	Aug 19	b0.00	Aug 28 1988

a--Gage height, 2.03 ft.

b--No flow many days in August and September 1988.

e--Estimated.

## BIG HOLE RIVER BASIN

06024450 BIG HOLE RIVER BELOW BIG LAKE CREEK, AT WISDOM, MT--Continued

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1988 to current year.

PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: May 1988 to current year (seasonal records only).

INSTRUMENTATION.--Temperature recorder since Apr. 27, 1988.

REMARKS.--Daily water temperatures record good except when flows were very low and the higher recorded temperatures were not representative of those of a well-mixed cross section; maximum daily values for Aug. 14-16 and Sept 2-6 were deleted due to the unreliable data . Unpublished records of instantaneous water temperature and specific conductance are available in files of the District office.

EXTREMES FOR PERIOD OF DAILY RECORD.--

WATER TEMPERATURE (seasonal records): Maximum, 26.5°C, July 12, 2002, minimum, 0.0°C many days during winter period.

EXTREMES FOR CURRENT YEAR.--

WATER TEMPERATURE: During period of seasonal operation, maximum, 25.5°C, July 12, 18-21; minimum, 0.0°C, several days in April and October.

## WATER TEMPERATURE, DEGREES CELSIUS, APRIL 2003 TO OCTOBER 2003

DAY	APRIL			MAY			JUNE			JULY		
	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
1	4.0	0.5	2.0	7.5	5.5	6.5	19.0	12.0	15.5	23.0	14.5	19.0
2	2.5	0.5	1.0	9.5	4.0	6.5	17.0	12.5	14.5	23.0	13.5	18.0
3	3.5	0.0	1.5	7.0	5.5	6.0	17.0	10.0	13.5	22.5	13.0	17.5
4	4.5	0.0	2.0	8.0	4.5	6.0	17.5	10.5	14.0	22.5	13.5	18.0
5	5.5	0.0	2.5	9.0	3.5	6.0	17.5	11.0	14.0	22.5	13.0	17.5
6	5.5	0.5	3.0	9.5	4.0	6.5	17.5	12.0	14.5	23.5	13.5	18.0
7	7.5	0.0	3.5	12.0	4.0	8.0	18.0	11.0	14.5	24.5	14.0	19.0
8	10.0	1.5	5.5	11.5	5.0	8.0	18.0	12.0	15.0	21.0	15.0	18.0
9	10.5	3.0	6.5	8.0	4.5	6.0	20.0	12.5	16.0	23.5	13.5	18.5
10	8.5	1.5	5.5	10.0	4.0	6.5	20.0	14.5	17.0	24.5	14.0	19.5
11	7.5	1.5	5.0	9.5	5.0	7.5	18.0	13.0	15.5	25.0	16.0	20.5
12	7.5	1.5	5.0	8.0	5.0	6.5	19.5	12.5	16.0	25.5	16.0	21.0
13	6.0	2.5	4.5	14.0	5.0	8.5	17.5	14.5	16.0	23.0	16.0	20.0
14	6.0	2.0	4.0	15.0	7.0	11.0	18.0	12.5	15.5	24.0	14.5	19.0
15	4.5	2.5	3.5	14.5	8.5	11.5	18.0	13.0	16.0	24.5	15.5	19.5
16	6.0	1.0	3.5	14.0	7.0	10.5	21.0	14.0	17.5	23.5	15.0	19.5
17	8.0	3.0	5.0	13.0	6.5	9.5	22.0	15.0	18.5	24.0	16.0	20.0
18	6.0	3.5	4.5	9.0	5.0	6.5	22.5	15.5	18.5	25.5	15.5	20.5
19	10.0	1.5	5.5	12.5	3.0	7.5	20.0	15.5	17.5	25.5	16.5	20.5
20	11.5	4.0	7.5	13.5	5.5	9.5	17.0	13.5	15.0	25.5	17.0	21.0
21	10.5	5.0	7.5	11.5	8.5	10.0	15.0	11.5	13.5	25.5	16.0	20.5
22	11.0	5.5	8.0	16.0	7.5	11.5	13.0	9.5	11.5	24.5	16.0	20.0
23	8.5	6.5	7.5	19.5	10.0	14.5	15.0	8.5	12.0	23.0	16.0	19.5
24	11.0	5.0	8.0	21.0	11.5	16.0	14.0	10.0	12.0	22.5	16.5	19.5
25	8.5	4.5	6.5	18.5	13.0	15.5	16.5	10.0	13.0	24.0	17.5	20.0
26	6.0	2.5	4.0	16.0	11.5	14.0	19.5	10.5	15.0	22.5	17.0	19.5
27	9.5	1.0	5.0	19.0	11.0	15.0	21.5	12.5	17.0	24.5	15.0	19.5
28	8.0	3.5	5.5	20.5	13.0	16.5	22.0	13.5	17.5	24.0	15.5	19.5
29	6.0	3.5	5.0	21.0	14.5	18.0	23.0	14.0	18.5	24.0	15.0	19.5
30	9.5	2.5	5.5	18.5	15.0	16.5	24.5	14.5	19.0	24.0	14.5	19.0
31	---	---	---	18.0	12.0	15.0	---	---	---	24.5	15.5	19.5
MONTH	11.5	0.0	5.0	21.0	3.0	10.0	24.5	8.5	15.5	25.5	13.0	19.5

## BIG HOLE RIVER BASIN

06024450 BIG HOLE RIVER BELOW BIG LAKE CREEK, AT WISDOM, MT--Continued

WATER TEMPERATURE, DEGREES CELSIUS, APRIL 2003 TO OCTOBER 2003--Continued

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	AUGUST			SEPTEMBER			OCTOBER		
1	24.5	14.5	19.5	20.5	12.0	16.5	15.5	8.0	11.5
2	23.0	15.5	19.0	---	12.0	16.5	14.5	8.0	11.0
3	22.0	17.0	19.5	---	12.0	16.5	14.5	6.5	10.0
4	24.0	16.5	19.5	---	12.0	16.0	14.5	6.5	10.5
5	22.0	15.0	18.0	---	14.0	16.5	14.5	6.5	10.5
6	22.5	14.5	18.0	---	12.5	15.5	14.5	8.5	11.0
7	22.5	14.0	18.0	19.5	12.0	15.5	11.5	8.0	10.0
8	22.0	14.5	18.0	17.0	12.5	14.5	13.0	8.5	10.5
9	23.5	14.0	18.5	16.0	9.5	13.0	12.5	7.5	10.0
10	24.5	14.5	19.5	14.0	11.0	12.5	9.0	5.5	7.0
11	22.5	14.0	18.5	15.0	10.5	12.5	6.5	2.0	4.5
12	21.5	15.0	18.0	13.5	9.5	11.5	8.0	4.5	6.0
13	22.5	14.0	18.5	16.0	8.0	11.5	7.5	4.5	5.5
14	---	14.5	19.0	16.0	7.0	11.5	7.0	3.0	4.5
15	---	16.0	19.5	12.5	9.0	11.0	6.0	3.0	5.0
16	---	16.5	19.0	12.5	9.0	10.5	6.5	2.5	4.5
17	20.0	14.5	17.0	12.0	7.0	9.0	11.5	4.5	7.5
18	22.5	13.0	17.5	12.0	4.5	8.0	11.5	5.0	8.0
19	23.5	14.0	18.5	14.0	6.0	9.5	11.5	5.5	8.5
20	24.0	15.5	19.5	15.5	7.5	11.0	11.5	6.0	8.5
21	20.5	14.0	17.5	14.5	7.0	11.0	13.0	6.5	9.5
22	20.5	16.0	18.0	15.5	7.0	11.0	10.0	5.5	7.5
23	21.0	14.0	17.5	15.0	7.5	11.0	8.5	5.0	6.0
24	22.0	13.0	17.5	16.0	7.5	11.5	6.0	1.5	4.0
25	23.0	13.5	18.0	16.0	8.0	11.5	6.0	0.0	3.0
26	20.5	13.5	17.0	16.5	8.5	12.0	7.5	1.0	4.0
27	20.5	15.0	17.5	16.5	8.0	12.0	7.5	4.0	6.0
28	21.5	13.0	17.0	16.5	8.0	12.0	9.0	6.0	7.0
29	21.0	12.0	16.5	15.5	8.0	11.5	8.0	0.5	5.0
30	21.5	12.0	16.5	15.0	6.5	10.5	0.5	0.0	0.0
31	21.5	12.0	16.5	---	---	---	0.5	0.0	0.0
MONTH	---	12.0	18.0	---	4.5	12.5	15.5	0.0	7.0

BIG HOLE RIVER BASIN

06024540 BIG HOLE RIVER BELOW MUDD CREEK, NEAR WISDOM, MT

LOCATION.--Lat 45°48'27", long 113°18'45" (NAD 27), in SE<sup>1</sup>/<sub>4</sub> SW<sup>1</sup>/<sub>4</sub> NW<sup>1</sup>/<sub>4</sub> sec. 26, T.1N., R. 14 W., Beaverhead County, Hydrologic Unit 10020004, on right bank at bridge on Montana Highway 43, 0.5 mi downstream from Mudd Creek, 15.0 mi northeast of Wisdom, 17.3 mi west of Wise River, and at river mile 91.6.

DRAINAGE AREA.--1,267 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1997 to current year (seasonal records only).

GAGE.--Water-stage recorder. Elevation of gage is 5,880 ft (NGVD 29).

REMARKS.--Seasonal records good except those from July to September, which are fair, and those for estimated daily discharges, which are poor. U.S. Geological Survey satellite telemeter at station. Several observations of water temperature and specific conductances were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 2003  
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1				1470	1170	4810	285	88	54	107		
2				1260	1200	4650	241	84	52	109		
3				886	1180	3980	215	85	51	106		
4				685	1310	3240	200	88	51	105		
5				600	1310	2610	187	87	50	104		
6				541	1080	2150	176	110	51	105		
7				473	934	1820	165	97	53	104		
8				469	857	1630	163	93	59	104		
9				624	809	1570	166	85	60	103		
10				947	778	1620	168	79	65	101		
11				1220	739	1620	164	73	66	101		
12				1500	793	1480	166	69	70	106		
13				1720	891	1310	158	68	71	106		
14				1610	897	1240	156	66	74	108		
15				1480	937	1140	154	64	76	111		
16				1110	1060	1050	149	65	77	117		
17				933	1240	954	139	64	79	117		
18				921	1270	831	127	64	81	115		
19				859	1250	762	124	66	91	113		
20				849	1080	1000	122	64	102	109		
21				908	979	1330	117	61	107	106		
22				1010	963	1280	111	59	101	105		
23				1190	966	1210	102	92	101	105		
24				1400	1160	1020	100	77	99	102		
25				1520	1640	827	105	70	100	99		
26				1660	2360	646	117	65	99	98		
27				1410	2910	527	132	64	97	102		
28				1160	3170	444	133	64	100	107		
29				1050	3450	374	118	61	99	e100		
30				1100	3850	324	104	58	102	e80		
31				---	4410	---	96	55	---	e60		
TOTAL				32565	46643	47449	4660	2285	2338	3215		
MEAN				1086	1505	1582	150	73.7	77.9	104		
MAX				1720	4410	4810	285	110	107	117		
MIN				469	739	324	96	55	50	60		
AC-FT				64590	92520	94120	9240	4530	4640	6380		

STATISTICS OF MONTHLY MEAN DATA FOR SEASONS 1997 - 2003

MEAN	843	1299	1466	352	124	104	159
MAX	1086	2306	2272	961	244	151	258
(WY)	2003	1998	1999	1998	1998	1998	1998
MIN	521	709	506	113	48.5	75.6	104
(WY)	2001	2001	2000	2000	2000	2000	2004

SUMMARY STATISTICS

	FOR 2003 SEASON		SEASONS 1997 - 2003	
HIGHEST DAILY MEAN	4810	Jun 1	4810	Jun 1 2003
LOWEST DAILY MEAN	50		38	Aug 28 2000
MAXIMUM PEAK FLOW	4900	Jun 1	4900	Jun 1 2003
MAXIMUM PEAK STAGE	5.97	Jun 1	5.97	Jun 1 2003
INSTANTANEOUS LOW FLOW	a43	Sep 5	b36	Aug 27 2000

a--Gage height, 2.22 ft.  
b--Gage height, 2.31 ft.  
e--Estimated.

## BIG HOLE RIVER BASIN

## 06025500 BIG HOLE RIVER NEAR MELROSE, MT

LOCATION.--Lat 45°31'36", long 112°42'03" (NAD 27), in SE<sup>1</sup>/<sub>4</sub>SE<sup>1</sup>/<sub>4</sub>SW<sup>1</sup>/<sub>4</sub> sec.34, T.3 S., R.9 W., Madison County, Hydrologic Unit 10020004, on left bank 50 ft downstream from bridge, on frontage road east of Interstate 15, 0.1 mi downstream from Rock Creek, 7 mi south of Melrose, and at river mile 31.1.

DRAINAGE AREA.--2,476 mi<sup>2</sup>.

## WATER-DISCHARGE RECORDS

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

GAGE.--Water-stage recorder. Elevation of gage is 5,032.87 ft (NGVD 29). Prior to June 14, 1927, water-stage recorder, and July 17, 1927, to Sept. 30, 1931, nonrecording gage, at site 1.7 mi upstream at different elevation.

REMARKS.--Water-discharge records good except those for estimated daily discharges, which are poor. Diversions for irrigation of about 136,000 acres upstream from station. Bureau of Reclamation satellite telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	327	e220	394	e310	463	e290	1490	1810	9110	882	250	187
2	332	e260	401	e320	477	e300	1860	1910	8430	803	235	181
3	334	e250	388	e330	475	e310	1460	1820	7040	736	233	180
4	343	e270	393	e310	491	e300	1020	1950	5740	682	256	179
5	340	e290	391	e330	452	e300	838	2050	4740	651	252	178
6	345	e310	378	e310	e400	e310	772	1840	4090	606	249	177
7	346	e330	332	e290	e360	e310	698	1570	3550	579	259	178
8	342	358	265	e270	e360	e310	639	1420	3230	549	261	181
9	335	367	245	e260	e350	312	693	1340	3220	545	243	181
10	335	386	250	e250	e350	315	1060	1260	3400	513	234	184
11	333	393	264	e250	e340	334	1460	1200	3490	470	230	184
12	330	389	302	e260	e340	383	1880	1200	3230	443	225	188
13	326	396	323	e270	e330	443	2270	1350	2930	424	212	191
14	317	400	350	e270	e330	591	2410	1440	2870	408	203	194
15	320	408	356	e260	e320	514	2160	1550	2710	370	189	195
16	327	399	348	e250	e310	693	1850	1770	2560	362	185	197
17	330	403	367	e250	e320	949	1470	1940	2420	359	189	200
18	329	386	306	e260	e320	1090	1400	2040	2320	336	192	212
19	330	401	273	e270	e320	995	1310	1970	2180	325	188	218
20	324	397	e240	e280	e320	892	1280	1820	2300	314	184	223
21	330	435	e240	e270	e320	833	1410	1630	2660	303	184	229
22	327	457	e260	e260	e320	779	1580	1560	2540	300	184	234
23	328	479	e280	e270	e280	813	1920	1660	2320	299	203	237
24	329	438	e270	e280	e220	818	2240	2150	2100	281	232	239
25	319	338	e260	e290	e240	841	2460	2940	1860	294	222	239
26	304	292	e270	e310	e260	800	2480	4040	1580	333	205	236
27	298	358	e300	e330	e280	657	2280	5100	1340	322	205	233
28	325	402	e330	e350	e290	572	1930	5750	1170	320	209	225
29	347	422	e320	e340	---	528	1710	6630	1070	304	207	226
30	217	409	e290	e350	---	574	1670	8020	975	289	197	223
31	194	---	e320	e370	---	709	---	8990	---	272	190	---
TOTAL	9963	11043	9706	9020	9638	17865	47700	81720	97175	13674	6707	6129
MEAN	321	368	313	291	344	576	1590	2636	3239	441	216	204
MAX	347	479	401	370	491	1090	2480	8990	9110	882	261	239
MIN	194	220	240	250	220	290	639	1200	975	272	184	177
AC-FT	19760	21900	19250	17890	19120	35440	94610	162100	192700	27120	13300	12160

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1924 - 2003, BY WATER YEAR (WY)

	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
MEAN	492	491	391	347	361	475	1490	3267	3936	1297	463	371																																																																				
MAX	1109	1037	763	716	800	958	3515	8294	8380	4120	1457	870																																																																				
(WY)	1947	1928	1976	1928	1971	1986	1943	1976	1965	1975	1975	1965																																																																				
MIN	184	255	223	143	143	247	490	1108	814	254	87.6	114																																																																				
(WY)	1936	1938	1933	1937	1937	1937	1975	1977	1992	1931	1988	1988																																																																				

## SUMMARY STATISTICS FOR 2002 CALENDAR YEAR FOR 2003 WATER YEAR WATER YEARS 1924 - 2003

ANNUAL TOTAL	263838	320340	
ANNUAL MEAN	723	878	1116
HIGHEST ANNUAL MEAN			2024
LOWEST ANNUAL MEAN			486
HIGHEST DAILY MEAN	5240	Jun 3	9110
LOWEST DAILY MEAN	194	Oct 31	177
ANNUAL SEVEN-DAY MINIMUM	214	Aug 16	179
MAXIMUM PEAK FLOW			9520
MAXIMUM PEAK STAGE			6.74
INSTANTANEOUS LOW FLOW			a154
ANNUAL RUNOFF (AC-FT)	523300	635400	808400
10 PERCENT EXCEEDS	1910	2170	2990
50 PERCENT EXCEEDS	330	336	474
90 PERCENT EXCEEDS	260	215	255

a--Gage height, 0.97 ft, result of freezeup.

b--Observed, gage height, 0.70 ft, site and datum then in use.

c--When Wise River Reservoir dam failed; maximum discharge unaffected by dam failure, 14,300 ft<sup>3</sup>/s, June 10 1972.

d--From floodmark, site and datum then in use.

e--Estimated.



BIG HOLE RIVER BASIN

06025500 BIG HOLE RIVER NEAR MELROSE, MT--Continued

WATER-QUALITY RECORDS

PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: August 1956 to September 1957, August 1960 to September 1964, June 1977 to current year.

SUSPENDED-SEDIMENT DISCHARGE: August 1956 to September 1957, August 1960 to September 1964.

INSTRUMENTATION.--Temperature recorder since June 1977.

REMARKS--Daily water temperature record good for the season. Unpublished records of instantaneous specific conductance and water temperature are available in files of the District office.

EXTREMES FOR PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: Maximum, 24.0°C, June 25, 1988, July 12, and 19-22, 2003; minimum, 0.0°C on many days during winter most years.

SEDIMENT CONCENTRATION (water years 1956-57, 1960-64): Maximum daily mean, 200 mg/L, June 29, 1961; minimum daily mean, 1 mg/L, on many days in 1960-64.

SEDIMENT LOAD (water years 1956-57, 1960-64): Maximum daily, 4,300 tons, June 9, 1964; minimum daily, less than 0.5 ton on several days in 1961.

EXTREMES FOR CURRENT YEAR.--

WATER TEMPERATURE: Maximum, 24.0°C, July 12, 19-22; minimum, 0.0°C many days October through March.

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	8.0	6.0	7.0	0.0	0.0	0.0	1.0	0.0	0.5	0.0	0.0	0.0
2	8.5	4.5	6.5	0.0	0.0	0.0	1.5	0.0	1.0	0.0	0.0	0.0
3	7.5	6.0	6.5	0.0	0.0	0.0	1.5	1.0	1.0	0.0	0.0	0.0
4	10.0	6.5	8.0	0.0	0.0	0.0	2.0	1.0	1.5	0.0	0.0	0.0
5	9.5	7.0	8.5	0.0	0.0	0.0	2.0	0.0	1.0	0.5	0.0	0.0
6	11.0	7.5	9.0	0.0	0.0	0.0	1.0	0.0	0.5	0.0	0.0	0.0
7	11.0	7.5	9.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	11.0	7.5	9.5	2.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0
9	11.0	7.0	9.0	2.5	0.5	1.5	0.0	0.0	0.0	0.0	0.0	0.0
10	9.5	6.5	8.0	2.5	1.0	1.5	0.0	0.0	0.0	0.0	0.0	0.0
11	8.0	6.0	7.0	2.5	1.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0
12	7.5	3.5	5.5	2.0	0.5	1.5	0.0	0.0	0.0	0.0	0.0	0.0
13	7.5	3.5	5.5	3.0	1.5	2.5	0.0	0.0	0.0	0.0	0.0	0.0
14	8.0	4.0	6.0	2.5	1.0	1.5	1.0	0.0	0.5	0.0	0.0	0.0
15	8.0	4.5	6.0	2.5	0.5	1.5	1.5	0.5	1.0	0.0	0.0	0.0
16	8.0	4.5	6.5	2.0	0.0	1.0	0.5	0.0	0.0	0.0	0.0	0.0
17	8.0	4.0	6.0	2.5	1.0	1.5	1.0	0.0	0.5	0.0	0.0	0.0
18	8.0	4.5	6.0	2.0	1.0	1.5	0.0	0.0	0.0	0.0	0.0	0.0
19	7.5	4.0	5.5	2.5	1.0	1.5	0.0	0.0	0.0	0.0	0.0	0.0
20	7.5	4.5	6.0	5.0	2.0	3.5	0.0	0.0	0.0	0.0	0.0	0.0
21	8.0	5.0	6.5	4.5	2.5	3.5	0.0	0.0	0.0	0.0	0.0	0.0
22	7.0	4.5	5.5	4.0	2.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0
23	4.5	3.0	4.0	3.5	1.0	2.5	0.0	0.0	0.0	0.0	0.0	0.0
24	5.0	2.0	3.5	1.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0
25	4.0	1.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
26	4.0	0.5	2.5	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.5
27	3.5	0.5	2.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.5	1.0
28	4.0	2.5	3.5	0.5	0.0	0.0	0.0	0.0	0.0	1.5	0.0	0.5
29	3.5	0.0	1.0	1.5	0.0	0.5	0.0	0.0	0.0	0.5	0.0	0.0
30	0.0	0.0	0.0	1.0	0.0	0.5	0.0	0.0	0.0	2.0	0.5	1.0
31	0.0	0.0	0.0	---	---	---	0.0	0.0	0.0	3.0	0.5	1.5
MONTH	11.0	0.0	5.5	5.0	0.0	1.0	2.0	0.0	0.0	3.0	0.0	0.0

## BIG HOLE RIVER BASIN

06025500 BIG HOLE RIVER NEAR MELROSE, MT--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003--Continued

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	FEBRUARY			MARCH			APRIL			MAY		
1	2.5	1.0	2.0	0.0	0.0	0.0	6.0	2.5	4.0	8.5	7.0	8.0
2	2.0	0.0	1.0	0.0	0.0	0.0	2.5	1.0	2.0	8.5	6.0	7.5
3	0.5	0.0	0.0	0.0	0.0	0.0	3.5	0.5	2.0	8.0	7.0	7.0
4	0.5	0.0	0.0	0.0	0.0	0.0	4.5	1.0	2.5	8.0	6.5	7.0
5	0.0	0.0	0.0	0.0	0.0	0.0	5.0	1.0	3.0	8.0	6.5	7.0
6	0.0	0.0	0.0	0.5	0.0	0.0	6.0	2.0	4.0	8.0	6.5	7.0
7	0.0	0.0	0.0	0.5	0.0	0.0	7.5	2.5	5.0	10.5	6.0	8.0
8	0.0	0.0	0.0	1.5	0.0	0.5	10.0	3.5	6.5	10.0	7.0	8.5
9	0.0	0.0	0.0	3.5	0.5	2.0	12.0	5.5	8.5	8.5	7.0	7.5
10	1.0	0.0	0.5	5.0	2.5	3.5	10.5	6.5	8.5	9.0	5.5	7.0
11	1.0	0.0	0.5	6.5	3.0	4.5	9.0	6.5	7.5	10.0	6.0	8.0
12	1.0	0.0	0.5	5.5	3.5	4.5	9.5	6.5	8.0	10.0	6.5	8.0
13	0.0	0.0	0.0	8.0	3.0	5.5	8.5	7.0	7.5	12.0	7.0	9.5
14	2.5	0.0	1.0	6.0	3.5	4.5	7.5	5.5	6.5	14.0	9.0	11.0
15	3.0	1.0	2.0	5.5	2.5	4.0	6.0	4.5	5.5	14.5	11.0	12.0
16	2.0	0.5	1.5	4.5	3.0	4.0	6.5	3.5	5.0	13.5	10.0	11.5
17	2.5	0.0	1.0	3.0	0.5	1.5	7.0	4.5	5.5	12.0	9.0	10.0
18	2.5	0.0	1.0	3.5	1.0	2.0	8.5	5.0	6.5	9.5	7.5	8.5
19	2.0	0.0	1.0	4.5	0.5	2.5	9.5	5.0	7.0	9.5	6.0	7.5
20	1.5	0.0	0.5	5.0	1.0	3.0	11.0	6.0	8.0	11.0	6.5	8.5
21	3.0	0.5	1.5	4.0	2.0	3.0	11.0	7.0	9.0	11.0	9.5	10.0
22	3.0	1.0	2.0	5.0	2.0	3.5	11.5	8.5	9.5	13.0	9.0	11.0
23	1.0	0.0	0.0	5.5	3.0	4.0	10.0	7.5	9.0	16.0	11.0	13.5
24	0.0	0.0	0.0	4.0	1.0	2.5	10.0	7.5	8.5	16.0	13.0	14.5
25	0.0	0.0	0.0	3.5	0.5	2.0	8.5	7.0	8.0	14.5	13.0	14.0
26	0.0	0.0	0.0	3.5	1.0	2.0	7.0	5.0	6.0	13.5	11.5	12.5
27	0.0	0.0	0.0	2.0	0.0	1.0	7.5	3.5	5.0	14.0	11.5	12.5
28	0.0	0.0	0.0	5.5	0.0	2.5	7.0	5.0	6.0	15.0	12.0	13.5
29	---	---	---	7.5	1.5	4.5	6.5	5.0	6.0	15.5	13.5	14.5
30	---	---	---	9.0	3.5	6.0	9.0	4.5	6.5	15.0	13.0	14.0
31	---	---	---	8.5	5.0	6.5	---	---	---	13.0	12.0	12.0
MONTH	3.0	0.0	0.5	9.0	0.0	2.5	12.0	0.5	6.0	16.0	5.5	10.0
	JUNE			JULY			AUGUST			SEPTEMBER		
1	12.5	11.5	12.0	21.0	16.0	18.0	23.0	17.0	20.0	19.5	14.0	17.0
2	13.5	12.0	12.5	20.5	15.5	18.0	22.5	17.5	20.5	19.0	14.0	16.5
3	13.0	11.0	12.0	20.0	14.5	17.0	21.5	18.0	19.5	19.0	14.0	16.5
4	14.0	11.5	12.5	20.5	14.5	17.5	22.5	17.0	19.5	18.5	14.0	16.5
5	13.5	11.0	12.5	20.5	14.5	17.5	20.5	16.5	18.5	18.0	14.5	16.0
6	13.0	11.0	12.0	21.0	14.5	17.5	22.0	15.5	18.5	17.0	15.0	16.0
7	13.5	10.0	12.0	21.0	14.5	18.0	21.0	15.5	18.5	18.5	13.5	16.0
8	14.5	11.5	13.0	19.5	15.5	17.5	20.5	15.5	18.0	17.0	13.5	15.0
9	15.0	13.0	14.0	21.0	14.5	17.5	22.0	16.0	18.5	15.0	11.0	13.0
10	15.0	13.0	14.0	22.0	15.0	18.5	22.5	16.0	19.5	14.0	11.5	12.5
11	15.0	12.5	13.5	23.0	16.0	19.5	20.5	16.5	18.5	14.5	11.0	12.5
12	15.0	12.0	13.5	24.0	17.0	20.0	20.5	16.0	18.0	14.0	12.0	13.0
13	15.0	13.0	14.0	22.5	17.0	20.0	21.5	15.5	18.5	14.5	9.5	12.0
14	14.5	12.5	13.5	23.0	16.5	19.5	22.0	16.0	19.0	14.5	9.5	12.5
15	15.5	13.0	14.0	22.5	16.5	19.5	21.5	17.5	19.5	13.5	10.5	12.0
16	16.0	13.5	15.0	22.0	17.0	19.5	21.0	17.5	19.0	13.5	10.5	12.0
17	17.0	13.5	15.0	22.0	17.0	19.5	19.0	15.5	17.0	11.5	9.0	10.0
18	18.0	14.5	16.0	23.5	17.0	20.0	20.0	14.5	17.5	11.0	8.0	9.5
19	16.5	15.0	16.0	24.0	17.5	20.5	21.0	15.5	18.5	12.0	8.0	10.0
20	15.5	13.5	14.5	24.0	18.0	21.0	22.5	17.0	19.5	14.0	8.5	11.0
21	14.0	12.0	13.0	24.0	17.5	20.5	20.0	16.0	17.5	14.0	9.0	11.5
22	12.5	10.5	11.5	24.0	18.0	21.0	20.5	16.0	18.0	14.0	9.0	11.5
23	12.5	9.5	11.0	23.0	18.0	20.5	21.0	15.5	18.0	14.5	9.5	12.0
24	12.5	10.0	11.5	22.0	18.0	20.0	21.0	15.5	18.0	14.5	9.5	12.0
25	13.5	9.5	11.5	22.0	18.0	20.0	21.5	15.5	18.5	14.5	9.5	12.5
26	15.0	12.0	13.5	21.5	18.0	19.5	20.0	15.5	18.0	15.5	10.5	13.0
27	17.0	12.5	15.0	23.0	16.5	19.5	20.0	16.0	18.0	15.0	10.5	13.0
28	19.0	14.5	16.5	22.5	16.5	19.5	19.0	15.0	17.0	14.5	10.5	12.5
29	19.5	15.0	17.0	23.0	17.0	20.0	18.0	13.5	16.0	14.0	10.5	12.5
30	20.0	15.0	17.5	23.0	17.0	20.0	19.0	13.5	16.0	13.0	9.0	11.5
31	---	---	---	23.0	17.5	20.5	19.5	13.5	16.5	---	---	---
MONTH	20.0	9.5	13.5	24.0	14.5	19.5	23.0	13.5	18.5	19.5	8.0	13.0

BIG HOLE RIVER BASIN

06026210 BIG HOLE RIVER NEAR GLEN, MT

LOCATION.--Lat 45°26'26", long 112°33'20" (NAD 27), in NW<sup>1</sup>/<sub>4</sub>SW<sup>1</sup>/<sub>4</sub>SE<sup>1</sup>/<sub>4</sub> sec. 35, T.4 S, R.8 W, Madison County, Hydrologic Unit 10020004, on left bank 50 ft downstream from private suspension bridge, 0.1 mi downstream from Sandy Hollow, 7.0 mi southeast of Glen, and at river mile 17.2.

DRAINAGE AREA.--2,655 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1997 to current year (seasonal records only).

GAGE.--Water-stage recorder. Elevation of gage is 4,850 ft (NGVD 29).

REMARKS.--Seasonal records good. Figures of discharge for seasons 1998-99 are the sum of river flow, Fred Bryan Ditch on left bank, and Upper and Lower Raffety Ditches on right bank. U.S. Geological Survey satellite telemeter at station. Several observations of water temperature and specific conductance were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 2003  
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1				1320	1780	10000	1020	292	230	244		
2				1840	1880	9400	944	271	225	250		
3				1520	1820	7890	879	258	218	246		
4				1100	1900	6360	827	299	221	250		
5				907	2020	5180	787	296	216	270		
6				832	1850	4390	733	293	215	287		
7				760	1590	3770	705	289	223	285		
8				694	1440	3340	672	324	226	278		
9				710	1360	3280	656	303	227	279		
10				997	1290	3460	619	276	225	287		
11				1400	1230	3570	582	271	216	294		
12				1780	1220	3350	542	277	191	299		
13				2140	1330	3010	516	260	202	307		
14				2360	1410	2910	498	243	209	313		
15				2140	1480	2780	462	222	213	323		
16				1860	1670	2620	439	209	217	339		
17				1500	1850	2510	436	218	218	353		
18				1410	1970	2410	417	225	241	359		
19				1320	1940	2280	406	217	249	357		
20				1280	1810	2360	394	200	251	354		
21				1370	1620	2800	363	201	256	350		
23				1810	1600	2460	320	223	270	341		
24				2170	2000	2230	299	252	274	346		
25				2380	2760	2000	323	265	276	341		
26				2440	3980	1730	425	240	273	336		
27				2290	5230	1500	386	239	268	348		
28				1940	6130	1330	368	250	259	353		
29				1720	7020	1230	337	250	249	376		
30				1660	8430	1140	320	243	229	426		
31				---	9680	---	307	236	---	332		
TOTAL				47170	82840	103950	16288	7853	7046	9867		
MEAN				1572	2672	3465	525	253	235	318		
MAX				2440	9680	10000	1020	324	276	426		
MIN				694	1220	1140	299	200	191	244		
AC-FT				93560	164300	206200	32310	15580	13980	19570		

STATISTICS OF MONTHLY MEAN DATA FOR SEASONS 1997 - 2003

MEAN	1276	2284	2967	905	318	283	454
MAX	1572	3829	4432	2138	565	393	708
(WY)	2003	1998	1999	1998	1998	1998	1998
MIN	874	1360	1310	399	149	207	318
(WY)	2001	2002	2000	2000	2000	2001	2004

SUMMARY STATISTICS

FOR 2003 SEASON

SEASONS 1997 - 2003

HIGHEST DAILY MEAN	10000	Jun 1	10000	Jun 1	2003
LOWEST DAILY MEAN	191	Sep 12	122	Aug 29	2000
MAXIMUM PEAK FLOW	10500	May 31	10500	May 31	2003
MAXIMUM PEAK STAGE	7.05	May 31	7.05	May 31	2003
INSTANTANEOUS LOW FLOW	a188	Sep 12	119	Aug 28	2000

a--Gage height, 1.96 ft.



## BOULDER RIVER BASIN

06031450 BOULDER RIVER ABOVE KLEINSMITH GULCH, NEAR BASIN, MT

LOCATION.--Lat 46°16'11", long 112°16'43" (NAD 27), in SW<sup>1</sup>/<sub>4</sub>NE<sup>1</sup>/<sub>4</sub>SW<sup>1</sup>/<sub>4</sub> sec. 18, T.6 N., R.5 W., Jefferson County, Hydrologic Unit 10020006, 0.5 mi upstream from Kleinsmith Gulch and 0.9 mi southwest of Basin.

DRAINAGE AREA.--218 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1996 to current year.

GAGE.--None. Elevation at site is 5,380 ft (NGVD 29).

## WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

Date	Time	Instan- taneous dis- charge, cfs (00061)	pH, water, unfltrd field, std units (00400)	Specif. conduc- tance, wat unf uS/cm 25 degC (00095)	Temper- ature, air, deg C (00020)	Temper- ature, water, deg C (00010)	Hard- ness, water, unfltrd mg/L as CaCO3 (00900)	Calcium water, fltrd, mg/L (00915)	Magnes- ium, water, fltrd, mg/L (00925)	Potas- sium, water, fltrd, mg/L (00935)	Sodium adsorp- tion ratio (00931)
FEB 2003											
20...	1240	15	7.8	144	-2.0	0.0	55	16.2	3.40	1.48	.5
MAY											
12...	0830	243	8.1	103	7.0	4.5	44	13.5	2.61	--	--
JUN											
03...	0840	390	7.8	53	12.0	7.5	21	6.31	1.23	--	--
AUG											
20...	0930	7.4	7.7	162	19.0	15.5	58	17.8	3.23	--	--

Date	Sodium, water, fltrd, mg/L (00930)	Alka- linity, wat flt fxd end lab, mg/L as CaCO3 (29801)	Chlor- ide, water, fltrd, mg/L (00940)	Fluor- ide, water, fltrd, mg/L (00950)	Silica, water, fltrd, mg/L (00955)	Sulfate water, fltrd, mg/L (00945)	Residue water, fltrd, sum of consti- tuents mg/L (70301)	Residue water, fltrd, tons/ acre-ft (70303)	Residue water, fltrd, tons/d (70302)	Arsenic water, fltrd, ug/L (01000)	Arsenic water unfltrd ug/L (01002)
FEB 2003											
20...	8.53	59	3.33	.12	20.4	15.2	104	.14	4.10	1.7	E2
MAY											
12...	--	--	--	--	--	--	--	--	--	3.2	4
JUN											
03...	--	--	--	--	--	--	--	--	--	3.5	5
AUG											
20...	--	--	--	--	--	--	--	--	--	3.8	4

Date	Cadmium water, fltrd, ug/L (01025)	Cadmium water, unfltrd ug/L (01027)	Copper, water, fltrd, ug/L (01040)	Copper, unfltrd recover- able, ug/L (01042)	Lead, water, fltrd, ug/L (01049)	Lead, unfltrd recover- able, ug/L (01051)	Zinc, water, fltrd, ug/L (01090)	Zinc, unfltrd recover- able, ug/L (01092)	Suspnd. sedi- ment, sieve diameter percent <.063mm (70331)	Sus- pended sedi- ment concen- tration mg/L (80154)	Sus- pended sedi- ment load, tons/d (80155)
FEB 2003											
20...	<.04	E.02	2.3	3.4	.11	.19	6	7	76	4	.16
MAY											
12...	<.04	.05	3.5	5.8	.12	1.19	7	12	28	53	35
JUN											
03...	<.04	E.03	3.8	5.7	E.06	1.11	4	8	40	38	40
AUG											
20...	<.04	<.04	2.5	2.6	E.05	.20	2	3	67	3	.06

E--Estimated.

## BOULDER RIVER BASIN

462517112173001 08N06W25AABB01

LOCATION.--Lat 46°25'16.6", long 112°17'29.8" (NAD 83), in NW<sup>1</sup>/<sub>4</sub>NE<sup>1</sup>/<sub>4</sub>NE<sup>1</sup>/<sub>4</sub> sec. 25, T.8 N., R.6 W., Jefferson County, Hydrologic Unit 10030101.  
 HYDROGEOLOGIC UNIT.--Tertiary volcanics.

WELL CHARACTERISTICS.--Drilled in May 1999, casing diameter 4 in., depth 108 ft.

DATUM.--Measuring point, top of PVC casing, 1.20 ft above land surface datum. Elevation of land-surface datum is 7,565.63 ft (NGVD 29).

PERIOD OF RECORD.--October 2001 to current year.

REMARKS.--All water levels are reported as distance, in feet below land-surface datum. Well was pumped extensively on June 30 and Aug. 8 in an attempt to remove sediment and standing water from the well casing.

MEASURED WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM,  
 WATER YEAR OCTOBER 2002 THROUGH SEPTEMBER 2003

DATE	WATER LEVEL
Jun 30	59.60
Jul 2	60.18
Aug 8	65.54
Aug 28	68.20

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

Date	Time	Flow rate, instantaneous gal/min (00059)	Pump or flow period prior to sampling, minutes (72004)	Sampling depth, feet (00003)	Turbidity, water, unfltrd field, NTU (61028)	Dissolved oxygen, mg/L (00300)	pH, water, unfltrd field, std units (00400)	Specif. conductance, wat unfltrd, uS/cm 25 degC (00095)	Temperature, water, deg C (00010)	Hardness, water, unfltrd mg/L as CaCO3 (00900)	Calcium water, fltrd, mg/L (00915)
JUL 2003 02...	1300	1.0	84	95	.6	.3	3.7	148	7.0	1	.30
AUG 28...	1300	2.0	50	102	17	.6	3.6	137	5.5	.7	.17

Date	Magnesium, water, fltrd, mg/L (00925)	Potassium, water, fltrd, mg/L (00935)	Sodium adsorption ratio (00931)	Sodium, water, fltrd, mg/L (00930)	Alkalinity, wat flt inc tit field, mg/L as CaCO3 (39086)	Chloride, water, fltrd, mg/L (00940)	Fluoride, water, fltrd, mg/L (00950)	Silica, water, fltrd, mg/L (00955)	Sulfate, water, fltrd, mg/L (00945)	Aluminum, water, fltrd, mg/L (01106)	Antimony, water, fltrd, mg/L (01095)
JUL 2003 02...	.113	4.79	1	3.32	.0	.60	<.2	51.7	56.5	4580	<.30
AUG 28...	.062	3.84	1	2.58	.0	.34	<.2	17.7	52.4	3940	<.30

Date	Arsenic, water, fltrd, ug/L (01000)	Beryllium, water, fltrd, ug/L (01010)	Cadmium, water, fltrd, ug/L (01025)	Chromium, water, fltrd, ug/L (01030)	Cobalt, water, fltrd, ug/L (01035)	Copper, water, fltrd, ug/L (01040)	Iron, water, fltrd, ug/L (01046)	Lead, water, fltrd, ug/L (01049)	Manganese, water, fltrd, ug/L (01056)	Nickel, water, fltrd, ug/L (01065)	Selenium, water, fltrd, ug/L (01145)
JUL 2003 02...	.3	.66	.57	<.8	.876	.3	266	9.71	9.4	1.34	1.8
AUG 28...	E.2	.59	.50	<.8	.897	.8	210	5.61	10.8	1.40	.9

Date	Silver, water, fltrd, ug/L (01075)	Thallium, water, fltrd, ug/L (01057)	Vanadium, water, fltrd, ug/L (01085)	Zinc, water, fltrd, ug/L (01090)
JUL 2003 02...	<.2	.56	<.1	204
AUG 28...	<.2	.48	<.1	174

E--Estimated.

BOULDER RIVER BASIN

462507112170601 08N05W30BBCD01

LOCATION.--Lat 46°25'06.8", long 112°17'05.6" (NAD 83), in SW<sup>1</sup>/<sub>4</sub>NW<sup>1</sup>/<sub>4</sub>NW<sup>1</sup>/<sub>4</sub> sec. 30, T.8 N., R.5 W., Lewis and Clark County, Hydrologic Unit 10020006.

HYDROGEOLOGIC UNIT.--Boulder batholith quartz monzonite.

WELL CHARACTERISTICS.--Drilled in June 2000, casing diameter 4 in., depth 84.5 ft.

DATUM.--Measuring point, top of PVC casing, 2.60 ft above land surface datum. Elevation of land-surface datum is 7,689.44 ft (NGVD 29).

PERIOD OF RECORD.--June 2000 to current year.

REMARKS.--All water levels are reported as distance, in feet below land-surface datum. Well was pumped extensively on Aug. 8 in an attempt to remove sediment and standing water from the well casing.

MEASURED WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM,  
WATER YEAR OCTOBER 2002 THROUGH SEPTEMBER 2003

DATE	WATER LEVEL
Jul 2	30.61
Aug 8	33.70
Aug 29	35.29

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

Date	Time	Flow rate, instantaneous gal/min (00059)	Pump or flow period prior to sampling, minutes (72004)	Sampling depth, feet (00003)	Turbidity, unfltrd field, NTU (61028)	Dissolved oxygen, mg/L (00300)	pH, unfltrd field, std units (00400)	Specific conductance, unfltrd wat us/cm 25 degC (00095)	Temperature, unfltrd water, deg C (00010)	Hardness, unfltrd water, mg/L as CaCO3 (00900)	Calcium, unfltrd water, mg/L (00915)
JUL 2003 02...	1500	.50	72	80	8.3	.4	6.5	110	11.0	43	10.6
AUG 29...	1000	.30	62	80	8.7	.2	6.3	112	7.5	38	9.40

Date	Magnesium, unfltrd, mg/L (00925)	Potassium, unfltrd, mg/L (00935)	Sodium adsorption ratio (00931)	Sodium, unfltrd, mg/L (00930)	Alkalinity, unfltrd, mg/L as CaCO3 (29801)	Alkalinity, unfltrd, mg/L as CaCO3 (39086)	Bicarbonate, unfltrd, mg/L (00453)	Carbonate, unfltrd, mg/L (00452)	Chloride, unfltrd, mg/L (00940)	Fluoride, unfltrd, mg/L (00950)	Silica, unfltrd, mg/L (00955)
JUL 2003 02...	3.93	1.65	.3	4.26	43	48	59	.0	.39	.3	27.6
AUG 29...	3.58	1.54	.3	4.08	44	45	55	.0	.41	.3	26.0

Date	Sulfate, unfltrd, mg/L (00945)	Residue sum of constituents, mg/L (70301)	Residue water, unfltrd, tons/acre-ft (70303)	Aluminum, unfltrd, ug/L (01106)	Antimony, unfltrd, ug/L (01095)	Arsenic, unfltrd, ug/L (01000)	Beryllium, unfltrd, ug/L (01010)	Cadmium, unfltrd, ug/L (01025)	Chromium, unfltrd, ug/L (01030)	Cobalt, unfltrd, ug/L (01035)	Copper, unfltrd, ug/L (01040)
JUL 2003 02...	8.8	92	.12	E1	<.30	E.1	.16	<.04	<.8	4.78	<.2
AUG 29...	8.7	85	.12	<1	<.30	E.1	.19	<.04	<.8	5.27	<.2

Date	Iron, unfltrd, ug/L (01046)	Lead, unfltrd, ug/L (01049)	Manganese, unfltrd, ug/L (01056)	Nickel, unfltrd, ug/L (01065)	Selenium, unfltrd, ug/L (01145)	Silver, unfltrd, ug/L (01075)	Thallium, unfltrd, ug/L (01057)	Vanadium, unfltrd, ug/L (01085)	Zinc, unfltrd, ug/L (01090)
JUL 2003 02...	4710	.11	328	2.71	<.5	<.2	<.04	E.1	2
AUG 29...	3970	<.08	360	2.50	<.5	<.2	<.04	E.1	2

E--Estimated.

## BOULDER RIVER BASIN

462503112172302 08N06W25ADAC02

LOCATION.--Lat 46°25'02.7", long 112°17'22.8" (NAD 83), in NE<sup>1</sup>/<sub>4</sub>SE<sup>1</sup>/<sub>4</sub>NE<sup>1</sup>/<sub>4</sub>, sec. 25, T.8 N., R.6 W., Jefferson County, Hydrologic Unit 10020006.  
HYDROGEOLOGIC UNIT.--Tertiary volcanics.

WELL CHARACTERISTICS.--Drilled in June 2000, casing diameter 2 in., depth 98.5 ft.

DATUM.--Measuring point, top of PVC casing, 1.60 ft above land surface datum. Elevation of land-surface datum is 7,521.47 ft (NGVD 29).

PERIOD OF RECORD.--June 2000 to current year.

REMARKS.--All water levels are reported as distance, in feet below land-surface datum. Well was pumped extensively on Aug. 8 in an attempt to remove sediment and standing water from well casing.

MEASURED WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM,  
WATER YEAR OCTOBER 2002 THROUGH SEPTEMBER 2003

DATE	WATER LEVEL
Jun 30	17.46
Aug 8	19.93
Aug 28	26.42

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

Date	Time	Flow rate, instantaneous gal/min (00059)	Pump or flow period prior to sampling, minutes (72004)	Sampling depth, feet (00003)	Turbidity, unfltrd field, NTU (61028)	Dissolved oxygen, mg/L (00300)	pH, unfltrd field, std units (00400)	Specif. conductance, wat unfltrd uS/cm 25 degC (00095)	Temperature, deg C (00010)	Hardness, unfltrd water, mg/L as CaCO3 (00900)	Calcium water, fltrd, mg/L (00915)	
JUN 2003	30...	1300	.30	70	90	560	4.9	4.6	62	13.0	5	1.53
AUG	28...	1500	.40	82	94	820	6.4	5.0	65	9.0	2	.79
Date	Time	Magnesium, water, fltrd, mg/L (00925)	Potassium, water, fltrd, mg/L (00935)	Sodium adsorption ratio (00931)	Sodium, water, fltrd, mg/L (00930)	Alkalinity, wat flt fxd end lab, mg/L as CaCO3 (29801)	Alkalinity, wat flt inc tit field, mg/L as CaCO3 (39086)	Bicarbonate, wat flt incrm. titr., field, mg/L (00453)	Carbonate, wat flt incrm. field, mg/L (00452)	Chloride, water, fltrd, mg/L (00940)	Fluoride, water, fltrd, mg/L (00950)	Silica, water, fltrd, mg/L (00955)
JUN 2003	30...	.163	3.85	.8	3.79	<2	<1	2	.0	3.62	<.2	30.6
AUG	28...	.104	4.28	2	7.81	3	2	2	.0	4.07	<.2	34.5
Date	Time	Sulfate water, fltrd, mg/L (00945)	Residue water, fltrd, sum of constituents mg/L (70301)	Residue water, fltrd, tons/acre-ft (70303)	Aluminum, water, fltrd, ug/L (01106)	Antimony, water, fltrd, ug/L (01095)	Arsenic, water, fltrd, ug/L (01000)	Beryllium, water, fltrd, ug/L (01010)	Cadmium, water, fltrd, ug/L (01025)	Chromium, water, fltrd, ug/L (01030)	Cobalt, water, fltrd, ug/L (01035)	Copper, water, fltrd, ug/L (01040)
JUN 2003	30...	14.9	60	.08	317	<.30	<.3	.27	.11	E.5	.616	2.7
AUG	28...	14.9	68	.09	81	<.30	<.3	.11	.09	E.5	.666	1.8
Date	Time	Iron, water, fltrd, ug/L (01046)	Lead, water, fltrd, ug/L (01049)	Manganese, water, fltrd, ug/L (01056)	Nickel, water, fltrd, ug/L (01065)	Selenium, water, fltrd, ug/L (01145)	Silver, water, fltrd, ug/L (01075)	Thallium, water, fltrd, ug/L (01057)	Vanadium, water, fltrd, ug/L (01085)	Zinc, water, fltrd, ug/L (01090)		
JUN 2003	30...	24	59.1	15.5	3.31	E.3	<.2	.52	<.1	97		
AUG	28...	31	28.7	8.6	3.66	<.5	<.2	.50	<.1	66		

E--Estimated.



BOULDER RIVER BASIN

462503112172301 08N06W25ADAC01

LOCATION.--Lat 46°25'02.7", long 112°17'22.8" (NAD 83), in NE<sup>1</sup>/<sub>4</sub>SE<sup>1</sup>/<sub>4</sub>NE<sup>1</sup>/<sub>4</sub> sec. 25, T.8 N., R.6 W., Jefferson County, Hydrologic Unit 10020006.  
 HYDROGEOLOGIC UNIT.--Boulder batholith quartz monzonite.

WELL CHARACTERISTICS.--Drilled in May 1999, casing diameter 4 in., depth 170 ft.

DATUM.--Measuring point, top of PVC casing, 0.0 ft above land surface datum. Elevation of land-surface datum is 7,521.1 ft (NGVD 29).

PERIOD OF RECORD.--October 2001 to current year.

REMARKS.--All water levels are reported as distance, in feet below land-surface datum. Well was pumped extensively on June 30 and Aug. 8 in an attempt to remove sediment and standing water from the well casing.

MEASURED WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM,  
 WATER YEAR OCTOBER 2002 THROUGH SEPTEMBER 2003

DATE	WATER LEVEL
Jun 30	32.85
Aug 8	35.63
Aug 28	35.70

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

Date	Time	Flow rate, instantaneous gal/min (00059)	Pump or flow period prior to sampling, minutes (72004)	Sampling depth, feet (00003)	Turbidity, water, unfltrd field, NTU (61028)	Dissolved oxygen, mg/L (00300)	pH, water, unfltrd field, std units (00400)	Specif. conductance, wat unfltrd uS/cm 25 degC (00095)	Temperature, deg C (00010)	Hardness, water, unfltrd mg/L as CaCO3 (00900)	Calcium water, fltrd, mg/L (00915)	
JUN 2003	30...	1200	1.0	160	E165	76	.2	6.6	123	9.5	39	10.9
AUG	28...	1600	.30	95	165	32	.3	6.5	129	8.5	38	10.6

Date	Magnesium, water, fltrd, mg/L (00925)	Potassium, water, fltrd, mg/L (00935)	Sodium adsorption ratio (00931)	Sodium, water, fltrd, mg/L (00930)	Alkalinity, wat flt fxd end lab, mg/L as CaCO3 (29801)	Alkalinity, wat flt inc tit field, mg/L as CaCO3 (39086)	Bicarbonate, wat flt incrm. titr., field, mg/L (00453)	Carbonate, wat flt incrm. titr., field, mg/L (00452)	Chloride, water, fltrd, mg/L (00940)	Fluoride, water, fltrd, mg/L (00950)	Silica, water, fltrd, mg/L (00955)	
JUN 2003	30...	2.78	6.35	.3	4.36	18	20	24	.0	.50	.2	38.7
AUG	28...	2.77	6.18	.4	5.70	21	21	26	.0	.52	.2	36.1

Date	Sulfate, water, fltrd, mg/L (00945)	Residue water, fltrd, sum of constituents, mg/L (70301)	Residue water, fltrd, tons/acre-ft (70303)	Aluminum, water, fltrd, ug/L (01106)	Antimony, water, fltrd, ug/L (01095)	Arsenic, water, fltrd, ug/L (01000)	Beryllium, water, fltrd, ug/L (01010)	Cadmium, water, fltrd, ug/L (01025)	Chromium, water, fltrd, ug/L (01030)	Cobalt, water, fltrd, ug/L (01035)	Copper, water, fltrd, ug/L (01040)	
JUN 2003	30...	32.4	110	.15	<2	<.30	1.5	.09	E.03	<.8	.985	.3
AUG	28...	34.1	111	.15	<2	<.30	1.5	.15	.06	<.8	1.15	.4

Date	Iron, water, fltrd, ug/L (01046)	Lead, water, fltrd, ug/L (01049)	Manganese, water, fltrd, ug/L (01056)	Nickel, water, fltrd, ug/L (01065)	Selenium, water, fltrd, ug/L (01145)	Silver, water, fltrd, ug/L (01075)	Thallium, water, fltrd, ug/L (01057)	Vanadium, water, fltrd, ug/L (01085)	Zinc, water, fltrd, ug/L (01090)	
JUN 2003	30...	2030	.17	111	1.36	<.5	<.2	.07	<.1	9
AUG	28...	2030	<.08	123	1.74	<.5	<.2	.07	<.1	9

E--Estimated.

## BOULDER RIVER BASIN

462500112170701 08N05W30BCBD01

LOCATION.--Lat 46°24'59.6", long 112°17'06.6 (NAD 83)", in NW<sup>1</sup>/<sub>4</sub>SW<sup>1</sup>/<sub>4</sub>NW<sup>1</sup>/<sub>4</sub> sec. 30, T.8 N., R.5 W., Jefferson County, Hydrologic Unit 10020006.

HYDROGEOLOGIC UNIT.--Boulder batholith quartz monzonite.

WELL CHARACTERISTICS.--Drilled in June 1999, casing diameter 4 in., depth 110 ft.

DATUM.--Measuring point, top of PVC casing, 0.8 ft above land surface datum. Elevation of land-surface datum is 7,577.99 ft (NGVD 29).

PERIOD OF RECORD.--October 2001 to current year.

REMARKS.--All water levels are reported as distance, in feet below land-surface datum. Well was pumped extensively on Aug. 8 in an attempt to remove sediment and standing water from the well casing.

MEASURED WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM,  
WATER YEAR OCTOBER 2002 THROUGH SEPTEMBER 2003

DATE	WATER LEVEL
Jul 3	26.35
Aug 8	28.49
Aug 28	29.93

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

Date	Time	Flow rate, instantaneous gal/min (00059)	Pump or flow period prior to sampling, minutes (72004)	Sampling depth, feet (00003)	Turbidity, water, unfltrd field, NTU (61028)	Dissolved oxygen, mg/L (00300)	pH, water, unfltrd std units (00400)	Specif. conductance, wat unfltrd uS/cm 25 degC (00095)	Temperature, water, deg C (00010)	Hardness, water, unfltrd mg/L as CaCO3 (00900)	Calcium water, fltrd, mg/L (00915)
JUL 2003 03...	1200	1.5	100	95.0	18	3.6	6.2	68	6.0	21	3.83
AUG 28...	1900	1.6	70	105	44	1.2	6.1	67	5.5	17	2.99

Date	Magnesium, water, fltrd, mg/L (00925)	Potassium, water, fltrd, mg/L (00935)	Sodium adsorption ratio (00931)	Sodium, water, fltrd, mg/L (00930)	Alkalinity, water, fxd end lab, mg/L as CaCO3 (29801)	Alkalinity, water, tit field, mg/L as CaCO3 (39086)	Bicarbonate, wat flt incrm. titr., field, mg/L (00453)	Carbonate, wat flt incrm. titr., field, mg/L (00452)	Chloride, water, fltrd, mg/L (00940)	Fluoride, water, fltrd, mg/L (00950)	Silica, water, fltrd, mg/L (00955)
JUL 2003 03...	2.87	1.11	.6	5.87	26	24	29	.0	.43	.3	32.7
AUG 28...	2.40	1.13	.6	5.42	24	20	25	.0	.41	.3	31.4

Date	Sulfate water, fltrd, mg/L (00945)	Residue water, fltrd, sum of constituents mg/L (70301)	Residue water, fltrd, tons/acre-ft (70303)	Aluminum, water, fltrd, ug/L (01106)	Antimony, water, fltrd, ug/L (01095)	Arsenic, water, fltrd, ug/L (01000)	Beryllium, water, fltrd, ug/L (01010)	Cadmium, water, fltrd, ug/L (01025)	Chromium, water, fltrd, ug/L (01030)	Cobalt, water, fltrd, ug/L (01035)	Copper, water, fltrd, ug/L (01040)
JUL 2003 03...	7.7	69	.09	2	<.30	E.2	<.06	<.04	<.8	1.09	.4
AUG 28...	7.7	64	.09	2	<.30	.3	<.06	<.04	<.8	.767	.3

Date	Iron, water, fltrd, ug/L (01046)	Lead, water, fltrd, ug/L (01049)	Manganese, water, fltrd, ug/L (01056)	Nickel, water, fltrd, ug/L (01065)	Selenium, water, fltrd, ug/L (01145)	Silver, water, fltrd, ug/L (01075)	Thallium, water, fltrd, ug/L (01057)	Vanadium, water, fltrd, ug/L (01085)	Zinc, water, fltrd, ug/L (01090)
JUL 2003 03...	180	<.08	129	1.14	<.5	<.2	<.04	E.1	7
AUG 28...	77	<.08	104	1.12	<.5	<.2	<.04	E.1	5

E--Estimated.

## BOULDER RIVER BASIN

462347112180401 BASIN CREEK BELOW BUCKEYE MINE NEAR LOGGING ROAD, NEAR BASIN, MT

LOCATION.--Lat 46°23'47", long 112°18'04" (NAD 27), in SW<sup>1</sup>/<sub>4</sub>SE<sup>1</sup>/<sub>4</sub>NW<sup>1</sup>/<sub>4</sub> sec. 36, T.8 N., R.6 W., Jefferson County, Hydrologic Unit 10020006, at old logging road crossing, 0.5 mi downstream from the Buckeye Mine, and 8.7 mi north of Basin.

DRAINAGE AREA.--2.54 mi<sup>2</sup>.

PERIOD OF RECORD.--January 2000 to current year.

GAGE.--None. Elevation at site is 6,940 ft (NGVD 29).

## WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

Date	Time	Instan- taneous dis- charge, cfs (00061)	pH, water, unfltrd field, std units (00400)	pH, water, unfltrd lab, std units (00403)	Specif. conduc- tance, wat unf uS/cm 25 degC (00095)	Temper- ature, air, deg C (00020)	Temper- ature, water, deg C (00010)	Hard- ness, water, unfltrd mg/L as CaCO3 (00900)	Calcium water, fltrd, mg/L (00915)	Magnes- ium, water, fltrd, mg/L (00925)	Potas- sium, water, fltrd, mg/L (00935)	Sodium adsorp- tion ratio (00931)
MAR 2003												
24...	1230	.48	--	7.5	83	1.5	0.0	43	12.3	3.02	1.57	.2
MAY												
14...	1030	1.9	7.5	--	72	7.5	0.5	35	10.4	2.14	--	--
JUN												
03...	1050	11	7.3	--	37	9.0	5.0	17	4.99	1.10	--	--
AUG												
21...	1255	.35	7.4	--	86	14.5	13.0	41	12.3	2.40	--	--

Date	Sodium, water, fltrd, mg/L (00930)	Alka- linity, wat flt fxd end mg/L as CaCO3 (29801)	Chlor- ide, water, fltrd, mg/L (00940)	Fluor- ide, water, fltrd, mg/L (00950)	Silica, water, fltrd, mg/L (00955)	Sulfate water, fltrd, mg/L (00945)	Residue water, fltrd, sum of consti- tuents mg/L (70301)	Residue water, fltrd, tons/ acre-ft (70303)	Residue water, fltrd, tons/d (70302)	Arsenic water, fltrd, ug/L (01000)	Arsenic water unfltrd ug/L (01002)
MAR 2003											
24...	2.43	43	.45	.08	14.5	8.7	69	.09	.09	19.1	24
MAY											
14...	--	--	--	--	--	--	--	--	--	44.3	67
JUN											
03...	--	--	--	--	--	--	--	--	--	13.4	20
AUG											
21...	--	--	--	--	--	--	--	--	--	34.7	37

Date	Cadmium water, fltrd, ug/L (01025)	Cadmium water, unfltrd ug/L (01027)	Copper, water, fltrd, ug/L (01040)	Copper, water, unfltrd recover- able, ug/L (01042)	Lead, water, fltrd, ug/L (01049)	Lead, water, unfltrd recover- able, ug/L (01051)	Zinc, water, fltrd, ug/L (01090)	Zinc, water, unfltrd recover- able, ug/L (01092)	Suspnd. sedi- ment, sieve diametr percent <.063mm (70331)	Sus- pended sedi- ment concen- tration mg/L (80154)	Sus- pended sedi- ment load, tons/d (80155)
MAR 2003											
24...	.23	.24	2.7	3.0	.50	1.02	50	52	64	2	<.01
MAY											
14...	.91	.97	10.2	12.0	1.24	5.18	187	192	67	2	.01
JUN											
03...	.29	.32	4.5	5.2	1.00	4.32	49	54	70	6	.18
AUG											
21...	.15	.14	2.1	2.2	1.27	1.45	23	22	83	1	<.01

E--Estimated.

## BOULDER RIVER BASIN

462501112173501 UNNAMED TRIBUTARY TO GRUB CREEK, SS NO. 4, NEAR RIMINI, MT

LOCATION.--Lat 46°25'00.8", long 112°17'35.2" (NAD 83), in SE<sup>1</sup>/<sub>4</sub>SW<sup>1</sup>/<sub>4</sub>NE<sup>1</sup>/<sub>4</sub> sec. 25, T.8 N., R.6 W., Jefferson County, Hydrologic Unit 10020006, 0.25 mi upstream from Grub Creek and 5.9 mi south of Rimini.

DRAINAGE AREA.--Indeterminate.

PERIOD OF RECORD.--October 2001 to current year.

GAGE.--None. Elevation at site is 7,420 ft (NGVD 29).

## WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

Date	Time	Instantaneous discharge, cfs (00061)	Dissolved oxygen, mg/L (00300)	pH, water, unfltrd field, std units (00400)	Specific conductance, wat unfltrd uS/cm 25 degC (00095)	Temperature, water, deg C (00010)	Hardness, water, unfltrd mg/L as CaCO3 (00900)	Calcium water, fltrd, mg/L (00915)	Magnesium, water, fltrd, mg/L (00925)	Potassium, water, fltrd, mg/L (00935)	Sodium adsorption ratio (00931)	
JUL 2003	10...	1200	.03	--	5.9	97	8.5	30	8.79	2.00	4.14	.1
SEP	05...	1215	.001	8.7	4.7	79	11.0	19	5.32	1.27	4.50	.1

Date	Sodium, water, fltrd, mg/L (00930)	Alkalinity, wat flt fxd end lab, mg/L as CaCO3 (29801)	Chloride, water, fltrd, mg/L (00940)	Fluoride, water, fltrd, mg/L (00950)	Silica, water, fltrd, mg/L (00955)	Sulfate, water, fltrd, mg/L (00945)	Residue water, fltrd, sum of constituents mg/L (70301)	Residue water, fltrd, tons/acre-ft (70303)	Residue water, fltrd, tons/d (70302)	Ammonia water, fltrd, mg/L as N (00608)	Nitrite + nitrate water, fltrd, mg/L as N (00631)	
JUL 2003	10...	1.86	3	1.20	<.2	12.0	33.0	65	.09	.01	<.04	E.05
SEP	05...	1.45	<2	1.43	<.2	20.1	30.4	E65	E.09	E.00	<.04	E.06

Date	Nitrite water, fltrd, mg/L as N (00613)	Orthophosphate, water, fltrd, mg/L as P (00671)	Aluminum, water, fltrd, recoverable, ug/L (01106)	Aluminum, water, unfltrd recoverable, ug/L (01105)	Antimony, water, fltrd, ug/L (01095)	Antimony, water, unfltrd, ug/L (01097)	Arsenic water, fltrd, ug/L (01000)	Arsenic water, unfltrd, ug/L (01002)	Beryllium, water, fltrd, ug/L (01010)	Beryllium, water, unfltrd recoverable, ug/L (01012)	Cadmium water, fltrd, ug/L (01025)	
JUL 2003	10...	<.008	<.02	25	119	<.30	<.6	.6	<2	.17	.24	.23
SEP	05...	<.008	<.18	187	258	<.30	<.6	.4	E1	.41	.39	.18

Date	Cadmium water, unfltrd, ug/L (01027)	Chromium, water, fltrd, ug/L (01030)	Chromium, water, unfltrd recoverable, ug/L (01034)	Cobalt water, fltrd, ug/L (01035)	Cobalt water, unfltrd recoverable, ug/L (01037)	Copper, water, fltrd, ug/L (01040)	Copper, water, unfltrd recoverable, ug/L (01042)	Iron, water, fltrd, ug/L (01046)	Iron, water, unfltrd recoverable, ug/L (01045)	Lead, water, fltrd, ug/L (01049)	Lead, water, unfltrd recoverable, ug/L (01051)	
JUL 2003	10...	.23	<.8	<.8	.700	.702	.7	1.2	665	1150	.14	.85
SEP	05...	.18	<.8	<.8	.910	.888	1.6	1.7	624	1490	.35	1.40

E--Estimated.

## BOULDER RIVER BASIN

462501112173501 UNNAMED TRIBUTARY TO GRUB CREEK, SS NO. 4, NEAR RIMINI, MT--Continued

## WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003--Continued

Date	Mangan- ese, water, unfltrd water, fltrd, ug/L (01056)	Mangan- ese, water, recover- able, ug/L (01055)	Nickel, water, unfltrd water, fltrd, ug/L (01065)	Nickel, water, unfltrd water, recover- able, ug/L (01067)	Selen- ium, water, unfltrd water, fltrd, ug/L (01145)	Selen- ium, water, unfltrd water, fltrd, ug/L (01147)	Silver, water, unfltrd water, fltrd, ug/L (01075)	Silver, water, unfltrd water, recover- able, ug/L (01077)
JUL 2003 10...	114	112	1.06	1.04	<.5	E.4	<.2	<.16
SEP 05...	136	132	1.00	.93	<.5	E.3	<.2	<.16

Date	Thall- ium, water, unfltrd water, fltrd, ug/L (01057)	Thall- ium, water, unfltrd water, fltrd, ug/L (01059)	Vanad- ium, water, unfltrd water, fltrd, ug/L (01085)	Vanad- ium, water, unfltrd water, fltrd, ug/L (01087)	Zinc, water, unfltrd water, fltrd, ug/L (01090)	Zinc, water, unfltrd water, recover- able, ug/L (01092)
JUL 2003 10...	.12	<.4	<.1	<1	65	64
SEP 05...	.16	<.4	<.1	<1	66	66

E--Estimated.

## BOULDER RIVER BASIN

462458112173201 UNNAMED TRIBUTARY TO GRUB CREEK, SS NO. 5, NEAR RIMINI, MT

LOCATION.--Lat 46°24'57.6", long 112°17'32.5" (NAD 27), SW<sup>1</sup>/<sub>4</sub>SE<sup>1</sup>/<sub>4</sub>SE<sup>1</sup>/<sub>4</sub> sec. 25, T.8N., R.6W., Jefferson County, Hydrologic Unit 10020006, 0.2 mi upstream from Grub Creek and 5.9 mi south of Rimini.

DRAINAGE AREA.--Indeterminate.

PERIOD OF RECORD.--July 2003 to September 2003.

GAGE.--None. Elevation at sampling site is 7,370 ft (NGVD 29).

## WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

Date	Time	Instantaneous discharge, cfs (00061)	Dissolved oxygen, mg/L (00300)	pH, water, unfltrd field, units (00400)	Specific conductance, uS/cm wat unfltrd, 25 degC (00095)	Temperature, water, deg C (00010)	Hardness, water, unfltrd mg/L as CaCO3 (00900)	Calcium water, fltrd, mg/L (00915)	Magnesium, water, fltrd, mg/L (00925)	Potassium, water, fltrd, mg/L (00935)	Sodium adsorption ratio (00931)	
JUL 2003	10...	1115	.03	--	5.7	104	8.5	32	8.94	2.32	3.87	.2
SEP	05...	1200	.004	8.6	4.7	80	10.5	20	5.64	1.36	4.26	.2
Date	Sodium water, fltrd, mg/L (00930)	Alkalinity, wat flt fxd end lab, mg/L as CaCO3 (29801)	Chloride, water, fltrd, mg/L (00940)	Fluoride, water, fltrd, mg/L (00950)	Silica, water, fltrd, mg/L (00955)	Sulfate water, fltrd, mg/L (00945)	Residue water, fltrd, sum of constituents (70301)	Residue water, fltrd, tons/acre-ft (70303)	Residue water, fltrd, tons/d (70302)	Ammonia water, fltrd, mg/L as N (00608)	Nitrite + nitrate water, fltrd, mg/L as N (00631)	
JUL 2003	10...	2.18	2	1.06	<.2	11.8	37.0	69	.09	.01	<.04	<.06
SEP	05...	1.64	<2	1.48	<.2	20.5	30.4	E67	E.09	E.00	<.04	E.04
Date	Nitrite water, fltrd, mg/L as N (00613)	Orthophosphate, water, fltrd, mg/L as P (00671)	Aluminum, water, fltrd, recoverable, ug/L (01106)	Aluminum, water, unfltrd, recoverable, ug/L (01105)	Antimony, water, fltrd, ug/L (01095)	Antimony, water, unfltrd, ug/L (01097)	Arsenic water, fltrd, ug/L (01000)	Arsenic water, unfltrd, ug/L (01002)	Beryllium, water, fltrd, ug/L (01010)	Beryllium, water, unfltrd, recoverable, ug/L (01012)	Cadmium water, fltrd, ug/L (01025)	
JUL 2003	10...	<.008	<.02	36	88	<.30	<.6	.5	<2	.29	.32	.30
SEP	05...	<.008	<.18	144	167	<.30	<.6	.4	E1	.64	.62	.23
Date	Cadmium water, unfltrd, ug/L (01027)	Chromium, water, fltrd, recoverable, ug/L (01030)	Chromium, water, unfltrd, recoverable, ug/L (01034)	Cobalt water, fltrd, recoverable, ug/L (01035)	Cobalt water, unfltrd, recoverable, ug/L (01037)	Copper, water, fltrd, recoverable, ug/L (01040)	Copper, water, unfltrd, recoverable, ug/L (01042)	Iron, water, fltrd, recoverable, ug/L (01046)	Iron, water, unfltrd, recoverable, ug/L (01045)	Lead, water, fltrd, recoverable, ug/L (01049)	Lead, water, unfltrd, recoverable, ug/L (01051)	
JUL 2003	10...	.28	<.8	<.8	1.18	1.14	.8	1.5	152	320	E.07	.42
SEP	05...	.23	<.8	<.8	1.75	1.69	1.5	1.5	260	550	.16	.67

E--Estimated.

## BOULDER RIVER BASIN

462458112173201 UNNAMED TRIBUTARY TO GRUB CREEK, SS NO. 5, NEAR RIMINI, MT--Continued

## WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003--Continued

Date	Mangan- ese, water, unfltrd water, fltrd, ug/L (01056)	Mangan- ese, water, recover- able, ug/L (01055)	Nickel, water, unfltrd water, fltrd, ug/L (01065)	Nickel, water, unfltrd water, recover- able, ug/L (01067)	Selen- ium, water, unfltrd water, fltrd, ug/L (01145)	Selen- ium, water, unfltrd water, fltrd, ug/L (01147)	Silver, water, unfltrd water, fltrd, ug/L (01075)	Silver, water, unfltrd water, recover- able, ug/L (01077)
JUL 2003 10...	123	120	1.43	1.40	<.5	E.3	<.2	<.16
SEP 05...	187	180	1.39	1.45	<.5	<.5	<.2	<.16

Date	Thall- ium, water, unfltrd water, fltrd, ug/L (01057)	Thall- ium, water, unfltrd water, fltrd, ug/L (01059)	Vanad- ium, water, unfltrd water, fltrd, ug/L (01085)	Vanad- ium, water, unfltrd water, fltrd, ug/L (01087)	Zinc, water, unfltrd water, fltrd, ug/L (01090)	Zinc, water, unfltrd water, recover- able, ug/L (01092)
JUL 2003 10...	.09	<.4	<.1	<1	72	71
SEP 05...	.14	<.4	<.1	<1	72	72

E--Estimated.

## BOULDER RIVER BASIN

462442112174602 UNNAMED TRIBUTARY TO GRUB CREEK AT MOUTH, SS NO. 6, NEAR RIMINI, MT

LOCATION.--Lat 46°24'42.3", long 112°17'45.5" (NAD 27), SW<sup>1</sup>/<sub>4</sub>NW<sup>1</sup>/<sub>4</sub>SE<sup>1</sup>/<sub>4</sub> sec. 25, T.8N., R.6W., Jefferson County, Hydrologic Unit 10020006, 30 ft upstream from Grub Creek and 5.9 mi south of Rimini.

DRAINAGE AREA.--Indeterminate.

PERIOD OF RECORD.-July 2003 to September 2003.

GAGE.--None. Elevation at sampling site is 7,320 ft (NGVD 29).

## WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

Date	Time	Instantaneous discharge, cfs (00061)	Dissolved oxygen, mg/L (00300)	pH, water, unfltrd field, std units (00400)	Specific conductance, wat unfltrd uS/cm 25 degC (00095)	Temperature, water, deg C (00010)	Hardness, water, unfltrd mg/L as CaCO3 (00900)	Calcium, water, fltrd, mg/L (00915)	Magnesium, water, fltrd, mg/L (00925)	Potassium, water, fltrd, mg/L (00935)	Sodium adsorption ratio (00931)	
JUL 2003	10...	1030	.06	--	6.4	97	8.0	35	9.79	2.50	3.01	.2
SEP	05...	1045	.01	8.9	5.5	109	9.5	34	9.59	2.54	3.83	.2
Date	Time	Sodium, water, fltrd, mg/L (00930)	Alkalinity, wat flt fxd end lab, mg/L as CaCO3 (29801)	Chloride, water, fltrd, mg/L (00940)	Fluoride, water, fltrd, mg/L (00950)	Silica, fltrd, mg/L (00955)	Sulfate, water, fltrd, mg/L (00945)	Residue water, fltrd, sum of constituents mg/L (70301)	Residue water, fltrd, tons/acre-ft (70303)	Residue water, fltrd, tons/d (70302)	Ammonia, water, fltrd, mg/L as N (00608)	Nitrite + nitrate, water, fltrd, mg/L as N (00631)
JUL 2003	10...	2.24	11	1.09	<.2	11.4	28.4	65	.09	.01	<.04	<.06
SEP	05...	2.80	15	2.21	<.2	14.3	27.1	72	.10	.00	<.04	E.03
Date	Time	Nitrite water, fltrd, mg/L as N (00613)	Orthophosphate, water, fltrd, mg/L as P (00671)	Aluminum, water, unfltrd, recoverable, ug/L (01106)	Aluminum, water, unfltrd, recoverable, ug/L (01105)	Antimony, water, fltrd, ug/L (01095)	Antimony, water, unfltrd, ug/L (01097)	Arsenic, water, fltrd, ug/L (01000)	Arsenic, water, unfltrd, ug/L (01002)	Beryllium, water, fltrd, ug/L (01010)	Beryllium, water, unfltrd, recoverable, ug/L (01012)	Cadmium, water, fltrd, ug/L (01025)
JUL 2003	10...	<.008	<.02	20	60	<.30	<.6	.6	<2	.12	.12	.14
SEP	05...	<.008	<.18	11	73	E.16	<.6	.6	E1	.16	.21	.11
Date	Time	Cadmium, water, unfltrd, ug/L (01027)	Chromium, water, fltrd, ug/L (01030)	Chromium, water, unfltrd, recoverable, ug/L (01034)	Cobalt, water, fltrd, ug/L (01035)	Cobalt, water, unfltrd, recoverable, ug/L (01037)	Copper, water, fltrd, ug/L (01040)	Copper, water, unfltrd, recoverable, ug/L (01042)	Iron, water, fltrd, ug/L (01046)	Iron, water, unfltrd, recoverable, ug/L (01045)	Lead, water, fltrd, ug/L (01049)	Lead, water, unfltrd, recoverable, ug/L (01051)
JUL 2003	10...	.14	<.8	<.8	.163	.178	3.2	3.8	45	110	.12	.46
SEP	05...	.12	<.8	<.8	.431	.534	1.3	1.4	79	290	<.08	.79

E--Estimated.



## BOULDER RIVER BASIN

462442112174602 UNNAMED TRIBUTARY TO GRUB CREEK AT MOUTH, SS NO. 6, NEAR RIMINI, MT--Continued

## WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003--Continued

Date	Mangan- ese, water, unfltrd water, fltrd, ug/L (01056)	Mangan- ese, water, recover- able, ug/L (01055)	Nickel, water, unfltrd water, fltrd, ug/L (01065)	Nickel, water, unfltrd water, recover- able, ug/L (01067)	Selen- ium, water, fltrd, ug/L (01145)	Selen- ium, water, unfltrd water, fltrd, ug/L (01147)	Silver, water, unfltrd water, fltrd, ug/L (01075)	Silver, water, unfltrd water, recover- able, ug/L (01077)
JUL 2003								
10...	43.0	45	.92	.89	<.5	<.5	<.2	<.16
SEP								
05...	113	123	.74	.96	<.5	<.5	<.2	<.16

Date	Thall- ium, water, fltrd, ug/L (01057)	Thall- ium, water, unfltrd water, fltrd, ug/L (01059)	Vanad- ium, water, fltrd, ug/L (01085)	Vanad- ium, water, unfltrd water, fltrd, ug/L (01087)	Zinc, water, unfltrd water, fltrd, ug/L (01090)	Zinc, water, unfltrd water, recover- able, ug/L (01092)
JUL 2003						
10...	E.02	<.4	<.1	<1	46	48
SEP						
05...	.05	<.4	E.1	<1	35	39

E--Estimated.

## BOULDER RIVER BASIN

462442112174601 GRUB CREEK ABOVE MOUTH OF UNNAMED TRIBUTARY, GC03, NEAR RIMINI, MT

LOCATION.--Lat 46°24'42.1", long 112°17'45.7" (NAD 27), NE<sup>1</sup>/<sub>4</sub>NW<sup>1</sup>/<sub>4</sub>SE<sup>1</sup>/<sub>4</sub> sec. 25, T.8N., R.6W., Jefferson County, Hydrologic Unit 10020006, 1.1 mi upstream from Basin Creek and 5.9 mi south of Rimini.

DRAINAGE AREA.--Indeterminate.

PERIOD OF RECORD.--July 2003.

GAGE.--None. Elevation at sampling site is 7,290 ft (NGVD 29).

REMARKS.--Stream was dry on site visits in August and September.

## WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

Date	Time	Instantaneous discharge, cfs (00061)	pH, water, unfltrd field, std units (00400)	Specif. conductance, wat unfltrd uS/cm 25 degC (00095)	Temperature, water, deg C (00010)	Hardness, water, unfltrd mg/L as CaCO3 (00900)	Calcium, water, fltrd, mg/L (00915)	Magnesium, water, fltrd, mg/L (00925)	Potassium, water, fltrd, mg/L (00935)	Sodium adsorption ratio (00931)	Sodium, water, fltrd, mg/L (00930)	
JUL 2003	10...	1000	.01	5.8	32	9.0	13	3.69	.829	.59	.2	1.39
Date	Alkalinity, wat flt fxd end lab, mg/L as CaCO3 (29801)	Chloride, water, fltrd, mg/L (00940)	Fluoride, water, fltrd, mg/L (00950)	Silica, water, fltrd, mg/L (00955)	Sulfate, water, fltrd, mg/L (00945)	Residue water, fltrd, sum of constituents mg/L (70301)	Residue water, fltrd, tons/acre-ft (70303)	Residue water, fltrd, tons/d (70302)	Ammonia, water, fltrd, mg/L as N (00608)	Nitrite + nitrate, water, fltrd, mg/L as N (00631)	Nitrite, water, fltrd, mg/L as N (00613)	
JUL 2003	10...	11	.49	<.2	8.65	3.0	26	.04	.00	<.04	<.06	<.008
Date	Orthophosphate, water, fltrd, mg/L as P (00671)	Aluminum, water, fltrd, ug/L (01106)	Aluminum, water, unfltrd recoverable, ug/L (01105)	Antimony, water, fltrd, ug/L (01095)	Antimony, water, unfltrd, ug/L (01097)	Arsenic, water, fltrd, ug/L (01000)	Arsenic, water, unfltrd, ug/L (01002)	Beryllium, water, fltrd, ug/L (01010)	Beryllium, water, unfltrd recoverable, ug/L (01012)	Cadmium, water, fltrd, ug/L (01025)	Cadmium, water, unfltrd, ug/L (01027)	
JUL 2003	10...	<.02	94	135	<.30	<.6	1.5	<2	.13	.17	.36	.39
Date	Chromium, water, fltrd, ug/L (01030)	Chromium, water, unfltrd recoverable, ug/L (01034)	Cobalt, water, fltrd, ug/L (01035)	Cobalt, water, unfltrd recoverable, ug/L (01037)	Copper, water, fltrd, ug/L (01040)	Copper, water, unfltrd recoverable, ug/L (01042)	Iron, water, fltrd, ug/L (01046)	Iron, water, unfltrd recoverable, ug/L (01045)	Lead, water, fltrd, ug/L (01049)	Lead, water, unfltrd recoverable, ug/L (01051)	Manganese, water, fltrd, ug/L (01056)	
JUL 2003	10...	<.8	<.8	.158	.174	19.1	21.0	175	230	.30	.40	23.4
Date	Manganese, water, unfltrd recoverable, ug/L (01055)	Nickel, water, fltrd, ug/L (01065)	Nickel, water, unfltrd recoverable, ug/L (01067)	Selenium, water, fltrd, ug/L (01145)	Selenium, water, unfltrd, ug/L (01147)	Silver, water, fltrd, ug/L (01075)	Silver, water, unfltrd recoverable, ug/L (01077)					
JUL 2003	10...	24	.85	.81	<.5	<.5	<.2	E.15				
Date	Thallium, water, fltrd, ug/L (01057)	Thallium, water, unfltrd, ug/L (01059)	Vanadium, water, fltrd, ug/L (01085)	Vanadium, water, unfltrd, ug/L (01087)	Zinc, water, fltrd, ug/L (01090)	Zinc, water, unfltrd recoverable, ug/L (01092)						
JUL 2003	10...	<.04	<.4	.4	<1	62	60					

E--Estimated.

## BOULDER RIVER BASIN

462155112181501 JACK CREEK ABOVE BULLION MINE TRIBUTARY, NEAR BASIN, MT

LOCATION.--Lat 46°21'55", long 112°18'15" (NAD 27), in NW<sup>1</sup>/<sub>4</sub>SW<sup>1</sup>/<sub>4</sub>SW<sup>1</sup>/<sub>4</sub> sec. 12, T.7 N., R.6 W., Jefferson County, Hydrologic Unit 10020006, 0.2 mi upstream of Bullion Mine tributary, 2.4 mi upstream of Basin Creek, and 7.1 mi north of Basin.

DRAINAGE AREA.--2.55 mi<sup>2</sup>.

PERIOD OF RECORD.--March 2003 to August 2003.

GAGE.--None. Elevation at site is 6,580 ft (NGVD 29).

## WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

Date	Time	Instan- taneous dis- charge, cfs (00061)	pH, water, unfltrd field, std units (00400)	Specif. conduc- tance, wat unfl- trd uS/cm 25 degC (00095)	Temper- ature, air, deg C (00020)	Temper- ature, water, deg C (00010)	Hard- ness, water, unfltrd mg/L as CaCO3 (00900)	Calcium water, fltrd, mg/L (00915)	Magnes- ium, water, fltrd, mg/L (00925)	Potas- sium, water, fltrd, mg/L (00935)	Sodium adsorp- tion ratio (00931)
MAR 2003											
24...	1415	.39	7.8	96	1.5	0.0	44	12.8	2.91	1.04	.2
MAY											
13...	1150	2.0	7.6	83	4.0	0.5	45	13.5	2.75	--	--
JUN											
03...	1300	11	7.4	41	12.5	4.5	20	5.84	1.20	--	--
AUG											
21...	1145	.25	7.2	128	15.0	10.5	48	14.5	2.80	--	--

Date	Sodium water, fltrd, mg/L (00930)	Alka- linity, wat flt fxd end lab, mg/L as CaCO3 (29801)	Chlor- ide, water, fltrd, mg/L (00940)	Fluor- ide, water, fltrd, mg/L (00950)	Silica, water, fltrd, mg/L (00955)	Sulfate water, fltrd, mg/L (00945)	Residue water, fltrd, sum of consti- tuents mg/L (70301)	Residue water, fltrd, tons/ acre-ft (70303)	Residue water, fltrd, tons/d (70302)	Arsenic water, fltrd, ug/L (01000)	Arsenic water unfltrd ug/L (01002)
MAR 2003											
24...	2.67	43	.34	.08	14.0	10.9	71	.10	.07	4.7	4
MAY											
13...	--	--	--	--	--	--	--	--	--	3.6	4
JUN											
03...	--	--	--	--	--	--	--	--	--	4.7	8
AUG											
21...	--	--	--	--	--	--	--	--	--	6.3	6

Date	Cadmium water, fltrd, ug/L (01025)	Cadmium water, unfltrd ug/L (01027)	Copper, water, fltrd, ug/L (01040)	Copper, water, unfltrd recover- able, ug/L (01042)	Lead, water, fltrd, ug/L (01049)	Lead, water, unfltrd recover- able, ug/L (01051)	Zinc, water, fltrd, ug/L (01090)	Zinc, water, unfltrd recover- able, ug/L (01092)	Suspnd. sedi- ment, sieve diametr percent <.063mm (70331)	Sus- pended sedi- ment concen- tration mg/L (80154)	Sus- pended sedi- ment load, tons/d (80155)
MAR 2003											
24...	.26	.24	3.0	3.2	<.08	E.04	54	40	75	1	<.01
MAY											
13...	.10	.10	3.2	3.5	E.05	.28	19	71	71	1	.01
JUN											
03...	.07	.10	4.8	6.4	.12	2.05	14	21	46	11	.32
AUG											
21...	.07	.08	1.9	1.8	<.08	.07	11	9	80	1	<.01

E--Estimated.

## BOULDER RIVER BASIN

462120112173701 BULLION MINE ADIT NEAR BASIN, MT

LOCATION.--Lat 46°21'20", long 112°17'37" (NAD 27), in NW<sup>1</sup>/<sub>4</sub>SW<sup>1</sup>/<sub>4</sub>SE<sup>1</sup>/<sub>4</sub> sec. 13, T.7 N., R.6 W., Jefferson County, Hydrologic Unit 10020006, at PVC pipe draining the Bullion mine adit about 400 ft upstream from the Bullion mine tributary, 2 mi upstream from Jack Creek, and 6.3 mi northwest of Basin.

PERIOD OF RECORD.--October 1999 to current year.

GAGE.--None. Elevation at site is 7,360 ft (NGVD 29).

## WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

Date	Time	Instantaneous discharge, cfs (00061)	pH, water, unfltrd field, std units (00400)	Specific conductance, wat unfltrd uS/cm 25 degC (00095)	Temperature, air, deg C (00020)	Temperature, water, deg C (00010)	Hardness, water, unfltrd mg/L as CaCO3 (00900)	Calcium, water, fltrd, mg/L (00915)	Magnesium, water, fltrd, mg/L (00925)	Potassium, water, fltrd, mg/L (00935)	Sodium adsorption ratio (00931)	
JUN 2003	26...	1020	.01	2.5	3010	14.0	5.5	350	80.1	35.7	2.22	.1
AUG	21...	1045	.02	3.6	3050	16.0	5.0	320	78.5	31.1	2.59	.1

Date	Sodium, water, fltrd, mg/L (00930)	Chloride, water, fltrd, mg/L (00940)	Fluoride, water, fltrd, mg/L (00950)	Silica, water, fltrd, mg/L (00955)	Sulfate, water, fltrd, mg/L (00945)	Aluminum, water, fltrd, ug/L (01106)	Antimony, water, fltrd, ug/L (01095)	Arsenic, water, fltrd, ug/L (01000)	Cadmium, water, fltrd, ug/L (01025)	Chromium, water, fltrd, ug/L (01030)	Copper, water, fltrd, ug/L (01040)	
JUN 2003	26...	3.87	8.50	.3	37.5	1610	19800	60.7	9240	718	10.4	16100
AUG	21...	4.79	2.11	.4	38.0	1160	18000	24.1	1870	464	3.7	11700

Date	Iron, water, fltrd, ug/L (01046)	Lead, water, fltrd, ug/L (01049)	Manganese, water, fltrd, ug/L (01056)	Mercury, water, fltrd, ug/L (71890)	Nickel, water, fltrd, ug/L (01065)	Silver, water, fltrd, ug/L (01075)	Zinc, water, fltrd, ug/L (01090)	
JUN 2003	26...	285000	676	24800	E.02	119	1.4	84100
AUG	21...	232000	410	23400	<.02	89.7	.5	49200

E--Estimated.

## BOULDER RIVER BASIN

462153112181701 BULLION MINE TRIBUTARY AT MOUTH, NEAR BASIN, MT

LOCATION.--Lat 46°21'53", long 112°18'17" (NAD 27), in SE<sup>1</sup>/<sub>4</sub>NW<sup>1</sup>/<sub>4</sub>NW<sup>1</sup>/<sub>4</sub> sec. 13, T.7 N., R.5 W., Jefferson County, Hydrologic Unit 10020006, at confluence with Jack Creek, 2.2 mi upstream from Basin Creek, and 6.7 mi northwest of Basin.

DRAINAGE AREA.--1.19 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1996 to current year.

GAGE.--None. Elevation at site is 6,595 ft (NGVD 29).

## WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

Date	Time	Instantaneous discharge, cfs (00061)	pH, water, unfltrd field, std units (00400)	Specific conductance, wat unfltrd, uS/cm 25 degC (00095)	Temperature, air, deg C (00020)	Temperature, water, deg C (00010)	Hardness, water, unfltrd mg/L as CaCO3 (00900)	Calcium, water, fltrd, mg/L (00915)	Magnesium, water, fltrd, mg/L (00925)	Potassium, water, fltrd, mg/L (00935)	Sodium adsorption ratio (00931)
MAR 2003											
24...	1340	.15	7.6	136	1.6	0.0	75	21.6	5.20	1.07	.2
MAY											
13...	1225	.60	7.7	123	4.0	0.5	55	16.2	3.44	--	--
JUN											
03...	1230	5.7	7.3	54	12.5	4.0	21	6.06	1.33	--	--
AUG											
21...	1130	.23	4.3	626	15.0	11.0	140	37.8	10.3	--	--

Date	Sodium, water, fltrd, mg/L (00930)	Alkalinity, wat flt fxd end lab, mg/L as CaCO3 (29801)	Chloride, water, fltrd, mg/L (00940)	Fluoride, water, fltrd, mg/L (00950)	Silica, water, fltrd, mg/L (00955)	Sulfate, water, fltrd, mg/L (00945)	Residue sum of constituents, mg/L (70301)	Residue water, fltrd, tons/acre-ft (70303)	Residue water, fltrd, tons/d (70302)	Arsenic, water, fltrd, ug/L (01000)	Arsenic, water, unfltrd, ug/L (01002)
MAR 2003											
24...	3.18	8	.81	.11	16.5	78.8	135	.18	.05	.7	4
MAY											
13...	--	--	--	--	--	--	--	--	--	1.4	9
JUN											
03...	--	--	--	--	--	--	--	--	--	8.0	55
AUG											
21...	--	--	--	--	--	--	--	--	--	5.0	15

Date	Cadmium, water, fltrd, ug/L (01025)	Cadmium, water, unfltrd, ug/L (01027)	Copper, water, fltrd, ug/L (01040)	Copper, water, unfltrd recoverable, ug/L (01042)	Lead, water, fltrd, ug/L (01049)	Lead, water, unfltrd recoverable, ug/L (01051)	Zinc, water, fltrd, ug/L (01090)	Zinc, water, unfltrd recoverable, ug/L (01092)	Suspnd. sediment, sieve diametr percent <.063mm (70331)	Suspended sediment concentration, mg/L (80154)	Suspended sediment load, tons/d (80155)
MAR 2003											
24...	22.0	22.2	93.8	150	.10	2.87	2640	2690	81	5	<.01
MAY											
13...	10.9	11.1	41.1	117	.14	3.53	1210	1250	75	3	<.01
JUN											
03...	3.15	3.47	52.0	71.1	1.58	19.4	347	391	36	25	.38
AUG											
21...	77.1	76.7	1100	1070	12.9	15.2	8110	7810	93	4	<.01

E--Estimated.

## BOULDER RIVER BASIN

462047112201901 JACK CREEK AT MOUTH, NEAR BASIN, MT

LOCATION.--Lat 46°20'47", long 112°20'19" (NAD 27), in NW<sup>1</sup>/<sub>4</sub>SE<sup>1</sup>/<sub>4</sub>SE<sup>1</sup>/<sub>4</sub> sec. 22, T.7 N., R.6 W., Jefferson County, Hydrologic Unit 10020006, at Basin Creek road crossing, 7 mi northwest of Basin.

DRAINAGE AREA.--8.55 mi<sup>2</sup>.

PERIOD OF RECORD.--January 2000 to current year.

GAGE.--None. Elevation at site is 6,260 ft (NGVD 29).

## WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

Date	Time	Instan- taneous dis- charge, cfs (00061)	pH, water, unfltrd field, std units (00400)	Specif. conduc- tance, wat unfltrd uS/cm 25 degC (00095)	Temper- ature, air, deg C (00020)	Temper- ature, water, deg C (00010)	Hard- ness, water, unfltrd mg/L as CaCO3 (00900)	Calcium water, fltrd, mg/L (00915)	Magnes- ium, water, fltrd, mg/L (00925)	Potas- sium, water, fltrd, mg/L (00935)	Sodium adsorp- tion ratio (00931)
APR 2003 23...	1100	14	7.5	48	5.5	0.5	34	10.0	2.16	1.15	.2
MAY 13...	1335	11	7.7	66	7.5	4.5	26	7.49	1.87	--	--
JUN 04...	0840	22	7.7	42	10.0	4.0	18	5.39	1.21	--	--
AUG 20...	1050	1.3	7.9	114	22.5	13.0	44	13.1	2.79	--	--

Date	Sodium, water, fltrd, mg/L (00930)	Alka- linity, wat flt fxd end lab, mg/L as CaCO3 (29801)	Chlor- ide, water, fltrd, mg/L (00940)	Fluor- ide, water, fltrd, mg/L (00950)	Silica, water, fltrd, mg/L (00955)	Sulfate water, fltrd, mg/L (00945)	Residue water, fltrd, sum of consti- tuents mg/L (70301)	Residue water, fltrd, tons/ acre-ft (70303)	Residue water, fltrd, tons/d (70302)	Arsenic water, fltrd, ug/L (01000)	Arsenic water unfltrd ug/L (01002)
APR 2003 23...	2.36	21	.76	<.2	13.5	14.0	57	.08	2.10	6.8	65
MAY 13...	--	--	--	--	--	--	--	--	--	4.8	8
JUN 04...	--	--	--	--	--	--	--	--	--	5.8	21
AUG 20...	--	--	--	--	--	--	--	--	--	5.4	8

Date	Cadmium water, fltrd, ug/L (01025)	Cadmium water, unfltrd ug/L (01027)	Copper, water, fltrd, ug/L (01040)	Copper, water, unfltrd recover- able, ug/L (01042)	Lead, water, fltrd, ug/L (01049)	Lead, water, unfltrd recover- able, ug/L (01051)	Zinc, water, fltrd, ug/L (01090)	Zinc, water, unfltrd recover- able, ug/L (01092)	Suspnd. sedi- ment, sieve diametr <.063mm percent (70331)	Sus- pended sedi- ment concen- tration mg/L (80154)	Sus- pended sedi- ment load, tons/d (80155)
APR 2003 23...	1.83	3.61	35.6	133	1.12	26.4	237	409	74	46	1.7
MAY 13...	1.20	1.36	17.5	22.1	.25	1.77	160	173	83	1	.03
JUN 04...	.80	1.01	18.2	26.7	.45	7.17	100	123	49	15	.89
AUG 20...	3.17	3.30	12.3	22.9	.12	.62	372	391	42	2	.01

## BOULDER RIVER BASIN

## 06031600 BASIN CREEK AT BASIN, MT

LOCATION.--Lat 46°16'16", long 112°15'42" (NAD 27), in NE<sup>1</sup>/<sub>4</sub>NW<sup>1</sup>/<sub>4</sub>SW<sup>1</sup>/<sub>4</sub> sec. 17, T.6 N., R.5 W., Jefferson County, Hydrologic Unit 10020006, at county bridge on old interstate 15 in Basin.

DRAINAGE AREA.--41.1 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1996 to current year.

GAGE.--None. Elevation at site is 5,340 ft (NGVD 29).

## WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

Date	Time	Instan- taneous dis- charge, cfs (00061)	pH, water, unfltrd field, std units (00400)	Specif. conduc- tance, wat unfltrd uS/cm 25 degC (00095)	Temper- ature, air, deg C (00020)	Temper- ature, water, deg C (00010)	Hard- ness, water, unfltrd mg/L as CaCO3 (00900)	Calcium water, fltrd, mg/L (00915)	Magnes- ium, water, fltrd, mg/L (00925)	Potas- sium, water, fltrd, mg/L (00935)	Sodium adsorp- tion ratio (00931)	
FEB 2003	20...	1000	4.2	7.8	102	-2.0	.0	39	11.1	2.82	1.25	.2
MAY	13...	0900	62	8.0	49	6.0	2.0	21	6.10	1.46	--	--
JUN	04...	1000	106	7.5	39	10.5	6.0	15	4.32	.961	--	--
AUG	20...	1140	2.7	7.2	108	23.0	17.0	43	12.9	2.65	--	--

Date	Sodium, water, fltrd, mg/L (00930)	Alka- linity, wat flt fxd end lab, mg/L as CaCO3 (29801)	Chlor- ide, water, fltrd, mg/L (00940)	Fluor- ide, water, fltrd, mg/L (00950)	Silica, water, fltrd, mg/L (00955)	Sulfate water, fltrd, mg/L (00945)	Residue water, fltrd, sum of consti- tuents mg/L (70301)	Residue water, fltrd, tons/ acre-ft (70303)	Residue water, fltrd, tons/d (70302)	Arsenic water, fltrd, ug/L (01000)	Arsenic water unfltrd ug/L (01002)	
FEB 2003	20...	3.60	30	1.18	.11	17.3	19.4	75	.10	.87	3.1	4
MAY	13...	--	--	--	--	--	--	--	--	--	5.1	7
JUN	04...	--	--	--	--	--	--	--	--	--	5.2	10
AUG	20...	--	--	--	--	--	--	--	--	--	7.4	8

Date	Cadmium water, fltrd, ug/L (01025)	Cadmium water, unfltrd ug/L (01027)	Copper, water, fltrd, ug/L (01040)	Copper, water, unfltrd recover- able, ug/L (01042)	Lead, water, fltrd, ug/L (01049)	Lead, water, unfltrd recover- able, ug/L (01051)	Zinc, water, fltrd, ug/L (01090)	Zinc, water, unfltrd recover- able, ug/L (01092)	Suspnd. sedi- ment, sieve diametr <.063mm percent (70331)	Sus- pended sedi- ment concen- tration mg/L (80154)	Sus- pended sedi- ment load, tons/d (80155)	
FEB 2003	20...	.30	.33	2.1	2.9	.11	.29	67	74	67	1	.01
MAY	13...	.30	.37	6.5	8.0	.33	1.42	57	69	84	3	.50
JUN	04...	.28	.36	7.9	10.9	.37	3.74	41	54	60	10	2.9
AUG	20...	.24	.24	3.1	3.3	E.07	.24	32	32	62	1	.01

E--Estimated.

## BOULDER RIVER BASIN

461905112144201 CATARACT CREEK ABOVE UNCLE SAM GULCH, NEAR BASIN, MT

LOCATION.--Lat 46°19'05", long 112°14'42" (NAD 27), in SE<sup>1</sup>/<sub>4</sub>SE<sup>1</sup>/<sub>4</sub>NE<sup>1</sup>/<sub>4</sub> sec. 32, T.7 N., R.5 W., Jefferson County, Hydrologic Unit 10020006, 100 ft upstream from Uncle Sam Gulch and 3.4 mi northeast of Basin.

DRAINAGE AREA.--22.2 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1996 to March 2003 (discontinued).

GAGE.--None. Elevation at site is 6,320 ft (NGVD 29).

## WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

Date	Time	Instantaneous discharge, cfs (00061)	pH, water, unfltrd field, std units (00400)	Specific conductance, wat unfltrd uS/cm 25 degC (00095)	Temperature, air, deg C (00020)	Temperature, water, deg C (00010)	Hardness, water, unfltrd mg/L as CaCO3 (00900)	Calcium, water, fltrd, mg/L (00915)	Magnesium, water, fltrd, mg/L (00925)	Potassium, water, fltrd, mg/L (00935)	Sodium adsorption ratio (00931)	
MAR 2003	25...	0850	3.2	7.8	103	-0.5	0.0	52	15.7	3.05	1.14	.2
Date	Sodium, water, fltrd, mg/L (00930)	Alkalinity, wat flt lab, mg/L as CaCO3 (29801)	Chloride, water, fltrd, mg/L (00940)	Fluoride, water, fltrd, mg/L (00950)	Silica, water, fltrd, mg/L (00955)	Sulfate, water, fltrd, mg/L (00945)	Residue sum of constituents mg/L (70301)	Residue water, fltrd, tons/acre-ft (70303)	Residue water, fltrd, tons/d (70302)	Arsenic, water, fltrd, ug/L (01000)	Arsenic, water, unfltrd, ug/L (01002)	
MAR 2003	25...	3.11	49	.69	.09	14.7	12.8	81	.11	.70	2.2	E2
Date	Cadmium, water, fltrd, ug/L (01025)	Cadmium, water, unfltrd, ug/L (01027)	Copper, water, fltrd, ug/L (01040)	Copper, water, unfltrd recoverable, ug/L (01042)	Lead, water, fltrd, ug/L (01049)	Lead, water, unfltrd recoverable, ug/L (01051)	Zinc, water, fltrd, ug/L (01090)	Zinc, water, unfltrd recoverable, ug/L (01092)	Suspnd. sediment, sieve percent <.063mm (70331)	Suspended sediment concentration, mg/L (80154)	Suspended sediment load, tons/d (80155)	
MAR 2003	25...	.30	.32	8.1	7.4	.41	.50	61	64	95	5	.04

E--Estimated.



## BOULDER RIVER BASIN

462053112153601 CRYSTAL MINE ADIT NEAR BASIN, MT

LOCATION.--Lat 46°20'53", long 112°15'36" (NAD 27), in NE<sup>1</sup>/<sub>4</sub>SW<sup>1</sup>/<sub>4</sub>NW<sup>1</sup>/<sub>4</sub> sec. 20, T.7 N., R.5 W., Jefferson County, Hydrologic Unit 10020006, adit discharge from Cystal Mine, about 3 mi upstream from the mouth of Uncle Sam Gulch, and 5.25 mi north of Basin.

DRAINAGE AREA.--None.

PERIOD OF RECORD.--June 2003 to August 2003.

GAGE.--None. Elevation at site is 7,600 ft (NGVD 29).

## WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

Date	Time	Instan- taneous dis- charge, cfs (00061)	pH, water, unfltrd field, std units (00400)	Specif. conduc- tance, wat un- f uS/cm 25 degC (00095)	Temper- ature, air, deg C (00020)	Temper- ature, water, deg C (00010)	Hard- ness, water, unfltrd mg/L as CaCO3 (00900)	Calcium water, fltrd, mg/L (00915)	Magnes- ium, water, fltrd, mg/L (00925)	Potas- sium, water, fltrd, mg/L (00935)	Sodium adsorp- tion ratio (00931)	
JUN 2003	26...	0845	.08	3.9	810	19.5	5.0	210	57.6	17.0	1.45	.1
AUG	21...	1010	.11	3.8	1270	15.0	6.0	220	57.8	17.3	1.47	.1

Date	Time	Sodium, water, fltrd, mg/L (00930)	Alka- linity, wat flt fxd end lab, mg/L as CaCO3 (29801)	Chlor- ide, water, fltrd, mg/L (00940)	Fluor- ide, water, fltrd, mg/L (00950)	Silica, water, fltrd, mg/L (00955)	Sulfate water, fltrd, mg/L (00945)	Alum- inum, water, fltrd, ug/L (01106)	Anti- mony, water, fltrd, ug/L (01095)	Arsenic water, fltrd, ug/L (01000)	Cadmium water, fltrd, ug/L (01025)	Chrom- ium, water, fltrd, ug/L (01030)
JUN 2003	26...	3.47	<1	1.41	<.2	20.6	477	2890	2.01	143	581	<.8
AUG	21...	3.34	<1	1.16	<.2	22.8	528	5810	2.09	85.2	700	<.8

Date	Time	Copper, water, fltrd, ug/L (01040)	Iron, water, fltrd, ug/L (01046)	Lead, water, fltrd, ug/L (01049)	Mangan- ese, water, fltrd, ug/L (01056)	Mercury water, fltrd, ug/L (71890)	Nickel, water, fltrd, ug/L (01065)	Silver, water, fltrd, ug/L (01075)	Zinc, water, fltrd, ug/L (01090)
JUN 2003	26...	5080	39500	30.9	12200	<.02	38.4	<.3	45700
AUG	21...	7400	55100	40.2	13600	<.02	39.5	<.2	55900

## BOULDER RIVER BASIN

461904112144401 UNCLE SAM GULCH AT MOUTH, NEAR BASIN, MT

LOCATION.--Lat 46°19'04", long 112°14'44" (NAD 27), in SE<sup>1</sup>/<sub>4</sub>SE<sup>1</sup>/<sub>4</sub>NE<sup>1</sup>/<sub>4</sub> sec. 32, T.7 N., R.5 W., Jefferson County, Hydrologic Unit 10020006, at confluence with Cataract Creek, 3.4 mi northeast of Basin.

DRAINAGE AREA.--3.06 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1996 to current year.

GAGE.--None. Elevation at site is 6,315 ft (NGVD 29).

## WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

Date	Time	Instan- taneous dis- charge, cfs (00061)	pH, water, unfltrd field, std units (00400)	Specif. conduc- tance, wat unfltrd uS/cm 25 degC (00095)	Temper- ature, air, deg C (00020)	Temper- ature, water, deg C (00010)	Hard- ness, water, unfltrd mg/L as CaCO3 (00900)	Calcium water, fltrd, mg/L (00915)	Magnes- ium, water, fltrd, mg/L (00925)	Potas- sium, water, fltrd, mg/L (00935)	Sodium adsorp- tion ratio (00931)	
MAR 2003	25...	0930	.54	7.5	112	-1.0	0.5	50	14.6	3.19	.79	.2
MAY	13...	1035	3.4	8.0	74	10.5	2.5	35	10.7	2.02	--	--
JUN	04...	1140	8.4	7.4	46	11.0	6.0	18	5.36	1.08	--	--
AUG	21...	0910	.37	8.0	269	16.5	9.0	73	21.9	4.31	--	--

Date	Sodium water, fltrd, mg/L (00930)	Alka- linity, wat flt fxd end lab, mg/L as CaCO3 (29801)	Chlor- ide, water, fltrd, mg/L (00940)	Fluor- ide, water, fltrd, mg/L (00950)	Silica, water, fltrd, mg/L (00955)	Sulfate water, fltrd, mg/L (00945)	Residue water, fltrd, sum of consti- tuents mg/L (70301)	Residue water, fltrd, tons/ acre-ft (70303)	Residue water, fltrd, tons/d (70302)	Arsenic water, fltrd, ug/L (01000)	Arsenic water unfltrd ug/L (01002)	
MAR 2003	25...	3.13	28	.41	.08	16.0	35.6	92	.13	.13	2.9	3
MAY	13...	--	--	--	--	--	--	--	--	--	4.5	15
JUN	04...	--	--	--	--	--	--	--	--	--	6.2	59
AUG	21...	--	--	--	--	--	--	--	--	--	4.9	5

Date	Cadmium water, fltrd, ug/L (01025)	Cadmium water, unfltrd ug/L (01027)	Copper, water, fltrd, ug/L (01040)	Copper, water, unfltrd recover- able, ug/L (01042)	Lead, water, fltrd, ug/L (01049)	Lead, water, unfltrd recover- able, ug/L (01051)	Zinc, water, fltrd, ug/L (01090)	Zinc, water, unfltrd recover- able, ug/L (01092)	Suspnd. sedi- ment, sieve diametr percent <.063mm (70331)	Sus- pended sedi- ment concen- tration mg/L (80154)	Sus- pended sedi- ment load, tons/d (80155)	
MAR 2003	25...	24.2	23.0	74.8	87.9	.27	.82	2040	2170	75	1	<.01
MAY	13...	11.0	11.2	90.2	125	.83	8.19	1010	1020	80	5	.05
JUN	04...	4.85	6.28	77.8	173	1.31	40.0	453	560	45	28	.64
AUG	21...	19.7	19.6	32.5	38.3	.18	.59	1730	1650	75	1	<.01

BOULDER RIVER BASIN

06031960 CATARACT CREEK AT BASIN, MT

LOCATION.--Lat 46°16'17", long 112°14'28" (NAD 27), in NE<sup>1</sup>/<sub>4</sub>NW<sup>1</sup>/<sub>4</sub>SW<sup>1</sup>/<sub>4</sub> sec. 16, T.6 N., R.5 W., Jefferson County, Hydrologic Unit 10020006, at county bridge, 0.1 mi upstream from the Boulder River, and 1 mi east of Basin.

DRAINAGE AREA.--29.3 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1996 to current year.

GAGE.--None. Elevation at site is 5,270 ft (NGVD 29).

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

Date	Time	Instan- taneous dis- charge, cfs (00061)	pH, water, unfltrd field, std units (00400)	Specif. conduc- tance, wat unfltrd uS/cm 25 degC (00095)	Temper- ature, air, deg C (00020)	Temper- ature, water, deg C (00010)	Hard- ness, water, unfltrd mg/L as CaCO3 (00900)	Calcium water, fltrd, mg/L (00915)	Magnes- ium, water, fltrd, mg/L (00925)	Potas- sium, water, fltrd, mg/L (00935)	Sodium adsorp- tion ratio (00931)	
FEB 2003	20...	1115	2.3	7.5	130	-2.0	.0	58	17.6	3.53	1.07	.2
MAY	13...	1145	46	7.7	71	21.0	5.5	33	10.2	1.81	--	--
JUN	04...	1300	68	7.3	50	14.0	6.0	20	6.19	1.20	--	--
AUG	20...	1230	2.0	8.2	155	24.0	16.5	68	21.1	3.79	--	--

Date	Sodium, water, fltrd, mg/L (00930)	Alka- linity, wat flt fxd end lab, mg/L as CaCO3 (29801)	Chlor- ide, water, fltrd, mg/L (00940)	Fluor- ide, water, fltrd, mg/L (00950)	Silica, water, fltrd, mg/L (00955)	Sulfate water, fltrd, mg/L (00945)	Residue water, fltrd, sum of consti- tuents mg/L (70301)	Residue water, fltrd, tons/ acre-ft (70303)	Residue water, fltrd, tons/d (70302)	Arsenic water, fltrd, ug/L (01000)	Arsenic water unfltrd ug/L (01002)	
FEB 2003	20...	3.55	49	.58	.09	15.2	20.0	91	.12	.57	3.1	3
MAY	13...	--	--	--	--	--	--	--	--	--	2.3	4
JUN	04...	--	--	--	--	--	--	--	--	--	3.4	11
AUG	20...	--	--	--	--	--	--	--	--	--	5.5	5

Date	Cadmium water, fltrd, ug/L (01025)	Cadmium water, unfltrd ug/L (01027)	Copper, water, fltrd, ug/L (01040)	Copper, water, unfltrd recover- able, ug/L (01042)	Lead, water, fltrd, ug/L (01049)	Lead, water, unfltrd recover- able, ug/L (01051)	Zinc, water, fltrd, ug/L (01090)	Zinc, water, unfltrd recover- able, ug/L (01092)	Suspnd. sedi- ment, sieve diametr <.063mm percent (70331)	Sus- pended sedi- ment concen- tration mg/L (80154)	Sus- pended sedi- ment load, tons/d (80155)	
FEB 2003	20...	3.01	3.07	9.5	10.2	.37	.39	284	307	83	1	.01
MAY	13...	1.19	1.34	16.5	22.0	.29	1.65	139	148	69	3	.37
JUN	04...	.84	1.05	19.9	26.9	.55	6.21	98	118	52	7	1.3
AUG	20...	1.91	1.89	7.1	8.6	E.04	.14	130	129	57	1	.01

E--Estimated.

## BOULDER RIVER BASIN

## 06032400 BOULDER RIVER BELOW LITTLE GALENA GULCH, NEAR BASIN, MT

LOCATION.--Lat 46°14'58", long 112°10'27 (NAD 27), in NE<sup>1</sup>/<sub>4</sub>NE<sup>1</sup>/<sub>4</sub>NW<sup>1</sup>/<sub>4</sub> sec. 25, T.6 N., R.5 W., Jefferson County, Hydrologic Unit 10020006, at county bridge, 0.2 mi downstream from Little Galena Gulch, and 2.5 mi northeast of Basin.

DRAINAGE AREA.--318 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1996 to current year.

GAGE.--None. Elevation at site is 5,020 ft (NGVD 29).

## WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

Date	Time	Instan- taneous dis- charge, cfs (00061)	pH, water, unfltrd field, std units (00400)	Specif. conduc- tance, wat unfltrd uS/cm 25 degC (00095)	Temper- ature, air, deg C (00020)	Temper- ature, water, deg C (00010)	Hard- ness, water, unfltrd mg/L as CaCO3 (00900)	Calcium water, fltrd, mg/L (00915)	Magnes- ium, water, fltrd, mg/L (00925)	Potas- sium, water, fltrd, mg/L (00935)	Sodium adsorp- tion ratio (00931)
FEB 2003 21...	0915	18	8.1	147	4.0	.0	59	17.1	3.89	1.55	.4
MAY 13...	1315	332	7.7	98	21.5	8.5	39	11.7	2.32	--	--
JUN 05...	1000	497	7.8	59	15.0	6.5	22	6.45	1.32	--	--
AUG 20...	1330	12	7.7	171	25.0	21.0	63	18.9	3.79	--	--

Date	Sodium, water, fltrd, mg/L (00930)	Alka- linity, wat flt fxd end lab, mg/L as CaCO3 (29801)	Chlor- ide, water, fltrd, mg/L (00940)	Fluor- ide, water, fltrd, mg/L (00950)	Silica, water, fltrd, mg/L (00955)	Sulfate water, fltrd, mg/L (00945)	Residue water, fltrd, sum of consti- tuents mg/L (70301)	Residue water, fltrd, tons/ acre-ft (70303)	Residue water, fltrd, tons/d (70302)	Arsenic water, fltrd, ug/L (01000)	Arsenic water unfltrd ug/L (01002)
FEB 2003 21...	7.04	55	3.09	.13	18.8	20.3	105	.14	5.05	3.4	4
MAY 13...	--	--	--	--	--	--	--	--	--	3.8	5
JUN 05...	--	--	--	--	--	--	--	--	--	4.0	7
AUG 20...	--	--	--	--	--	--	--	--	--	9.7	9

Date	Cadmium water, fltrd, ug/L (01025)	Cadmium water, unfltrd ug/L (01027)	Copper, water, fltrd, ug/L (01040)	Copper, water, unfltrd recover- able, ug/L (01042)	Lead, water, fltrd, ug/L (01049)	Lead, water, unfltrd recover- able, ug/L (01051)	Zinc, water, fltrd, ug/L (01090)	Zinc, water, unfltrd recover- able, ug/L (01092)	Suspnd. sedi- ment, sieve diametr percent <.063mm (70331)	Sus- pended sedi- ment concen- tration mg/L (80154)	Sus- pended sedi- ment load, tons/d (80155)
FEB 2003 21...	.68	.76	8.2	10.6	.16	.55	117	135	74	2	.10
MAY 13...	.23	.32	7.6	9.7	.24	1.14	38	50	55	12	11
JUN 05...	.20	.43	9.0	17.9	.38	4.23	34	52	53	20	27
AUG 20...	.30	.38	8.9	10.1	.10	.34	31	37	82	2	.06

E--Estimated.

## BOULDER RIVER BASIN

## 06033000 BOULDER RIVER NEAR BOULDER, MT

LOCATION.--Lat 46°12'40", long 112°05'27" (NAD 27), in SE<sup>1</sup>/<sub>4</sub>NE<sup>1</sup>/<sub>4</sub>SW<sup>1</sup>/<sub>4</sub> sec. 3, T.5 N., R.4 W., Jefferson County, Hydrologic Unit 10020006, on left bank 40 ft downstream from county bridge, 1.1 mile downstream from Muskrat Creek, 2.0 mi southeast of Boulder, and at river mile 44.1.

DRAINAGE AREA.--381 mi<sup>2</sup>.

PERIOD OF RECORD.--May 1929 to December 1932, March 1934 to September 1972, October 1984 to current year. Monthly discharge only for some periods, published in WSP 1309.

REVISED RECORDS.--WSP 1279: 1931.

GAGE.--Water-stage recorder. Elevation of gage is 4,810 ft (NGVD 29). Prior to Aug. 29, 1946, nonrecording gage at present site and elevation.

REMARKS.--Records good except those for estimated daily discharges, which are fair. Diversions for irrigation of about 3,500 acres upstream from station. Several observations of water temperature and specific conductance were made during the year. U.S. Geological Survey satellite telemeter at station.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of May 22, 1981, reached a discharge of 7,000 ft<sup>3</sup>/s, gage height, 12.3 ft, from floodmarks.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	20	17	27	18	37	23	103	247	932	59	11	9.2
2	20	18	29	19	30	23	122	270	750	55	10	9.1
3	19	17	29	21	28	23	91	274	584	50	12	9.0
4	20	18	28	21	27	23	63	334	487	48	15	9.1
5	20	19	28	22	27	23	62	353	416	43	15	8.9
6	21	20	27	22	26	23	56	346	384	41	14	9.1
7	21	22	23	21	25	23	45	307	348	38	14	9.4
8	21	22	21	21	25	24	51	288	316	36	12	9.8
9	23	23	21	20	26	24	63	260	318	36	11	9.9
10	22	25	22	19	26	24	111	242	320	31	10	10
11	21	26	23	16	26	30	164	227	334	27	9.2	10
12	21	26	22	16	25	48	200	247	285	24	9.1	11
13	21	27	23	16	25	83	259	317	253	19	9.2	11
14	21	27	25	16	25	106	263	339	276	19	9.5	12
15	22	27	26	17	25	70	226	401	228	18	9.2	11
16	22	26	26	17	25	63	174	488	209	18	9.3	12
17	22	27	26	17	25	50	156	455	198	18	9.7	12
18	22	27	21	17	25	72	145	408	188	17	9.7	12
19	22	28	19	17	25	78	130	363	168	17	9.1	12
20	22	31	16	18	25	77	135	339	192	17	8.5	12
21	22	31	16	18	25	75	166	342	194	16	8.2	12
22	22	32	17	20	25	72	219	371	175	16	8.2	12
23	21	32	18	19	e23	76	329	512	170	13	9.2	12
24	16	22	18	18	e20	54	435	708	166	13	11	12
25	15	18	17	18	e21	63	473	936	152	14	11	12
26	15	25	16	19	e22	60	410	1040	129	16	9.8	12
27	17	29	16	20	e23	46	324	1050	114	16	9.9	12
28	23	31	16	21	e23	41	278	1020	104	14	9.7	12
29	18	31	17	22	---	43	245	1060	91	12	9.7	12
30	14	29	17	23	---	51	236	1030	79	11	10	12
31	16	---	17	25	---	64	---	1040	---	11	9.9	---
TOTAL	622	753	667	594	710	1555	5734	15614	8560	783	323.1	328.5
MEAN	20.1	25.1	21.5	19.2	25.4	50.2	191	504	285	25.3	10.4	10.9
MAX	23	32	29	25	37	106	473	1060	932	59	15	12
MIN	14	17	16	16	20	23	45	227	79	11	8.2	8.9
AC-FT	1230	1490	1320	1180	1410	3080	11370	30970	16980	1550	641	652

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1929 - 2003, BY WATER YEAR (WY)\*

MEAN	36.6	34.9	28.5	26.3	30.6	48.1	167	461	405	94.5	31.1	28.5
MAX	113	71.2	53.0	42.1	68.5	121	511	961	1027	374	194	156
(WY)	1966	1966	1996	1969	1971	1986	1930	1948	1965	1938	1993	1993
MIN	5.85	9.09	7.45	10.1	7.71	20.7	46.0	1.26	70.4	10.9	7.11	5.69
(WY)	1936	1936	1936	1937	1937	1937	1967	1992	2000	1931	1931	1935

SUMMARY STATISTICS

	FOR 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1929 - 2003*	
ANNUAL TOTAL	27182		36243.6			
ANNUAL MEAN	74.5		99.3		117	
HIGHEST ANNUAL MEAN					211	
LOWEST ANNUAL MEAN					48.2	
HIGHEST DAILY MEAN	666	Jun 2	1060	May 29	2400	May 22 1948
LOWEST DAILY MEAN	10	Jan 2	8.2	Aug 21	0.00	Jul 15 1931
ANNUAL SEVEN-DAY MINIMUM	14	Feb 24	8.9	Aug 17	1.0	Jan 21 1930
MAXIMUM PEAK FLOW			1150	May 27	3490	Jun 9 1964
MAXIMUM PEAK STAGE			7.78	May 27	10.90	Jun 9 1964
INSTANTANEOUS LOW FLOW			a7.9	Aug 20	0.00	Jul 15 1931
ANNUAL RUNOFF (AC-FT)	53920		71890		84400	
10 PERCENT EXCEEDS	235		317		337	
50 PERCENT EXCEEDS	23		23		36	
90 PERCENT EXCEEDS	17		11		16	

\*--During periods of operation (May 1929 to December 1932, March 1934 to September 1972, October 1984 to present).  
a--Gage height, 4.74 ft.  
e--Estimated.

JEFFERSON RIVER BASIN

06036650 JEFFERSON RIVER NEAR THREE FORKS, MT

LOCATION.--Lat 45°53'52", long 111°35'45" (NAD 27), in SW<sup>1</sup>/<sub>4</sub>SW<sup>1</sup>/<sub>4</sub>NW<sup>1</sup>/<sub>4</sub> sec.27, T.2 N., R.1 E., Broadwater County, Hydrologic Unit 10020005, on left bank 50 ft downstream from bridge on U.S. Highway 10, 2.5 mi northwest of Three Forks, and at river mile 2,329.3.

DRAINAGE AREA.--9,532 mi<sup>2</sup>.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1978 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 4,076.76 ft (NGVD 29).

REMARKS.--Water-discharge records good except those for estimated daily discharges, which are poor. Some regulation by Ruby River Reservoir (station number 06020500) and Clark Canyon Reservoir (station number 06015300). Diversions for irrigation of about 390,000 acres upstream from station. U.S. Army Corps of Engineers satellite telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	756	705	1100	972	1040	e750	1210	2600	10300	1390	173	196
2	773	793	1100	939	1060	e800	1790	2750	11300	1210	158	205
3	802	1010	1100	957	1060	e850	2470	2870	11000	1090	152	203
4	829	1130	1070	976	1060	e800	2180	2870	9560	1030	161	189
5	863	1150	1070	988	1030	e800	1780	3070	7940	1020	159	173
6	857	1130	1070	954	e950	e850	1570	3190	6570	979	177	167
7	846	1140	1060	949	e850	e900	1460	2970	5650	878	172	178
8	835	1160	1000	923	e900	e800	1340	2690	4910	776	172	190
9	835	1180	959	863	e900	e850	1250	2460	4350	652	171	211
10	845	1120	927	681	e950	e900	1230	2290	4320	584	167	216
11	856	1110	968	637	e950	e950	1470	2170	4480	543	177	230
12	863	1120	1020	e800	e900	e1050	1910	2090	4490	470	195	240
13	869	1120	980	e900	e900	1140	2260	2100	4170	422	187	273
14	872	1130	997	e950	e900	1200	2660	2140	3830	396	180	277
15	878	1120	1020	e1000	957	1380	2940	2120	3760	354	168	299
16	881	1120	1020	e950	923	1370	2810	2180	3630	333	156	309
17	896	1110	1030	e750	918	1390	2550	2400	3420	304	165	328
18	902	1090	986	e650	908	1570	2240	2580	3260	283	170	351
19	905	1100	958	e700	901	1670	2110	2660	3170	269	177	372
20	908	1110	807	e750	890	1660	1990	2590	3030	253	175	414
21	913	1120	840	e800	915	1570	1900	2420	3570	240	175	433
22	910	1150	946	e700	935	1490	1980	2180	4210	226	178	462
23	919	1200	978	e600	e750	1440	2220	2010	4170	218	173	451
24	950	1210	911	e650	e550	1440	2580	2000	3850	199	176	444
25	965	1080	701	e750	e500	1430	2970	2490	3450	195	176	453
26	962	1020	568	e900	e550	1450	3340	3380	3040	207	174	426
27	947	995	653	e1000	e650	1440	3350	4670	2600	250	168	442
28	934	1110	e900	e1000	e700	1310	3160	6040	2160	313	173	443
29	957	1180	e950	e950	---	1200	2840	6970	1840	286	179	428
30	1000	1120	e950	e950	---	1140	2670	7850	1600	240	177	438
31	712	---	948	e1000	---	1130	---	8870	---	195	177	---
TOTAL	27240	32833	29587	26589	24497	36720	66230	99670	143630	15805	5338	9441
MEAN	879	1094	954	858	875	1185	2208	3215	4788	510	172	315
MAX	1000	1210	1100	1000	1060	1670	3350	8870	11300	1390	195	462
MIN	712	705	568	600	500	750	1210	2000	1600	195	152	167
AC-FT	54030	65120	58690	52740	48590	72830	131400	197700	284900	31350	10590	18730

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1978 - 2003, BY WATER YEAR (WY)

	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
MEAN	1582	1631	1342	1222	1298	1538	2384	3766	5097	2030	890	1127														
MAX	3163	2805	1993	1929	1964	2295	4444	7679	11420	5505	3030	3303														
(WY)	1985	1984	1999	1983	1984	1996	1996	1997	1997	1995	1984	1984														
MIN	803	1039	805	727	805	824	1371	990	988	352	59.1	262														
(WY)	1989	1989	1993	1993	2002	2002	1992	1992	1992	1988	1988	1994														

SUMMARY STATISTICS FOR 2002 CALENDAR YEAR FOR 2003 WATER YEAR WATER YEARS 1978 - 2003

ANNUAL TOTAL	415193	517580	
ANNUAL MEAN	1138	1418	1991
HIGHEST ANNUAL MEAN			3650
LOWEST ANNUAL MEAN			996
HIGHEST DAILY MEAN	6180	Jun 4	11300
LOWEST DAILY MEAN	204	Aug 21	152
ANNUAL SEVEN-DAY MINIMUM	222	Aug 19	164
MAXIMUM PEAK FLOW			11500
MAXIMUM PEAK STAGE			7.72
INSTANTANEOUS LOW FLOW			a145
ANNUAL RUNOFF (AC-FT)	823500	1027000	1443000
10 PERCENT EXCEEDS	2020	3030	3830
50 PERCENT EXCEEDS	910	954	1460
90 PERCENT EXCEEDS	481	195	607

a--Gage height, 1.75 ft.  
b--Gage height, 9.00 ft.  
c--Backwater from ice.  
d--Gage height, 1.31 ft.  
e--Estimated.

JEFFERSON RIVER BASIN

06036650 JEFFERSON RIVER NEAR THREE FORKS, MT--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1980-81, 1986, 1987, May 1999 to current year.

PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: June 1980 to September 1981, October 1999 to current year.

INSTRUMENTATION.--Temperature recorder since October 1999.

REMARKS--Daily water temperature records good. Unpublished records of instantaneous specific conductance and temperature data are available in files of the District office.

EXTREMES FOR PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: Maximum, 28.0°C, July 19-21, 2003; minimum, 0.0°C, on many days during winter period.

EXTREMES FOR CURRENT YEAR.--

WATER TEMPERATURE: Maximum, 28.0°C, July 19-21; minimum, 0.0°C, many days October through March.

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

Date	Time	Instantaneous discharge, cfs (00061)	pH, water, unfltrd field, std units (00400)	Specific conductance, wat unfltrd uS/cm 25 degC (00095)	Temperature, air, deg C (00020)	Temperature, water, deg C (00010)	Ammonia + org-N, water, unfltrd mg/L as N (00625)	Nitrite + nitrate, water, fltrd, mg/L as N (00631)	Nitrite water, fltrd, mg/L as N (00613)
APR 2003									
16...	1630	2810	8.2	228	12.0	10.0	.77	.158	.004
MAY									
20...	1230	2620	8.4	218	14.0	12.0	.44	<.022	<.002
JUN									
03...	1000	11200	8.0	170	24.0	14.0	.85	.023	.003
JUL									
29...	1300	290	8.6	419	28.0	24.0	.29	<.022	<.002

Date	Ortho-phosphate, water, fltrd, mg/L as P (00671)	Phosphorus, water, unfltrd mg/L (00665)	Suspnd. sedi-ment, sieve diametr <.063mm percent (70331)	Suspended sedi-ment concentration mg/L (80154)	Suspended sedi-ment load, tons/d (80155)
APR 2003					
16...	.023	.177	64	99	751
MAY					
20...	.009	.063	78	26	184
JUN					
03...	.040	.178	51	179	5410
JUL					
29...	<.007	.014	84	3	2.3

Date	Time	Hardness, water, unfltrd mg/L as CaCO3 (00900)	Calcium, water, fltrd, mg/L (00915)	Magnesium, water, fltrd, mg/L (00925)	Potassium, water, fltrd, mg/L (00935)	Sodium adsorption ratio (00931)	Sodium, water, fltrd, mg/L (00930)	Alkalinity, wat flt fxd end lab, mg/L as CaCO3 (29801)	Chloride, water, fltrd, mg/L (00940)	Fluoride, water, fltrd, mg/L (00950)	Silica, water, fltrd, mg/L (00955)
MAY											
20...	1230	89	23.7	7.17	2.33	.4	9.19	78	4.18	.2	16.0
JUL											
29...	1300	180	41.3	17.9	4.65	.7	20.7	145	9.84	.4	14.1

Date	Time	Sulfate, water, fltrd, mg/L (00945)	Residue water, sum of consti-tuents fltrd, mg/L (70301)	Residue water, fltrd, tons/ acre-ft (70303)	Residue water, fltrd, tons/d (70302)	Arsenic, water, unfltrd ug/L (01002)	Cadmium, water, unfltrd ug/L (01027)	Chromium, water, unfltrd recover-able, ug/L (01034)	Copper, water, unfltrd recover-able, ug/L (01042)	Lead, water, unfltrd recover-able, ug/L (01051)	Nickel, water, unfltrd recover-able, ug/L (01067)	Zinc, water, unfltrd recover-able, ug/L (01092)
MAY												
20...	24.9	134	.18	950	3	<.2	E.6	5.9	1.51	.85	11	
JUL												
29...	58.6	254	.35	199	4	<.04	<.8	1.5	.08	1.09	<2	

E--Estimated.

## JEFFERSON RIVER BASIN

06036650 JEFFERSON RIVER NEAR THREE FORKS, MT--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	10.5	8.0	9.0	0.0	0.0	0.0	1.0	0.0	0.5	0.0	0.0	0.0
2	10.5	7.0	8.5	0.5	0.0	0.0	2.5	0.5	1.5	0.0	0.0	0.0
3	9.0	7.5	8.0	0.0	0.0	0.0	2.5	1.0	2.0	0.5	0.0	0.0
4	10.5	7.5	9.0	0.5	0.0	0.0	1.5	1.0	1.0	0.5	0.0	0.0
5	9.5	8.5	9.0	0.5	0.0	0.0	1.5	0.0	1.0	1.0	0.0	0.5
6	11.0	8.0	9.5	1.0	0.0	0.5	1.5	0.0	1.0	0.5	0.0	0.0
7	12.5	9.0	10.5	1.0	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.0
8	12.0	9.0	10.5	3.0	0.5	1.5	0.0	0.0	0.0	0.0	0.0	0.0
9	12.0	9.0	10.5	2.5	1.5	2.0	0.0	0.0	0.0	0.0	0.0	0.0
10	11.0	8.5	10.0	2.5	1.5	2.0	0.0	0.0	0.0	0.0	0.0	0.0
11	10.0	8.0	9.0	3.5	2.0	2.5	0.5	0.0	0.0	0.0	0.0	0.0
12	8.5	5.5	7.0	3.0	2.0	2.5	0.5	0.0	0.0	0.0	0.0	0.0
13	8.5	5.0	7.0	3.5	2.0	3.0	1.0	0.0	0.5	0.0	0.0	0.0
14	9.0	6.0	7.5	3.0	2.5	3.0	2.5	1.0	2.0	0.0	0.0	0.0
15	9.0	5.5	7.5	3.5	2.0	3.0	2.5	2.0	2.5	0.0	0.0	0.0
16	8.5	6.0	7.5	3.5	2.5	2.5	2.0	1.5	1.5	0.0	0.0	0.0
17	9.0	6.0	7.5	3.0	2.0	2.5	2.0	1.0	1.5	0.0	0.0	0.0
18	9.0	6.0	7.5	3.0	2.0	2.5	1.0	0.0	0.0	0.0	0.0	0.0
19	8.5	5.0	7.0	3.0	2.0	2.5	0.0	0.0	0.0	0.0	0.0	0.0
20	9.0	6.0	7.5	5.0	2.5	4.0	0.0	0.0	0.0	0.0	0.0	0.0
21	10.0	7.0	8.5	5.5	4.0	4.5	0.0	0.0	0.0	0.0	0.0	0.0
22	8.5	6.0	7.0	5.5	3.5	4.5	0.0	0.0	0.0	0.0	0.0	0.0
23	6.0	4.0	4.5	5.0	2.5	4.0	0.0	0.0	0.0	0.0	0.0	0.0
24	4.5	2.0	3.5	2.5	0.0	1.5	0.0	0.0	0.0	0.0	0.0	0.0
25	5.0	2.0	3.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
26	5.0	2.0	3.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
27	4.5	2.0	3.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
28	5.0	3.5	4.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
29	4.0	1.0	2.0	1.5	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0
30	1.0	0.0	0.0	1.5	0.5	1.0	0.0	0.0	0.0	1.0	0.0	0.5
31	0.5	0.0	0.0	---	---	---	0.5	0.0	0.0	2.5	1.0	1.5
MONTH	12.5	0.0	7.0	5.5	0.0	1.5	2.5	0.0	0.5	2.5	0.0	0.0
	FEBRUARY			MARCH			APRIL			MAY		
1	3.5	2.0	3.0	0.0	0.0	0.0	8.5	7.5	8.0	12.0	9.5	10.5
2	3.5	2.0	3.0	0.0	0.0	0.0	8.0	6.0	7.5	12.0	9.5	10.5
3	2.0	1.0	1.5	0.0	0.0	0.0	6.5	5.0	5.5	11.0	10.0	10.5
4	1.5	0.5	1.0	0.0	0.0	0.0	6.0	4.0	5.0	11.5	9.0	10.0
5	0.5	0.0	0.0	0.0	0.0	0.0	8.0	4.5	6.0	11.0	9.5	10.0
6	0.0	0.0	0.0	0.0	0.0	0.0	7.5	5.5	7.0	10.5	8.5	9.5
7	0.0	0.0	0.0	0.0	0.0	0.0	9.0	5.5	7.0	12.5	9.0	10.5
8	0.0	0.0	0.0	0.0	0.0	0.0	10.5	6.0	8.0	11.5	9.5	10.5
9	0.5	0.0	0.0	0.0	0.0	0.0	12.5	8.0	10.0	11.0	9.0	10.0
10	1.0	0.0	0.5	0.0	0.0	0.0	13.5	9.0	11.5	11.0	8.5	10.0
11	1.0	0.0	0.5	0.5	0.0	0.0	13.5	10.5	12.0	12.0	9.0	10.5
12	1.5	0.0	0.5	2.0	0.0	1.0	14.0	11.0	12.5	12.5	10.5	11.5
13	1.0	0.0	0.5	6.5	1.0	4.0	13.5	11.5	12.0	14.0	10.0	12.0
14	2.0	0.0	1.0	8.5	6.0	7.0	11.5	10.0	10.5	16.0	12.0	14.0
15	3.0	1.0	2.0	8.0	6.5	7.0	10.0	8.5	9.5	17.5	14.0	15.5
16	2.5	1.0	2.0	7.0	6.0	6.5	10.0	7.0	8.5	16.5	14.0	15.0
17	3.0	1.0	2.0	7.0	5.0	6.0	9.0	8.0	8.5	15.0	12.5	13.5
18	2.5	0.5	1.5	6.0	4.5	5.5	9.0	8.5	8.5	12.5	10.0	12.0
19	3.0	0.5	2.0	6.5	3.5	5.0	11.5	8.0	9.5	12.0	8.5	10.0
20	2.5	0.5	1.5	7.5	4.5	6.0	12.5	9.0	11.0	13.0	9.5	11.5
21	3.5	1.0	2.0	7.0	6.0	6.5	14.0	10.0	12.0	14.0	11.5	12.5
22	3.0	0.0	1.5	8.5	6.0	7.0	15.0	11.5	13.0	16.0	12.0	14.0
23	0.0	0.0	0.0	9.0	6.5	7.5	13.5	12.0	13.0	18.5	14.5	16.0
24	0.0	0.0	0.0	7.5	5.5	6.5	12.5	11.5	12.0	20.5	16.5	18.5
25	0.0	0.0	0.0	6.0	5.0	5.5	11.5	10.0	11.0	20.0	17.5	18.5
26	0.0	0.0	0.0	6.0	4.5	5.0	10.0	8.0	9.0	18.5	16.5	17.5
27	0.0	0.0	0.0	4.5	3.5	4.0	10.0	7.0	8.5	18.5	16.0	17.0
28	0.0	0.0	0.0	6.5	2.5	4.5	9.0	7.5	8.5	18.5	16.0	17.5
29	---	---	---	8.5	4.5	6.0	8.0	7.5	7.5	19.5	17.0	18.5
30	---	---	---	10.0	6.5	8.0	10.5	7.5	9.0	18.5	17.0	18.0
31	---	---	---	10.0	8.0	8.5	---	---	---	17.0	16.0	16.5
MONTH	3.5	0.0	1.0	10.0	0.0	4.0	15.0	4.0	9.5	20.5	8.5	13.5



## JEFFERSON RIVER BASIN

06036650 JEFFERSON RIVER NEAR THREE FORKS, MT--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003--Continued

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
1	16.5	15.5	16.0	23.5	20.0	21.5	27.0	21.0	23.5	22.0	17.0	19.5
2	16.0	14.5	15.0	23.0	19.5	21.0	27.0	21.5	24.5	22.0	17.0	19.5
3	16.0	13.5	14.5	22.5	18.5	20.5	25.5	22.0	23.5	22.0	17.0	19.5
4	15.5	14.5	15.0	23.5	19.5	21.0	25.5	21.5	23.0	21.5	17.5	19.5
5	16.0	14.0	15.0	23.0	19.0	21.0	25.0	20.0	22.5	20.5	17.5	19.0
6	15.5	14.0	14.5	23.0	18.5	20.5	25.5	19.5	22.0	19.5	18.0	18.5
7	15.5	13.0	14.0	24.0	19.0	21.5	26.0	19.5	22.5	22.0	17.0	19.5
8	17.5	14.0	15.5	22.5	19.5	20.5	24.0	20.5	22.5	19.5	15.5	17.5
9	18.0	15.5	17.0	23.0	18.0	20.5	25.5	19.0	22.0	17.5	13.5	15.5
10	18.5	16.5	17.5	24.5	19.5	22.0	25.5	20.0	23.0	16.5	14.5	15.5
11	19.0	16.5	17.5	25.5	20.5	23.0	24.0	20.5	22.0	16.0	13.5	14.5
12	19.0	15.5	17.5	26.0	21.5	24.0	25.0	19.5	22.0	14.0	12.0	13.0
13	18.5	16.5	17.5	25.5	22.0	23.5	25.0	20.0	22.0	15.0	11.5	13.0
14	19.0	16.5	17.5	25.5	20.5	23.0	26.0	20.0	22.5	16.0	11.5	13.5
15	20.0	16.5	18.0	26.0	21.5	23.5	26.5	21.5	24.0	14.0	12.5	13.0
16	20.5	17.0	19.0	25.5	21.5	23.5	25.5	21.0	23.0	14.0	12.0	12.5
17	21.0	18.0	19.5	26.0	21.5	23.5	23.0	19.5	21.5	12.5	10.5	11.5
18	21.0	19.0	20.0	27.5	21.5	24.5	23.5	18.0	20.5	13.0	9.5	11.0
19	20.5	19.0	19.5	28.0	22.5	25.0	24.5	19.0	21.5	13.5	10.0	11.5
20	19.5	17.5	18.5	28.0	22.5	25.5	25.5	20.0	22.5	14.5	11.5	13.0
21	17.5	16.0	17.0	28.0	22.0	25.0	24.0	19.5	22.0	14.5	11.5	13.0
22	16.5	14.0	15.0	27.5	22.5	25.0	23.5	20.0	21.5	15.0	11.5	13.5
23	16.0	12.5	14.0	27.0	22.5	24.5	24.0	19.0	21.5	15.5	12.5	14.0
24	14.5	13.0	14.0	26.5	22.5	24.0	24.5	18.5	21.5	15.5	12.0	13.5
25	16.0	12.0	14.0	25.5	22.0	23.5	24.5	19.0	21.5	15.0	12.5	14.0
26	17.5	14.5	16.0	27.0	22.0	24.0	23.5	19.5	21.5	16.5	13.5	15.0
27	19.5	15.5	17.5	27.0	22.5	24.5	22.5	19.5	20.5	16.5	13.0	14.5
28	22.0	18.0	20.0	27.0	23.0	25.0	22.0	17.5	19.5	16.0	13.0	14.5
29	23.0	19.0	21.0	26.0	22.0	24.0	21.0	16.0	18.5	15.5	13.0	14.0
30	23.5	20.0	21.5	26.5	21.5	24.0	21.5	16.5	19.0	14.5	11.5	13.0
31	---	---	---	26.5	21.5	23.5	22.0	16.5	19.0	---	---	---
MONTH	23.5	12.0	17.0	28.0	18.0	23.0	27.0	16.0	22.0	22.0	9.5	15.0

## MADISON RIVER BASIN

## 06036905 FIREHOLE RIVER NEAR WEST YELLOWSTONE, MT

LOCATION.--Lat 44°37'13", long 110°51'44" (NAD 27), Yellowstone National Park, Hydrologic Unit 10020007, on right bank 1.6 mi south of Madison Junction, 12 mi east of West Yellowstone, and at river mile 1.8.

DRAINAGE AREA.--282 mi<sup>2</sup>.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1983 to March 1996, October 2002 to September 2003.

GAGE.--Water-stage recorder. Elevation of gage is 7,050 ft (NGVD 29).

REMARKS.--Water-discharge records good. No regulation or diversions upstream from station. U. S. Geological Survey satellite telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	240	237	250	250	316	248	289	325	589	258	234	228
2	242	238	253	249	283	246	294	307	528	254	230	227
3	246	235	253	253	261	251	279	325	479	249	228	234
4	245	243	252	254	260	250	272	374	448	247	247	229
5	276	240	251	256	253	247	263	341	422	246	240	230
6	251	241	251	249	244	246	261	342	411	245	234	245
7	243	244	250	248	243	254	254	321	393	244	229	239
8	240	251	244	248	255	257	254	305	387	240	226	242
9	237	249	244	247	250	258	267	297	402	238	228	238
10	235	253	246	244	248	259	291	288	396	236	228	250
11	248	249	248	250	252	261	310	288	390	235	225	243
12	239	248	249	248	250	264	333	304	382	235	225	242
13	239	251	251	250	250	280	337	361	368	232	225	239
14	241	250	253	255	254	293	336	347	369	229	224	237
15	239	247	255	258	251	281	360	386	353	232	225	237
16	239	246	253	250	257	282	309	425	347	230	225	238
17	237	250	259	250	253	264	300	464	329	231	225	238
18	237	246	250	248	253	254	303	473	323	234	229	236
19	235	246	250	250	249	254	293	396	318	238	227	237
20	236	250	252	251	250	253	286	382	306	242	224	236
21	236	258	254	253	254	253	297	402	303	240	223	235
22	237	258	255	252	257	257	315	466	301	240	225	233
23	241	277	248	257	253	294	335	518	309	240	229	233
24	254	258	244	252	240	262	325	585	292	241	225	233
25	242	247	243	251	247	255	328	620	286	245	224	232
26	239	248	252	253	251	269	374	589	278	245	224	232
27	239	250	254	273	251	265	339	608	271	246	225	232
28	243	252	260	265	247	257	338	596	268	240	228	233
29	237	254	257	257	---	253	344	619	265	240	228	233
30	238	251	254	260	---	264	328	644	262	234	239	233
31	238	---	256	273	---	280	---	594	---	233	232	---
TOTAL	7489	7467	7791	7854	7132	8111	9214	13292	10775	7439	7080	7074
MEAN	242	249	251	253	255	262	307	429	359	240	228	236
MAX	276	277	260	273	316	294	374	644	589	258	247	250
MIN	235	235	243	244	240	246	254	288	262	229	223	227
AC-FT	14850	14810	15450	15580	14150	16090	18280	26360	21370	14760	14040	14030

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1984 - 2003, BY WATER YEAR (WY)\*

	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
MEAN	280	275	268	263	262	271	332	488	429	295	271	272
MAX	356	348	316	298	304	336	398	613	756	415	371	368
(WY)	1984	1984	1984	1985	1986	1986	1986	1986	1986	1986	1986	1986
MIN	225	227	220	223	226	239	276	367	273	221	212	217
(WY)	1989	1993	1993	1993	1993	1992	1993	1987	1992	1988	1994	1988

## SUMMARY STATISTICS

## FOR 2003 WATER YEAR

## WATER YEARS 1984 - 2003\*

ANNUAL TOTAL	100718	
ANNUAL MEAN	276	308
HIGHEST ANNUAL MEAN		399
LOWEST ANNUAL MEAN		264
HIGHEST DAILY MEAN	644	1240
LOWEST DAILY MEAN	223	201
ANNUAL SEVEN-DAY MINIMUM	225	205
MAXIMUM PEAK FLOW	754	b2050
MAXIMUM PEAK STAGE	4.28	c6.10
INSTANTANEOUS LOW FLOW	a217	d190
ANNUAL RUNOFF (AC-FT)	199800	223300
10 PERCENT EXCEEDS	349	422
50 PERCENT EXCEEDS	251	277
90 PERCENT EXCEEDS	232	232

\*--During periods of operation (October 1983 to March 1996, October 2002 to September 2003).

a--Gage height, 2.91 ft.

b--From rating curve extended above 1,540 ft<sup>3</sup>/s.

c--From floodmark.

d--Gage height, 3.03 ft.

## MADISON RIVER BASIN

06036905 FIREHOLE RIVER NEAR WEST YELLOWSTONE, MT--Continued

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1983 to 1993, October 2002 to September 2003.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: August 1983 to September 1986, October 1987 to September 1988.

WATER TEMPERATURE: October 1983 to September 1993, October 2002 to September 2003.

INSTRUMENTATION.--Temperature recorder installed Sept. 18, 2002.

REMARKS.--Daily water temperature records good. Unpublished records of instantaneous water temperature and specific conductance are available in files of the District office.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: Maximum 633 microsiemens per centimeter ( $\mu\text{s}/\text{cm}$ ) at 25.0°C, Apr. 1, 1988; minimum 140  $\mu\text{s}/\text{cm}$  at 25.0°C, June 5, 1986.

WATER TEMPERATURE: Maximum, 30.0°C, June 24, 1988; minimum, 0.5°C Dec. 21, 1990.

EXTREMES FOR CURRENT YEAR.--

WATER TEMPERATURE: Maximum, 29.0°C, July 18 and 21; minimum, 3.0°C, Feb. 24.

## WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
1	13.5	11.0	12.5	11.0	6.5	8.5	12.5	10.0	11.0	11.0	9.0	10.0
2	17.0	10.0	13.0	9.5	6.5	8.0	13.0	11.5	12.0	10.5	9.0	10.0
3	15.0	13.0	14.5	10.5	6.5	8.5	12.5	11.5	12.0	11.5	9.5	10.5
4	16.0	14.0	15.0	11.0	7.5	9.0	13.0	12.0	12.5	12.5	9.5	11.0
5	15.0	13.5	14.0	11.5	7.0	9.5	12.5	11.0	11.5	12.5	10.0	11.5
6	17.0	13.5	15.0	13.0	8.5	10.5	13.0	11.0	12.0	10.5	8.0	9.5
7	18.0	13.5	15.5	12.5	9.0	10.5	12.0	10.0	11.0	10.0	7.5	9.0
8	18.5	13.5	16.0	10.5	9.5	10.0	10.0	8.0	9.0	9.5	7.0	8.5
9	17.5	13.0	15.5	11.5	9.5	10.5	10.0	7.5	8.5	9.0	6.5	8.0
10	15.5	12.5	14.0	12.5	10.5	11.0	10.5	7.0	9.0	10.0	5.5	7.5
11	14.5	12.0	13.0	11.5	10.0	10.5	10.0	8.5	9.0	12.0	9.5	10.5
12	15.0	9.5	12.5	11.5	10.0	10.5	11.0	9.0	10.0	11.5	10.0	11.0
13	16.0	10.5	13.0	13.0	11.5	12.0	11.5	10.5	11.0	11.5	9.5	10.5
14	16.5	10.5	13.5	12.0	10.0	11.0	12.5	11.0	12.0	13.5	11.5	12.5
15	16.5	11.5	14.0	11.5	9.5	10.5	12.0	8.0	10.0	11.5	8.5	10.0
16	17.0	12.0	14.5	11.5	8.5	10.0	10.5	8.0	9.5	10.5	7.5	9.0
17	17.0	11.5	14.5	11.0	9.5	10.0	11.5	9.5	10.5	10.0	8.0	9.0
18	17.0	11.5	14.5	10.0	8.5	9.5	9.5	7.5	8.0	9.5	6.0	8.0
19	16.5	11.5	14.0	11.5	8.5	10.0	8.5	6.0	7.5	11.5	9.0	10.5
20	16.5	12.0	14.5	14.0	11.5	13.0	9.5	7.0	8.0	10.5	9.0	10.0
21	16.5	13.0	15.0	16.0	13.5	14.5	10.0	8.0	9.0	11.0	9.0	10.0
22	15.5	11.0	13.0	15.0	12.0	13.5	11.0	9.5	10.0	10.5	8.5	9.5
23	15.0	11.0	12.5	14.0	8.5	11.5	9.5	7.0	7.5	11.0	9.5	10.5
24	14.0	11.5	12.5	10.5	8.0	9.0	7.0	5.0	6.0	12.0	8.5	10.0
25	14.5	10.0	12.5	9.5	6.0	7.5	7.5	4.0	5.5	12.5	10.5	11.0
26	14.5	10.0	12.5	9.0	6.0	8.0	8.5	6.5	7.5	11.5	10.0	11.0
27	14.0	10.0	12.0	11.5	8.5	10.0	9.0	7.5	8.5	11.5	10.0	10.5
28	12.5	10.5	11.5	13.5	11.0	12.5	10.5	8.5	9.5	11.5	8.5	10.5
29	11.0	8.0	10.0	13.0	11.5	12.5	10.5	8.0	9.0	12.0	10.5	11.0
30	9.5	7.0	8.0	12.5	11.0	12.0	9.0	7.5	8.0	11.0	9.0	10.0
31	10.5	7.5	9.0	---	---	---	11.5	8.5	10.0	11.0	10.5	10.5
MONTH	18.5	7.0	13.5	16.0	6.0	10.5	13.0	4.0	9.5	13.5	5.5	10.0

## MADISON RIVER BASIN

06036905 FIREHOLE RIVER NEAR WEST YELLOWSTONE, MT--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003--Continued

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	FEBRUARY			MARCH			APRIL			MAY		
1	11.0	9.5	10.5	12.0	9.0	10.5	14.0	11.5	12.5	16.0	13.0	14.5
2	9.5	8.0	8.5	9.5	6.0	8.0	16.5	12.0	14.0	17.5	13.0	15.0
3	9.5	6.5	8.0	11.5	8.0	10.0	12.0	9.5	11.0	16.0	14.0	15.5
4	10.5	7.5	9.0	12.5	9.0	10.5	15.0	9.0	11.5	16.5	13.0	14.5
5	9.5	6.5	8.0	9.5	6.5	7.5	17.0	9.5	13.0	17.0	12.0	14.0
6	8.5	4.5	6.5	9.0	5.5	7.0	14.5	11.0	12.5	17.0	11.5	14.0
7	9.5	4.5	7.0	8.0	6.0	7.0	18.0	11.0	14.0	19.5	12.0	15.5
8	10.0	7.5	9.0	10.0	6.0	8.0	19.5	11.0	15.0	18.0	14.5	16.0
9	10.0	7.5	8.5	10.5	9.0	9.5	19.5	12.5	16.0	15.0	12.5	13.5
10	10.5	6.5	8.5	13.5	9.0	11.0	20.5	12.5	16.5	16.5	12.0	14.0
11	12.0	8.0	10.0	14.0	10.0	11.5	20.5	12.5	16.5	17.0	13.5	15.0
12	12.5	7.0	10.0	14.5	9.5	11.5	19.0	12.0	15.5	17.0	14.5	15.5
13	12.5	8.5	10.5	16.5	11.0	13.5	18.0	12.5	15.5	19.5	12.5	15.5
14	14.5	12.5	13.0	14.5	11.5	13.0	17.0	12.5	15.0	21.5	13.5	17.5
15	14.0	12.5	13.0	15.5	10.5	13.0	16.0	12.5	14.5	19.5	14.5	17.5
16	12.5	8.5	11.0	15.5	12.5	13.5	16.5	11.0	13.5	17.5	12.0	15.0
17	9.5	7.0	8.0	12.5	10.0	11.5	15.5	12.5	14.0	17.0	10.0	13.5
18	13.0	8.0	10.0	10.0	9.0	9.5	16.0	13.0	14.5	14.0	9.5	11.5
19	12.0	8.5	10.0	16.0	9.5	12.5	17.5	11.5	14.5	17.0	9.0	13.0
20	12.0	7.5	10.0	16.0	10.0	13.0	20.5	12.5	16.5	18.5	11.0	15.0
21	10.0	8.5	9.5	14.5	12.0	13.0	20.0	13.0	16.5	17.0	12.5	15.5
22	11.0	9.0	10.0	14.5	11.0	13.0	18.5	14.0	16.5	18.5	12.0	16.0
23	10.5	5.5	8.5	13.5	9.5	11.0	16.0	14.0	15.0	19.5	11.5	16.0
24	8.5	3.0	5.5	14.5	8.5	11.5	17.5	14.0	15.5	20.0	10.5	16.0
25	10.0	4.0	7.0	12.5	10.0	11.0	19.0	14.0	16.0	19.0	11.5	15.5
26	11.5	5.5	9.0	13.0	10.0	11.0	16.5	10.5	13.0	18.0	12.5	15.5
27	13.0	8.5	10.5	12.5	8.5	10.5	17.5	8.5	12.5	20.0	12.5	16.5
28	12.5	8.0	10.0	16.5	8.5	12.0	16.0	11.5	13.5	20.0	13.5	17.5
29	---	---	---	16.0	9.0	12.5	17.0	12.5	14.5	19.5	14.5	17.5
30	---	---	---	17.0	11.0	14.0	17.0	13.0	15.0	17.5	13.0	15.5
31	---	---	---	15.0	11.5	13.5	---	---	---	18.0	14.0	16.0
MONTH	14.5	3.0	9.0	17.0	5.5	11.0	20.5	8.5	14.5	21.5	9.0	15.5
	JUNE			JULY			AUGUST			SEPTEMBER		
1	18.0	14.0	16.0	26.0	19.5	22.5	27.5	19.5	23.5	25.0	18.0	21.5
2	17.5	13.5	15.5	25.0	19.0	22.0	28.0	20.5	24.0	24.0	18.0	21.5
3	18.0	12.5	15.5	25.0	18.0	21.0	26.0	22.0	24.0	25.0	18.5	21.5
4	17.0	13.5	15.5	25.5	18.0	21.5	24.0	21.0	22.0	24.5	18.5	21.5
5	19.0	13.0	16.0	25.5	18.5	22.0	27.0	19.5	23.0	22.0	18.5	20.0
6	18.5	14.0	16.0	26.5	18.5	22.5	26.5	20.5	23.5	22.0	19.5	20.5
7	20.5	13.0	17.0	27.0	19.0	23.0	26.5	19.5	23.0	24.5	19.0	21.5
8	21.0	14.5	18.0	23.0	19.5	21.5	24.0	19.0	22.0	21.5	16.5	19.5
9	20.5	16.5	19.0	26.5	17.5	21.5	24.0	19.0	21.5	18.5	14.0	16.5
10	21.0	16.0	18.5	28.0	19.0	23.5	25.5	19.5	22.5	17.5	16.0	17.0
11	20.0	15.5	17.5	28.0	20.5	24.5	27.0	20.0	23.5	17.5	15.5	16.5
12	21.5	15.0	18.5	28.0	21.0	24.5	26.0	20.5	23.0	17.0	15.0	16.0
13	21.0	16.0	19.0	26.0	20.5	23.0	26.5	20.0	23.0	19.0	13.0	16.0
14	22.5	16.0	19.0	27.0	18.5	22.5	28.5	20.5	24.0	20.0	13.5	16.5
15	23.5	17.0	20.0	27.5	20.0	24.0	26.5	21.5	24.0	19.0	14.5	16.5
16	24.0	18.0	21.0	27.5	20.5	24.0	26.0	20.5	23.0	17.5	13.0	16.0
17	25.0	19.0	22.0	28.0	21.0	24.5	22.5	19.0	20.0	15.5	12.5	14.0
18	27.0	18.5	22.5	29.0	22.0	25.5	25.5	16.5	20.5	17.0	11.5	14.0
19	24.0	19.5	22.0	26.5	21.5	24.0	26.0	19.0	22.5	17.5	12.5	15.0
20	22.5	19.0	20.5	28.5	21.0	25.0	26.5	20.0	23.0	20.0	13.5	16.5
21	20.5	16.5	18.5	29.0	22.0	25.5	25.0	20.0	22.5	19.0	13.5	16.5
22	17.5	15.0	16.0	28.5	21.0	25.0	24.5	21.5	22.5	20.0	13.5	16.5
23	18.5	14.5	16.5	28.5	21.5	25.0	25.0	19.0	22.0	20.0	14.0	17.0
24	18.0	15.0	16.5	28.5	22.5	25.5	25.0	19.0	21.5	20.5	14.0	17.5
25	20.5	14.0	17.0	25.5	22.5	24.0	26.5	18.5	22.5	20.0	15.0	17.5
26	23.5	16.0	19.5	27.0	22.0	24.0	25.5	18.0	22.0	20.5	15.5	18.0
27	25.0	17.5	21.5	28.5	22.0	25.0	22.5	20.0	21.0	21.5	15.0	18.0
28	25.5	20.0	22.5	28.0	21.5	25.0	23.5	18.5	21.0	21.5	15.0	18.5
29	25.5	19.0	22.5	28.0	20.0	24.0	21.0	18.0	19.5	21.0	15.5	18.0
30	26.0	19.5	23.0	27.0	20.0	23.5	22.5	18.0	20.0	20.5	14.5	17.5
31	---	---	---	25.0	21.0	23.5	25.0	17.5	21.0	---	---	---
MONTH	27.0	12.5	19.0	29.0	17.5	23.5	28.5	16.5	22.5	25.0	11.5	18.0

MADISON RIVER BASIN

06037100 GIBBON RIVER AT MADISON JUNCTION, YELLOWSTONE NATIONAL PARK

LOCATION.--Lat 44°38'26", long 110°51'38" (NAD 27), Yellowstone National Park, Hydrologic Unit 10020007, on left bank 40 ft downstream from highway bridge, 0.4 mi south of Madison Junction, 14 mi east of West Yellowstone, and at river mile 0.2.

DRAINAGE AREA.--126 mi<sup>2</sup>.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--April 2001 to September 2001, October 2002 to September 2003.

GAGE.--Water-stage recorder. Elevation of gage is 6,800 ft (NGVD 29).

REMARKS.--Water-discharge records good. No regulation or diversions upstream from station. U. S. Geological Survey satellite telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	103	89	92	94	115	88	101	201	494	141	101	91
2	101	89	94	93	109	85	109	187	387	137	99	90
3	102	86	94	95	97	89	105	202	326	134	99	89
4	102	89	94	95	98	89	101	227	288	133	109	89
5	116	88	93	97	93	88	95	229	264	130	106	90
6	107	88	95	90	92	91	97	217	250	128	102	97
7	101	91	93	90	e90	92	92	197	238	126	98	96
8	98	94	87	e88	92	92	91	194	224	124	96	101
9	96	95	87	e86	94	89	96	183	217	122	99	98
10	95	94	88	e85	95	92	110	173	210	118	100	100
11	102	92	92	91	93	93	127	170	201	117	98	99
12	98	92	93	94	91	93	148	182	193	115	97	97
13	96	94	94	94	92	98	167	211	189	112	96	95
14	98	93	94	97	97	107	179	234	192	109	94	94
15	97	92	95	98	95	104	196	294	185	108	95	93
16	98	93	95	90	96	105	178	360	184	107	98	94
17	97	93	97	92	95	99	161	428	179	105	96	94
18	96	89	90	91	93	95	155	441	182	104	98	92
19	93	93	89	93	90	93	142	330	191	104	95	92
20	93	91	92	95	90	92	137	292	182	105	94	92
21	93	94	95	96	97	92	155	295	180	103	93	91
22	93	95	94	96	97	92	179	319	183	102	94	90
23	93	103	90	98	92	101	226	390	197	101	94	90
24	96	96	87	94	e82	92	204	453	177	102	92	89
25	93	89	e85	94	e85	92	209	503	177	106	91	89
26	91	93	90	95	87	97	240	504	168	111	91	88
27	91	94	94	101	87	96	202	506	162	112	91	88
28	93	96	96	101	87	90	192	496	156	106	93	88
29	91	97	98	95	---	89	188	469	152	102	93	88
30	88	95	95	100	---	91	185	441	147	100	96	87
31	89	---	96	101	---	95	---	432	---	100	94	---
TOTAL	3000	2777	2868	2919	2621	2901	4567	9760	6475	3524	2992	2771
MEAN	96.8	92.6	92.5	94.2	93.6	93.6	152	315	216	114	96.5	92.4
MAX	116	103	98	101	115	107	240	506	494	141	109	101
MIN	88	86	85	85	82	85	91	170	147	100	91	87
AC-FT	5950	5510	5690	5790	5200	5750	9060	19360	12840	6990	5930	5500

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 2001 - 2003, BY WATER YEAR (WY)\*

	2001	2002	2003	2001	2002	2003	2001	2002	2003	2001	2002	2003
MEAN	96.8	92.6	92.5	94.2	93.6	93.6	141	280	176	111	92.1	87.5
MAX	96.8	92.6	92.5	94.2	93.6	93.6	152	315	216	114	96.5	92.4
(WY)	2003	2003	2003	2003	2003	2003	2003	2003	2003	2003	2003	2003
MIN	96.8	92.6	92.5	94.2	93.6	93.6	130	246	137	109	87.7	82.6
(WY)	2003	2003	2003	2003	2003	2003	2001	2001	2001	2001	2001	2001

SUMMARY STATISTICS

FOR 2003 WATER YEAR

WATER YEARS 2001 - 2003\*

ANNUAL TOTAL	47175		
ANNUAL MEAN	129	129	
HIGHEST ANNUAL MEAN		129	2003
LOWEST ANNUAL MEAN		129	2003
HIGHEST DAILY MEAN	506	May 27	584
LOWEST DAILY MEAN	82	Feb 24	79
ANNUAL SEVEN-DAY MINIMUM	86	Feb 24	81
MAXIMUM PEAK FLOW	a555	May 25	674
MAXIMUM PEAK STAGE	b5.58	Feb 25	5.93
INSTANTANEOUS LOW FLOW	c81	Dec 24	
ANNUAL RUNOFF (AC-FT)	93570		93630
10 PERCENT EXCEEDS	203		203
50 PERCENT EXCEEDS	96		96
90 PERCENT EXCEEDS	89		89

\*--During periods of operation (April 2001 to September 2001, October 2002 to September 2003).

a--Gage height, 5.35 ft.

b--Backwater from ice.

c--Gage height, 3.89 ft, but may have been lower during period of ice effect.

e--Estimated.

## MADISON RIVER BASIN

06037100 GIBBON RIVER AT MADISON JUNCTION, YELLOWSTONE NATIONAL PARK--Continued

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--October 2002 to September 2003.

PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: October 2002 to September 2003.

INSTRUMENTATION.--Temperature recorder installed Sept. 19, 2002.

REMARKS.--Daily water temperature records good. Unpublished records of instantaneous water temperature and specific conductance are available in files of the District office.

EXTREMES FOR PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: Maximum, 25.5°C, July 21, 2003; minimum, 0.0°C, several days during winter months.

EXTREMES FOR CURRENT YEAR.--

WATER TEMPERATURE: Maximum, 25.5°C, July 21; minimum, 0.0°C, several days November through February.

## WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
1	9.0	7.0	8.0	4.0	0.5	2.5	6.5	4.5	5.5	5.5	3.0	4.5
2	12.0	5.5	8.5	5.5	1.0	3.0	7.5	6.0	7.0	5.5	4.5	5.0
3	10.0	7.0	9.0	4.5	0.0	2.5	7.5	6.5	7.0	6.5	5.0	6.0
4	11.0	9.0	10.0	5.5	1.5	3.5	8.5	7.0	7.5	7.0	4.5	6.0
5	10.5	9.5	10.0	6.0	1.0	3.5	8.0	6.5	7.0	7.5	5.0	6.5
6	13.0	9.0	10.5	7.0	3.0	5.0	8.0	6.0	7.0	5.0	2.5	4.0
7	14.0	8.0	11.0	7.0	3.0	5.0	7.0	4.5	6.0	4.5	2.0	3.0
8	14.0	8.5	11.0	6.5	4.5	5.5	4.5	2.0	3.5	3.5	0.5	2.0
9	13.5	8.5	11.0	7.0	5.5	6.0	4.0	1.0	3.0	3.0	0.5	1.5
10	12.0	8.0	10.0	7.5	5.5	6.5	4.5	1.0	3.0	3.0	0.0	1.0
11	10.5	8.0	9.0	6.5	5.0	6.0	5.0	3.5	4.5	6.0	3.0	4.5
12	10.5	5.0	7.5	6.5	5.5	6.0	6.0	4.0	5.0	6.5	5.5	6.0
13	10.5	5.0	8.0	8.0	6.0	7.0	6.5	6.0	6.5	7.0	5.5	6.5
14	11.0	5.5	8.0	7.0	5.0	6.0	8.0	6.5	7.0	8.0	6.5	7.0
15	11.5	6.0	9.0	7.0	4.5	5.5	8.0	6.0	7.0	7.0	3.5	5.5
16	12.0	7.0	9.0	6.5	3.5	5.0	6.0	4.5	5.5	5.5	3.0	4.0
17	12.0	6.5	9.0	6.0	3.5	5.0	6.5	4.5	6.0	5.0	2.5	4.0
18	12.0	6.5	9.0	5.5	3.0	4.0	4.5	2.0	3.0	4.0	0.5	2.5
19	11.5	6.0	8.5	7.0	4.5	5.5	3.5	1.5	2.5	7.0	4.0	5.0
20	12.0	7.0	9.5	8.5	7.0	7.5	4.0	1.5	2.5	6.0	3.5	5.0
21	12.0	8.5	10.0	10.5	8.5	9.0	4.5	2.5	4.0	6.5	5.0	6.0
22	10.5	7.0	9.0	10.0	7.0	8.5	5.5	4.0	4.5	6.5	5.0	6.0
23	9.5	6.0	7.5	9.0	4.5	7.0	4.0	1.0	2.0	7.0	4.5	6.0
24	10.0	6.5	8.5	5.0	2.0	3.5	1.0	0.0	0.5	6.5	3.0	5.0
25	9.5	5.0	7.0	3.0	0.0	1.5	1.0	0.0	0.5	7.5	5.5	6.5
26	9.0	4.0	6.5	3.0	0.0	2.0	3.5	0.5	2.0	7.5	6.5	7.0
27	9.0	4.5	6.5	6.0	2.5	4.0	4.5	3.5	4.0	7.5	5.5	7.0
28	8.5	6.5	7.0	8.0	5.5	7.0	6.5	4.5	5.5	7.0	4.5	5.5
29	7.0	3.5	5.5	8.5	7.0	7.5	6.0	4.5	5.5	7.0	5.5	6.5
30	4.0	2.0	3.0	8.0	6.0	7.0	4.5	3.5	4.0	7.0	5.5	6.0
31	4.5	1.0	2.5	---	---	---	6.0	4.5	5.0	7.5	5.5	7.0
MONTH	14.0	1.0	8.5	10.5	0.0	5.0	8.5	0.0	4.5	8.0	0.0	5.0

## MADISON RIVER BASIN

06037100 GIBBON RIVER AT MADISON JUNCTION, YELLOWSTONE NATIONAL PARK--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003--Continued

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	FEBRUARY			MARCH			APRIL			MAY		
1	8.0	6.5	7.5	8.0	3.5	5.0	10.5	8.0	9.5	10.5	7.0	8.5
2	6.5	3.5	5.5	5.0	0.5	3.0	12.5	7.0	9.5	12.5	7.5	10.0
3	4.5	1.5	3.0	6.5	4.0	5.0	8.5	5.0	6.5	12.5	9.0	10.5
4	5.0	2.5	3.5	7.0	3.5	5.0	10.0	4.5	7.0	11.5	8.0	10.0
5	4.0	1.0	2.5	4.5	2.0	3.0	11.5	3.5	7.5	12.0	7.0	9.5
6	2.0	0.0	1.0	4.0	2.5	3.5	10.5	6.5	8.0	11.5	6.5	9.0
7	2.5	0.0	1.0	4.0	2.5	3.0	13.5	6.0	9.0	14.5	8.0	11.0
8	4.5	2.0	3.0	6.0	2.5	4.5	14.5	6.0	10.0	14.0	9.5	11.5
9	4.5	2.5	3.5	7.5	5.0	6.0	15.5	7.0	11.0	11.0	7.5	9.5
10	5.0	2.5	4.0	9.5	5.5	7.5	16.0	8.5	12.0	12.5	8.0	10.0
11	6.5	3.0	4.5	9.5	7.0	7.5	16.0	9.0	12.5	12.0	8.5	10.0
12	6.0	1.0	3.5	10.0	6.5	8.0	15.5	8.5	12.0	11.5	9.5	10.5
13	6.5	2.0	4.5	13.0	7.0	9.5	14.5	8.5	11.0	14.0	8.5	11.0
14	9.0	6.5	7.5	10.5	7.5	9.0	12.0	8.5	10.0	16.0	8.5	12.0
15	9.0	7.0	8.0	11.5	6.5	9.0	10.5	8.0	9.5	13.0	9.0	11.0
16	7.5	4.5	6.5	12.0	8.0	9.5	12.0	6.5	9.0	12.5	7.5	10.0
17	7.0	3.5	5.0	9.5	6.0	8.0	10.5	7.0	8.5	11.5	6.0	9.0
18	7.0	3.0	5.0	8.0	6.0	7.0	11.0	8.0	9.0	10.0	6.5	7.5
19	6.5	2.5	4.5	12.0	5.0	8.0	13.5	7.0	10.0	11.5	4.0	7.5
20	6.5	2.0	4.0	11.0	5.0	8.0	15.5	7.5	11.0	13.0	7.0	10.0
21	5.5	4.5	5.0	10.0	7.0	8.5	15.5	8.0	11.5	12.0	9.5	11.0
22	6.5	4.5	5.0	10.0	7.5	9.0	13.0	9.0	11.0	15.0	9.5	12.5
23	4.5	0.5	3.5	9.0	6.0	7.5	10.5	8.0	9.5	15.0	10.0	13.0
24	0.5	0.0	0.0	9.0	4.0	6.5	11.5	8.5	9.5	16.5	11.0	14.0
25	2.0	0.0	0.5	8.5	5.5	6.5	13.0	8.0	10.0	15.5	11.0	13.5
26	5.5	0.0	2.5	8.5	4.5	6.5	10.0	6.0	7.5	14.5	11.0	13.0
27	7.5	2.5	5.0	8.5	4.5	6.5	12.0	4.5	8.0	16.5	10.5	13.5
28	7.0	2.0	4.5	12.0	4.0	7.5	10.5	7.0	8.5	17.0	12.0	15.0
29	---	---	---	11.5	4.0	8.0	12.5	7.5	9.5	16.5	13.5	15.5
30	---	---	---	12.5	6.5	9.5	12.5	8.0	10.0	15.5	12.5	14.5
31	---	---	---	11.5	7.5	9.5	---	---	---	15.0	13.0	14.0
MONTH	9.0	0.0	4.0	13.0	0.5	7.0	16.0	3.5	9.5	17.0	4.0	11.0
	JUNE			JULY			AUGUST			SEPTEMBER		
1	16.0	12.0	14.0	22.5	14.5	18.0	23.5	15.0	19.0	21.0	13.0	17.0
2	15.5	11.5	13.5	21.5	14.0	17.5	24.5	15.5	19.5	20.5	13.5	17.0
3	16.0	11.0	13.5	21.5	13.0	17.0	22.5	18.0	20.0	21.5	13.5	17.5
4	16.5	11.5	13.5	21.0	13.5	17.0	21.0	17.0	18.5	21.0	13.5	17.5
5	17.0	10.5	13.5	22.0	14.0	17.5	23.0	15.5	19.0	18.0	13.5	15.5
6	15.0	11.0	13.0	22.5	14.0	18.0	23.5	15.5	19.5	18.5	14.5	16.0
7	17.5	10.0	13.5	23.0	14.5	18.5	23.0	15.0	19.0	21.0	14.5	17.0
8	18.5	11.5	15.0	20.5	14.5	17.5	20.5	14.0	17.5	17.5	12.5	15.0
9	18.5	13.5	16.0	22.5	13.5	18.0	20.5	14.5	17.5	15.5	9.5	12.5
10	18.5	13.0	16.0	24.0	14.0	19.0	21.0	14.5	18.0	14.0	12.0	13.0
11	18.5	12.5	15.5	24.0	15.5	19.5	23.0	16.0	19.5	13.5	11.5	12.5
12	20.0	11.5	15.5	24.5	16.0	20.0	22.0	16.0	19.0	14.5	11.5	12.5
13	18.5	13.0	15.5	23.0	15.5	19.0	22.5	15.5	19.0	16.0	8.5	12.0
14	19.5	12.0	15.5	23.5	14.0	18.5	23.5	15.5	19.5	15.5	8.5	12.0
15	20.5	13.5	16.5	23.5	15.0	19.0	22.0	16.5	19.5	15.0	9.5	12.0
16	21.0	14.0	17.5	23.0	15.5	19.0	23.0	15.5	19.0	13.5	10.0	12.0
17	21.0	15.0	18.0	24.0	15.5	20.0	19.5	14.5	16.0	12.0	8.5	10.0
18	21.0	14.5	18.0	25.0	17.5	21.0	21.5	12.0	16.5	13.0	7.0	9.5
19	20.5	15.0	17.5	23.0	16.5	20.0	22.0	14.0	18.0	13.5	7.5	10.5
20	19.0	14.5	16.5	25.0	16.5	20.5	23.0	15.0	18.5	15.0	8.5	11.5
21	16.5	12.5	14.5	25.5	17.0	21.0	21.0	15.0	18.0	15.0	8.5	11.5
22	12.5	10.5	11.5	25.0	16.5	20.5	20.5	17.0	18.5	16.0	8.5	12.0
23	14.0	9.0	11.5	24.5	16.5	20.5	21.5	15.5	18.5	15.5	9.5	12.5
24	15.5	10.5	12.5	25.0	17.5	21.0	21.0	14.0	17.5	16.0	9.0	12.5
25	16.5	10.0	13.0	22.5	19.0	20.5	22.5	14.5	18.5	16.0	10.0	13.0
26	19.5	11.0	15.0	23.0	17.5	20.0	22.0	13.5	17.5	17.0	10.5	13.5
27	21.0	12.5	16.5	25.0	17.5	21.0	19.0	15.5	17.0	17.0	10.0	13.5
28	21.0	14.5	18.0	24.5	17.0	20.5	19.5	14.0	16.5	17.0	10.5	13.5
29	21.5	14.0	18.0	24.5	15.5	20.0	17.0	13.5	15.5	17.0	11.0	13.5
30	22.5	14.5	18.5	24.0	15.5	19.5	18.5	14.0	16.0	16.0	9.5	12.5
31	---	---	---	21.0	17.0	19.0	20.5	12.0	16.5	---	---	---
MONTH	22.5	9.0	15.0	25.5	13.0	19.5	24.5	12.0	18.0	21.5	7.0	13.5

MADISON RIVER BASIN

06037500 MADISON RIVER NEAR WEST YELLOWSTONE, MT

LOCATION.--Lat 44°39'25", long 111°04'03" (NAD 27), in NE<sup>1</sup>/<sub>4</sub>NW<sup>1</sup>/<sub>4</sub>SW<sup>1</sup>/<sub>4</sub> sec.36, T.13 S., R.5 E., Gallatin County, Hydrologic Unit 10020007, Yellowstone National Park, on left bank 0.7 mi downstream from Montana-Wyoming stateline, 1.5 mi east of West Yellowstone, 16.4 mi downstream from Gibbon River, and at river mile 132.7.

DRAINAGE AREA.--420 mi<sup>2</sup>.

PERIOD OF RECORD.--June 1913 to December 1917, July 1918 to October 1921, June 1922 to September 1973, August 1983 to September 1986, October 1988 to current year. Monthly discharge only for some periods, published in WSP 1309.

GAGE.--Water-stage recorder. Elevation of gage is 6,650 ft (NGVD 29). 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 mi upstream at different elevations. Supplementary nonrecording gage at site 0.3 mi downstream at different elevation used at time during 1927-30.

REMARKS.--Records good. No regulation or diversions upstream from station. U. S. Geological Survey satellite telemeter at station. Several observations of water temperature and specific conductance were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	381	379	387	382	450	373	422	544	1100	415	352	342
2	384	382	387	376	434	366	435	527	969	410	348	339
3	385	373	387	381	395	373	424	535	844	405	348	342
4	386	384	387	382	393	375	410	608	770	401	363	341
5	418	381	387	388	381	374	392	601	715	395	369	341
6	411	381	387	378	376	370	390	576	685	391	357	360
7	390	384	387	373	e365	380	380	555	659	388	350	364
8	387	391	376	373	383	383	378	524	637	387	347	360
9	381	393	372	373	378	383	390	510	637	385	351	363
10	380	394	372	e365	375	383	421	492	632	375	352	364
11	391	392	376	377	379	387	454	482	617	375	352	367
12	389	387	380	375	374	390	493	502	604	372	347	358
13	386	392	381	377	374	404	526	575	582	369	345	356
14	389	392	382	384	385	437	541	586	583	363	342	351
15	387	390	387	392	379	423	579	660	560	361	346	350
16	387	387	386	377	381	428	534	764	553	359	347	350
17	384	388	392	378	384	410	494	876	537	358	347	353
18	382	385	382	373	380	394	494	922	522	358	349	349
19	381	385	374	377	374	388	478	770	518	358	347	347
20	383	387	377	382	375	386	456	692	500	359	341	347
21	387	392	384	385	382	387	474	702	485	358	341	347
22	387	399	385	385	387	384	513	772	482	353	342	346
23	390	418	377	387	382	427	581	895	508	352	346	343
24	406	408	e370	384	e345	401	559	1020	488	352	341	341
25	399	381	e370	382	e350	388	554	1110	474	358	339	341
26	390	388	e375	381	e370	401	626	1100	455	363	336	341
27	387	387	382	401	375	403	577	1120	444	365	338	346
28	390	389	389	406	370	388	559	1100	437	359	341	347
29	389	392	390	388	---	382	564	1090	436	353	341	347
30	386	390	383	392	---	386	549	1110	427	352	350	347
31	384	---	385	399	---	408	---	1040	---	349	349	---
TOTAL	12057	11671	11836	11853	10676	12162	14647	23360	17860	11498	10764	10490
MEAN	389	389	382	382	381	392	488	754	595	371	347	350
MAX	418	418	392	406	450	437	626	1120	1100	415	369	367
MIN	380	373	370	365	345	366	378	482	427	349	336	339
AC-FT	23920	23150	23480	23510	21180	24120	29050	46330	35430	22810	21350	20810

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1913 - 2003, BY WATER YEAR (WY)\*

	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933
MEAN	433	424	416	404	399	406	496	850	812	498	433	426									
MAX	710	697	641	586	572	539	671	1725	1479	917	759	704									
(WY)	1914	1914	1997	1997	1914	1917	1925	1997	1997	1913	1913	1913									
MIN	297	297	304	304	303	313	369	388	341	282	273	282									
(WY)	1935	1932	1932	1932	1932	1943	1941	1934	1931	1931	1934	1934									

SUMMARY STATISTICS

FOR 2002 CALENDAR YEAR

FOR 2003 WATER YEAR

WATER YEARS 1913 - 2003\*

ANNUAL TOTAL	156800	158874		
ANNUAL MEAN	430	435	499	
HIGHEST ANNUAL MEAN			789	1997
LOWEST ANNUAL MEAN			337	1934
HIGHEST DAILY MEAN	1000	May 21	1120	May 27
LOWEST DAILY MEAN	348	Feb 26	336	Aug 26
ANNUAL SEVEN-DAY MINIMUM	357	Jan 15	340	Aug 23
MAXIMUM PEAK FLOW			1230	May 25
MAXIMUM PEAK STAGE			2.65	May 25
INSTANTANEOUS LOW FLOW			a325	Feb 24
ANNUAL RUNOFF (AC-FT)	311000	315100	361200	Feb 7 1933
10 PERCENT EXCEEDS	583	580	741	
50 PERCENT EXCEEDS	385	385	432	
90 PERCENT EXCEEDS	363	348	339	

\*--During periods of operation (June 1913 to December 1917, July 1918 to October 1921, June 1922 to September 1973, August 1983 to September 1986, October 1988 to current year).

- a--Gage height, 1.59 ft.
- b--Gage height, 3.78 ft.
- c--About, backwater from ice.
- d--Result of freezeup.
- e--Estimated.



MADISON RIVER BASIN

06038500 MADISON RIVER BELOW HEBGEN LAKE, NEAR GRAYLING, MT

LOCATION.--Lat 44°52'00", long 111°20'15" (NAD 27), NE<sup>1</sup>/<sub>4</sub>NE<sup>1</sup>/<sub>4</sub>NE<sup>1</sup>/<sub>4</sub> sec.22, T.11 S., R.3 E., Gallatin County, Hydrologic Unit 10020007, Gallatin National Forest, on right bank 1,500 ft downstream from Hebgen Dam, 8 mi northwest of Grayling, 17 mi upstream from West Fork, and at river mile 108.8.

DRAINAGE AREA.--905 mi<sup>2</sup>.

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".

REVISED RECORDS.--WSP 1509: 1948. WSP 1559: Drainage area. WSP 1629: 1943. WSP 1709: 1959. WSP 1729: 1943.

GAGE.--Water-stage recorder. Elevation of gage is 6,448.47 ft (after 1959 earthquake) (NGVD 29). Prior to July 13, 1943, nonrecording gage in stilling well.

REMARKS.--Records excellent. Flow completely regulated by Hebgen Lake (station number 06038000). Diversions for irrigation of about 1,100 acres upstream from station. Bureau of Reclamation satellite telemeter at station. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--94 years, 1,020 ft<sup>3</sup>/s, 15.31 in/yr, 739,000 acre-ft/yr, adjusted for storage.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 10,200 ft<sup>3</sup>/s, 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 ft<sup>3</sup>/s on basis of slope-area measurement of peak flow; maximum observed unaffected by wave over dam, 5,090 ft<sup>3</sup>/s, June 3, 1943, gage height, 3.69 ft; minimum daily, 5.0 ft<sup>3</sup>/s, May 9-12, 1960.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 1,890 ft<sup>3</sup>/s, July 21, gage height, 2.41 ft; minimum daily, 608 ft<sup>3</sup>/s, Apr. 26.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	879	869	842	831	821	803	803	616	833	942	1010	813
2	879	867	841	831	821	803	803	616	838	941	1130	813
3	879	865	841	831	821	803	803	616	944	938	1210	863
4	879	863	841	831	822	803	803	616	1040	938	1200	898
5	879	861	841	831	815	803	803	616	980	938	1190	898
6	879	860	841	830	810	804	803	616	972	938	1170	898
7	878	859	841	829	805	804	804	616	998	938	1160	898
8	877	859	841	829	804	803	803	649	992	902	1140	899
9	877	860	841	824	804	803	803	730	996	859	1130	898
10	876	859	841	824	803	803	803	761	1090	859	1120	898
11	876	859	841	822	803	804	803	760	1160	859	1100	898
12	875	859	841	822	803	803	803	762	1150	859	1090	898
13	872	859	841	823	803	807	803	766	1150	946	1080	898
14	870	859	841	822	803	803	803	767	1140	988	1070	895
15	870	854	841	822	803	803	803	767	1140	1060	1050	888
16	870	850	841	822	803	803	803	770	1140	1200	1030	888
17	869	850	841	822	803	803	803	770	1050	1400	1020	888
18	869	850	841	822	803	803	803	775	959	1480	945	888
19	869	849	841	822	803	803	803	776	951	1590	875	888
20	869	849	841	822	803	803	803	776	944	1640	868	888
21	869	849	841	822	804	803	803	776	940	1730	859	888
22	869	847	841	822	803	803	803	777	939	1780	850	888
23	869	849	841	822	803	803	803	778	940	1760	850	888
24	869	849	841	822	803	803	765	784	942	1740	850	888
25	869	848	841	822	803	803	650	786	942	1730	845	888
26	869	846	841	822	803	803	608	790	943	1720	830	888
27	869	844	837	822	803	803	608	803	944	1700	818	888
28	869	843	831	822	803	803	608	804	944	1630	816	888
29	869	844	831	822	---	804	612	813	946	1490	818	888
30	869	842	831	822	---	803	616	824	946	1380	817	885
31	868	---	831	822	---	803	---	831	---	1160	814	---
TOTAL	27049	25621	26028	25554	22581	24901	22937	22907	29893	39035	30755	26570
MEAN	873	854	840	824	806	803	765	739	996	1259	992	886
MAX	879	869	842	831	822	807	804	831	1160	1780	1210	899
MIN	868	842	831	822	803	803	608	616	833	859	814	813
AC-FT	53650	50820	51630	50690	44790	49390	45500	45440	59290	77430	61000	52700

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1939 - 2003, BY WATER YEAR (WY) (UNADJUSTED)

	MEAN	MAX	(WY)	MIN	(WY)	MEAN	MAX	(WY)	MIN	(WY)	MEAN	MAX	(WY)	MIN	(WY)
1939	1357	2477	1962	215	1942	1396	2535	1960	501	1941	983	2838	1960	410	1940
1940	898	1407	1944	180	1940	898	1905	1943	181	1940	838	1574	1947	291	1941
1941	838	1574	1948	217	1961	838	1574	1948	217	1961	926	2343	1996	45.5	1962
1942	856	2494	1996	45.5	1962	856	2494	1996	45.5	1962	1263	2940	1943	96.0	1960
1943	1263	2940	1943	96.0	1960	1030	2058	1965	503	1978	1080	1722	1939	662	1941
1944	1030	2058	1965	503	1978	1080	1722	1939	662	1941	1132	1688	1982	368	1941

ADJUSTED FOR CHANGE IN CONTENTS IN HEBGEN LAKE

	MEAN †	CFSM †	IN †	AC-FT†	MEAN	CFSM	IN	AC-FT
2002	707	0.78	0.90	43450	699	0.77	0.89	42990
2003	723	0.80	0.89	43020	679	0.75	0.78	37690
TOTAL	727	0.80	0.93	44730	740	0.82	0.94	45490
MEAN	707	0.78	0.90	43450	699	0.77	0.89	42990
CFSM	0.78	0.80	0.89	43020	0.77	0.75	0.78	37690
IN	0.90	0.89	0.93	43020	0.89	0.78	0.94	37690
AC-FT	43450	43020	44730	44730	42990	37690	45490	45490

OBSERVED

CALENDAR YEAR	2002	TOTAL	311878	MEAN	854	MAX	1650	MIN	733	AC-FT	618600
WATER YEAR	2003	TOTAL	323831	MEAN	887	MAX	1780	MIN	608	AC-FT	642300
ADJUSTED		TOTAL	313688	MEAN	859	CFSM	0.95	IN	12.89	AC-FT	622200
CALENDAR YEAR	2002	TOTAL	312780	MEAN	857	CFSM	0.95	IN	12.85	AC-FT	620400
WATER YEAR	2003	TOTAL	312780	MEAN	857	CFSM	0.95	IN	12.85	AC-FT	620400

†--Adjusted for change in contents in Hebgen Lake.

MADISON RIVER BASIN

06038800 MADISON RIVER AT KIRBY RANCH, NEAR CAMERON, MT

LOCATION.--Lat 44°53'22", long 111°34'46" (NAD 27), in NE<sup>1</sup>/<sub>4</sub>NE<sup>1</sup>/<sub>4</sub>SE<sup>1</sup>/<sub>4</sub> sec. 10, T.11 S., R.1 E., Madison County, Hydrologic Unit 10020007, 75 ft upstream from county bridge, 0.2 mi upstream from West Fork Madison River, and 22 mi south of Cameron, and at river mile 89.8.

DRAINAGE AREA.--1,065 mi<sup>2</sup>.

PERIOD OF RECORD.--September 1959 to September 1963, May 1978 to September 1994 (seasonal records only), October 1995 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 5,860 ft (NGVD 29). Aug. 31, 1959 to Oct. 2, 1959, nonrecording gage 75 ft downstream at elevation 0.96 ft lower. Oct. 3, 1959 to September 1963, water-stage recorder at present site and elevation. May 1978 to September 1994, nonrecording gage 75 ft downstream at present elevation.

REMARKS.--Records good. Flow regulated by Hebgen Lake (station 06038000). Diversions for irrigation of about 1,500 acres upstream from station. U.S. Geological Survey satellite telemeter at station. Several observations of water temperature and specific conductance were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	933	895	897	893	913	900	879	734	1950	1140	1170	861
2	923	899	897	890	904	905	893	725	1770	1120	1130	859
3	927	899	896	892	898	904	888	731	1630	1110	1260	870
4	932	899	894	892	900	906	878	734	1670	1090	1290	921
5	930	900	897	896	899	907	875	736	1580	1080	1280	938
6	926	900	896	890	902	908	887	737	1460	1070	1260	951
7	927	899	893	887	e900	907	876	734	1430	1070	1250	956
8	926	900	885	886	906	911	875	734	1420	1060	1230	958
9	925	900	888	886	911	905	872	785	1450	1010	1220	948
10	921	900	885	893	912	904	881	844	1550	984	1200	946
11	915	900	891	891	911	893	891	863	1690	974	1180	942
12	915	900	894	892	907	894	897	878	1680	971	1170	939
13	917	900	895	896	913	895	910	884	1640	990	1150	942
14	918	900	898	898	917	901	917	901	1660	1070	1140	939
15	916	900	899	897	911	900	924	946	1620	1100	1120	937
16	919	900	898	892	911	898	907	994	1560	1200	1100	938
17	920	898	899	894	912	891	901	1010	1540	1390	1090	936
18	917	899	894	892	905	892	891	1020	1390	1570	1060	933
19	915	899	891	895	903	891	875	986	1360	1640	979	932
20	917	900	893	895	903	896	873	952	1340	1740	942	928
21	920	900	896	899	908	883	880	955	1290	1770	925	928
22	915	e900	898	900	915	884	891	986	1230	1870	909	927
23	912	e900	895	901	e890	893	904	1090	1180	1860	899	925
24	914	898	893	899	e880	880	901	1260	1140	1840	895	926
25	916	887	e890	900	e890	881	836	1460	1110	1850	891	923
26	915	891	894	900	e890	883	780	1670	1100	1870	886	924
27	911	895	890	910	899	871	738	1730	1090	1840	876	927
28	915	899	894	904	902	864	728	1790	1110	1800	879	926
29	903	897	891	900	---	865	733	1940	1120	1660	868	922
30	899	897	889	908	---	872	729	2090	1130	1580	863	924
31	895	---	893	909	---	879	---	2070	---	1380	865	---
TOTAL	28454	26950	27703	27777	25312	27663	25910	33969	42890	42699	32977	27826
MEAN	918	898	894	896	904	892	864	1096	1430	1377	1064	928
MAX	933	900	899	910	917	911	924	2090	1950	1870	1290	958
MIN	895	887	885	886	880	864	728	725	1090	971	863	859
AC-FT	56440	53460	54950	55100	50210	54870	51390	67380	85070	84690	65410	55190

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1959 - 2003, BY WATER YEAR (WY)\*

	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
MEAN	1561	1560	1217	1043	1025	1028	1001	1374	1864	1328	1131	1166																																	
MAX	2570	2780	3005	1449	1521	1611	1527	2865	3862	2125	1672	1567																																	
(WY)	1962	1960	1960	1999	1999	1999	1995	1997	1997	1982	1997	1996																																	
MIN	918	736	739	737	626	525	370	445	619	716	734	732																																	
(WY)	2003	1961	1961	1961	1963	1963	1961	1961	1960	1979	1960	1960																																	

SUMMARY STATISTICS

	FOR 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1959 - 2003*	
ANNUAL TOTAL	363666		370130			
ANNUAL MEAN	996		1014		1295	
HIGHEST ANNUAL MEAN					1896	
LOWEST ANNUAL MEAN					733	
HIGHEST DAILY MEAN	2020		2090		5030	
LOWEST DAILY MEAN	806		725		139	
ANNUAL SEVEN-DAY MINIMUM	812		731		152	
MAXIMUM PEAK FLOW			2170		b5030	
MAXIMUM PEAK STAGE			2.71		3.97	
INSTANTANEOUS LOW FLOW			a712		c139	
ANNUAL RUNOFF (AC-FT)	721300		734200		938300	
10 PERCENT EXCEEDS	1330		1420		2090	
50 PERCENT EXCEEDS	914		905		1170	
90 PERCENT EXCEEDS	826		879		734	

\*--During periods of operation {September 1959 to September 1963, May 1978 to September 1994 (seasonal records only), October 1994 to current year}.

a--Gage height, 1.62 ft.

b--Observed, gage height, 3.15 ft, previous site at present datum.

c--Observed, present site and datum.

e--Estimated.

MADISON RIVER BASIN

06040800 MADISON RIVER ABOVE POWERPLANT, NEAR MCALLISTER, MT

LOCATION.--Lat 45°29'12", long 111°37'59" (NAD 27), in NW<sup>1</sup>/<sub>4</sub>NE<sup>1</sup>/<sub>4</sub>SW<sup>1</sup>/<sub>4</sub> sec.17, T.4 S., R.1 E., Madison County, Hydrologic Unit 10020007, on right bank 160 ft upstream from Madison powerplant, 1.4 mi downstream from Ennis Lake, 5.6 mi northeast of McAllister, and at river mile 38.9.  
 DRAINAGE AREA.--2,186 mi<sup>2</sup>.

PERIOD OF RECORD.--April 2002 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 4,690 ft (NGVD 29).

REMARKS.--Records good. Flow regulated by Hebgen Lake (station number 06038000) and Ennis Lake (station number 06040500). Diversions for irrigation of about 23,000 acres upstream from station. Flow through Madison Powerplant bypasses the station. U. S. Geological Survey satellite telemeter at station. Several observations of water temperature and specific conductance were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003  
 DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	289	306	85	84	89	100	179	220	3530	165	643	93
2	291	303	84	84	88	637	233	221	3210	117	442	92
3	292	302	95	84	81	130	234	222	2340	119	350	105
4	294	305	81	84	90	129	233	224	1950	123	322	113
5	295	308	100	83	100	129	231	228	1410	119	319	103
6	296	242	116	83	99	104	230	230	748	117	144	95
7	296	340	88	83	98	90	229	226	592	112	147	95
8	296	397	87	82	99	e90	228	221	712	103	148	95
9	298	395	87	79	100	96	224	217	719	105	153	94
10	300	394	87	80	102	101	219	217	870	108	339	95
11	294	392	86	79	104	104	219	220	1060	257	293	98
12	294	392	87	79	105	106	220	765	1200	438	125	98
13	293	388	87	80	108	117	222	1170	1090	495	123	99
14	245	387	87	88	115	123	226	1170	753	469	120	101
15	176	385	89	87	125	121	227	1190	569	577	125	101
16	180	385	91	86	126	117	229	1200	651	606	126	102
17	185	381	90	85	122	103	228	1220	755	569	118	102
18	188	379	e90	84	115	97	231	e1250	754	598	108	104
19	190	226	e85	83	111	98	231	1280	748	559	118	107
20	193	107	81	84	106	98	231	1280	684	497	117	107
21	196	105	79	86	104	99	229	1010	577	750	113	106
22	196	102	80	85	104	100	228	309	572	751	115	106
23	245	99	81	85	102	99	231	312	559	767	111	105
24	331	98	e80	87	97	98	232	358	473	689	109	105
25	330	95	e78	89	95	97	232	857	349	624	108	105
26	329	92	e75	93	95	96	232	2000	274	496	108	104
27	327	91	73	150	96	97	230	2380	214	412	108	103
28	324	89	75	278	98	97	226	2380	223	562	106	104
29	320	88	82	324	---	97	221	2570	233	427	104	104
30	328	87	86	320	---	98	219	3260	233	344	98	100
31	344	---	84	250	---	99	---	3540	---	354	95	---
TOTAL	8455	7660	2656	3508	2874	3767	6784	31947	28052	12429	5555	3041
MEAN	273	255	85.7	113	103	122	226	1031	935	401	179	101
MAX	344	397	116	324	126	637	234	3540	3530	767	643	113
MIN	176	87	73	79	81	90	179	217	214	103	95	92
AC-FT	16770	15190	5270	6960	5700	7470	13460	63370	55640	24650	11020	6030

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 2002 - 2003, BY WATER YEAR (WY)

	2002	2003	2003	2003	2003	2003	2002	2003	2002	2002	2002	2002
MEAN	273	255	85.7	113	103	122	289	686	1005	480	191	174
MAX	273	255	85.7	113	103	122	351	1031	1076	560	203	247
(WY)	2003	2003	2003	2003	2003	2003	2002	2003	2002	2002	2002	2002
MIN	273	255	85.7	113	103	122	226	342	935	401	179	101
(WY)	2003	2003	2003	2003	2003	2003	2003	2002	2003	2003	2003	2003

SUMMARY STATISTICS

FOR 2003 WATER YEAR

WATER YEARS 2002 - 2003

ANNUAL TOTAL	116728	
ANNUAL MEAN	320	320
HIGHEST ANNUAL MEAN		320
LOWEST ANNUAL MEAN		320
HIGHEST DAILY MEAN	3540	3540
LOWEST DAILY MEAN	73	73
ANNUAL SEVEN-DAY MINIMUM	77	77
MAXIMUM PEAK FLOW	3550	3940
MAXIMUM PEAK STAGE	9.05	9.42
ANNUAL RUNOFF (AC-FT)	231500	231700
10 PERCENT EXCEEDS	698	698
50 PERCENT EXCEEDS	129	129
90 PERCENT EXCEEDS	86	86

e--Estimated.

MADISON RIVER BASIN

06041000 MADISON RIVER BELOW ENNIS LAKE, NEAR MCALLISTER, MT

LOCATION.--Lat 45°29'25", long 111°38'00" (NAD 27), in SW<sup>1</sup>/<sub>4</sub>SE<sup>1</sup>/<sub>4</sub>NW<sup>1</sup>/<sub>4</sub> sec.17, T.4 S., R.1 E., Madison County, Hydrologic Unit 10020007, on right bank 500 ft downstream from Madison powerplant, 1.5 mi downstream from Ennis Lake, 5.7 mi northeast of McAllister, and at river mile 38.8.  
DRAINAGE AREA.--2,186 mi<sup>2</sup>.

WATER-DISCHARGE RECORDS

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.

REVISED RECORDS.--WSP 1559: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 4,689.03 ft (levels by U.S. Army Corps of Engineers) (NGVD 29). Prior to May 7, 1941, nonrecording gage in wooden stilling well at present site at different elevation. May 7, 1941, to Jan. 13, 1945, nonrecording gages in concrete stilling well at present site and elevation.

REMARKS.--Water-discharge records excellent. Flow regulated by Hebgen Lake (station number 06038000) and Ennis Lake (station number 06040500). Diversions for irrigation of about 23,000 acres upstream from station. U. S. Geological Survey satellite telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1250	1280	1400	1340	1440	1230	1210	1130	4550	1410	1870	1140
2	1250	1280	1400	1330	1440	1190	1220	1130	4290	1370	1610	1150
3	1250	1280	1390	1340	1370	1260	1300	1130	3430	1380	1510	1150
4	1250	1290	1400	1340	1270	1260	1290	1130	2990	1380	1480	1160
5	1250	1290	1410	1340	1170	1250	1290	1220	2490	1380	1480	1150
6	1250	1230	1340	1330	1150	1180	1290	1300	2080	1380	1300	1150
7	1260	1320	1270	1330	1160	1120	1290	1300	1940	1240	1280	1150
8	1270	1370	1270	1330	1140	1130	1290	1300	2040	1130	1300	1150
9	1260	1370	1270	1240	1140	1190	1260	1190	2050	1130	1320	1140
10	1260	1370	1280	1190	1140	1220	1200	1130	2170	1140	1500	1150
11	1270	1370	1280	1160	1140	1230	1190	1130	2330	1320	1360	1150
12	1270	1370	1280	1150	1150	1240	1190	1180	2470	1480	1290	1150
13	1270	1370	1260	1150	1150	1390	1190	1170	2360	1530	1290	1150
14	1230	1370	1260	1270	1260	1500	1270	1180	2060	1500	1240	1150
15	1170	1360	1290	1250	1430	1490	1310	1190	1910	1610	1250	1150
16	1170	1360	1330	1210	1480	1490	1300	1210	1980	1640	1310	1150
17	1170	1360	1350	1210	1470	1310	1300	1230	2070	1590	1280	1160
18	1180	1360	1340	1210	1410	1220	1310	1250	2080	1630	1230	1150
19	1180	1410	1340	1210	1350	1200	1310	1280	2080	1580	1340	1190
20	1190	1430	1260	1210	1290	1210	1310	1290	2020	1520	1280	1220
21	1190	1420	1210	1210	1230	1210	1310	1370	1850	1790	1210	1220
22	1200	1420	1210	1210	1220	1210	1310	1380	1920	1820	1170	1220
23	1230	1420	1210	1210	1220	1210	1310	1370	1900	1970	1160	1220
24	1310	1420	1210	1210	1190	1210	1310	1410	1820	1890	1160	1220
25	1310	1410	1210	1210	1140	1200	1310	1880	1720	1800	1160	1220
26	1310	1410	1200	1220	1120	1200	1310	3030	1670	1640	1160	1220
27	1310	1410	1160	1270	1120	1200	1310	3440	1580	1550	1160	1220
28	1300	1400	1140	1380	1190	1210	1310	3420	1510	1860	1160	1220
29	1300	1400	1250	1420	---	1190	1220	3630	1480	1640	1160	1230
30	1290	1400	1330	1410	---	1190	1140	4330	1470	1550	1150	1220
31	1280	---	1330	1440	---	1200	---	4560	---	1660	1140	---
TOTAL	38680	40950	39880	39330	34980	38540	38160	53890	66310	47510	40310	35320
MEAN	1248	1365	1286	1269	1249	1243	1272	1738	2210	1533	1300	1177
MAX	1310	1430	1410	1440	1480	1500	1310	4560	4550	1970	1870	1230
MIN	1170	1230	1140	1150	1120	1120	1140	1130	1470	1130	1140	1140
AC-FT	76720	81220	79100	78010	69380	76440	75690	106900	131500	94240	79950	70060

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1939 - 2003, BY WATER YEAR (WY)

	1928	1997	1519	1392	1395	1446	1556	2016	2988	1859	1527	1618
MEAN	1928	1997	1519	1392	1395	1446	1556	2016	2988	1859	1527	1618
MAX	2963	3318	3243	2061	2336	2087	3008	4189	6135	3454	2339	2298
(WY)	1960	1960	1960	1999	1943	1939	1948	1969	1997	1965	1971	1972
MIN	810	961	974	767	781	891	717	859	1122	972	1044	934
(WY)	1942	1941	1940	1940	1940	1941	1941	1961	1992	1961	1961	1941

SUMMARY STATISTICS

FOR 2002 CALENDAR YEAR

FOR 2003 WATER YEAR

WATER YEARS 1939 - 2003

ANNUAL TOTAL	505670	513860	
ANNUAL MEAN	1385	1408	1770
HIGHEST ANNUAL MEAN			2530
LOWEST ANNUAL MEAN			1047
HIGHEST DAILY MEAN	4310	Jun 3	9210 Jun 11 1970
LOWEST DAILY MEAN	1110	Aug 15	210 Aug 25 1959
ANNUAL SEVEN-DAY MINIMUM	1120	Aug 21	390 Aug 23 1959
MAXIMUM PEAK FLOW		4670	9550 Jun 12 1970
MAXIMUM PEAK STAGE		5.62	8.01 Jun 12 1970
ANNUAL RUNOFF (AC-FT)	1003000	1019000	1282000
10 PERCENT EXCEEDS	1690	1810	2700
50 PERCENT EXCEEDS	1270	1280	1560
90 PERCENT EXCEEDS	1140	1150	1090

MADISON RIVER BASIN

06041000 MADISON RIVER BELOW ENNIS LAKE, NEAR MCALLISTER, MT--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1972-73, 1977 to current year.

PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: June 1977 to current year.

INSTRUMENTATION.--Temperature recorder since June 21, 1977.

REMARKS.--Daily water temperature records good. Unpublished records of instantaneous water temperature and specific conductance are available in files of the District office.

EXTREMES FOR PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: Maximum, 24.5°C, July 22 and 23, 2003; minimum, 0.0°C several to many day during winter months most years.

EXTREMES FOR CURRENT YEAR.--

WATER TEMPERATURE: Maximum, 24.5°C, July 22 and 23; minimum, 0.0°C, Oct. 30.

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	11.0	10.0	10.5	1.0	0.5	0.5	2.5	2.0	2.5	1.5	1.0	1.5
2	10.0	9.5	9.5	1.0	0.5	1.0	2.5	2.5	2.5	1.5	1.5	1.5
3	9.5	9.0	9.5	1.5	1.0	1.0	2.5	2.5	2.5	1.5	1.5	1.5
4	9.0	8.5	8.5	1.5	1.0	1.5	2.5	2.5	2.5	1.5	1.5	1.5
5	9.0	8.5	8.5	2.0	1.5	1.5	2.5	2.5	2.5	1.5	1.5	1.5
6	9.0	8.5	9.0	2.0	1.5	2.0	3.0	2.5	2.5	1.5	1.5	1.5
7	9.5	9.0	9.0	2.5	2.0	2.0	3.0	2.5	3.0	2.0	1.5	2.0
8	9.5	9.5	9.5	2.5	2.5	2.5	3.0	2.5	3.0	2.0	1.5	2.0
9	9.5	9.5	9.5	2.5	2.0	2.5	3.5	3.0	3.0	2.0	1.5	1.5
10	10.0	9.5	9.5	2.5	2.0	2.5	3.0	3.0	3.0	2.0	1.5	2.0
11	9.5	9.0	9.5	2.5	2.0	2.5	3.0	3.0	3.0	2.0	2.0	2.0
12	9.0	8.0	8.5	2.5	2.0	2.5	3.0	3.0	3.0	2.5	2.0	2.0
13	8.0	8.0	8.0	2.5	2.0	2.0	3.0	3.0	3.0	2.5	2.5	2.5
14	8.0	7.5	8.0	2.0	2.0	2.0	3.0	2.5	2.5	2.5	2.5	2.5
15	8.5	8.0	8.0	2.0	2.0	2.0	2.5	1.0	1.5	2.5	2.0	2.5
16	8.0	7.5	8.0	2.0	1.5	1.5	1.0	1.0	1.0	2.0	2.0	2.0
17	8.0	7.5	7.5	1.5	1.0	1.0	1.0	0.5	0.5	2.0	1.5	2.0
18	8.0	7.5	8.0	1.0	1.0	1.0	0.5	0.5	0.5	2.0	1.5	2.0
19	8.0	7.5	8.0	1.0	0.5	1.0	1.0	0.5	1.0	2.0	1.5	2.0
20	8.0	8.0	8.0	1.0	0.5	0.5	1.0	0.5	1.0	2.0	2.0	2.0
21	8.0	7.5	7.5	1.5	0.5	1.0	1.0	0.5	1.0	2.0	1.5	2.0
22	7.5	6.5	7.0	1.5	1.0	1.5	1.0	1.0	1.0	2.0	1.5	1.5
23	6.5	5.5	6.0	1.5	1.0	1.5	1.0	1.0	1.0	2.0	2.0	2.0
24	5.5	4.0	5.0	2.0	1.5	1.5	1.0	0.5	0.5	2.0	2.0	2.0
25	4.5	4.0	4.0	1.5	1.0	1.0	0.5	0.5	0.5	2.0	2.0	2.0
26	4.5	4.0	4.5	1.0	1.0	1.0	0.5	0.5	0.5	2.0	2.0	2.0
27	4.5	4.0	4.0	1.5	1.0	1.5	1.0	0.5	1.0	2.0	1.5	2.0
28	5.0	4.0	4.5	2.0	1.5	1.5	1.0	1.0	1.0	1.5	1.5	1.5
29	4.5	2.5	3.5	2.0	1.5	2.0	1.0	1.0	1.0	1.5	1.5	1.5
30	2.5	0.0	1.0	2.0	2.0	2.0	1.0	1.0	1.0	2.0	1.5	2.0
31	0.5	0.5	0.5	---	---	---	1.5	1.0	1.0	2.5	2.0	2.0
MONTH	11.0	0.0	7.0	2.5	0.5	1.5	3.5	0.5	1.5	2.5	1.0	2.0

## MADISON RIVER BASIN

06041000 MADISON RIVER BELOW ENNIS LAKE, NEAR MCALLISTER, MT--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003--Continued

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	FEBRUARY			MARCH			APRIL			MAY		
1	2.5	2.0	2.0	2.5	2.0	2.5	6.5	6.0	6.0	9.0	8.0	8.5
2	2.5	2.0	2.0	2.0	0.5	2.0	6.0	5.5	6.0	9.0	9.0	9.0
3	2.5	2.0	2.0	2.0	1.5	2.0	5.5	5.0	5.5	9.5	9.0	9.5
4	2.5	2.0	2.5	1.5	1.5	1.5	5.5	4.5	5.0	9.5	9.0	9.5
5	2.5	2.0	2.0	1.5	1.0	1.5	5.5	5.0	5.5	9.5	9.5	9.5
6	2.5	2.0	2.0	1.5	1.5	1.5	6.0	5.0	5.5	10.0	9.5	10.0
7	2.5	2.0	2.0	1.5	1.0	1.5	6.5	5.5	6.0	10.0	9.5	10.0
8	2.5	2.5	2.5	1.0	0.5	1.0	6.5	6.0	6.0	10.0	9.5	10.0
9	2.5	2.0	2.0	1.5	0.5	1.0	7.0	6.5	6.5	9.5	9.0	9.5
10	2.0	2.0	2.0	1.5	1.0	1.5	8.5	7.0	7.5	9.0	8.5	9.0
11	2.0	1.5	1.5	1.5	1.5	1.5	9.0	8.5	8.5	9.0	8.5	8.5
12	1.5	1.5	1.5	2.0	1.5	1.5	10.0	9.0	9.5	9.5	9.0	9.0
13	1.5	1.0	1.0	2.5	1.5	2.0	10.0	9.5	10.0	10.0	9.0	9.5
14	1.0	1.0	1.0	3.0	2.5	2.5	10.0	9.5	9.5	12.0	10.0	11.0
15	1.5	1.0	1.0	3.5	3.0	3.0	9.5	9.0	9.5	13.5	12.0	13.0
16	1.5	1.0	1.5	4.0	3.5	4.0	9.0	8.5	9.0	13.0	12.0	12.5
17	2.0	1.5	1.5	4.0	3.5	3.5	9.0	9.0	9.0	12.5	11.5	12.0
18	2.0	1.5	2.0	4.0	2.5	3.0	9.0	9.0	9.0	11.5	11.0	11.0
19	2.5	2.0	2.0	3.0	2.5	2.5	9.0	8.5	8.5	11.0	10.5	10.5
20	2.5	2.0	2.5	3.5	2.5	3.0	9.5	8.5	9.0	12.0	10.0	11.0
21	3.0	2.5	3.0	3.5	2.5	3.0	10.5	9.5	10.0	12.0	11.0	12.0
22	3.5	2.5	3.0	5.0	2.5	3.5	11.0	9.5	10.5	12.5	11.5	11.5
23	2.5	2.0	2.5	5.5	4.5	5.0	11.0	10.5	10.5	13.5	12.5	13.0
24	3.0	2.5	2.5	5.5	5.0	5.0	11.5	11.0	11.0	16.0	12.5	14.0
25	3.0	2.5	2.5	5.5	4.5	5.0	12.0	11.5	11.5	16.5	14.5	15.5
26	3.0	2.5	2.5	4.5	4.5	4.5	11.5	10.0	10.5	16.5	16.0	16.5
27	3.0	2.5	2.5	4.5	4.0	4.0	10.0	9.5	10.0	18.5	16.0	17.0
28	2.5	2.0	2.5	4.0	3.5	4.0	10.5	10.0	10.0	18.5	17.0	17.5
29	---	---	---	5.0	4.0	4.5	10.0	9.0	9.5	19.5	16.5	17.5
30	---	---	---	5.5	5.0	5.0	9.0	8.5	9.0	19.0	17.0	17.5
31	---	---	---	6.0	5.5	6.0	---	---	---	17.5	16.0	16.5
MONTH	3.5	1.0	2.0	6.0	0.5	3.0	12.0	4.5	8.5	19.5	8.0	12.0
	JUNE			JULY			AUGUST			SEPTEMBER		
1	16.5	15.5	16.0	20.0	19.0	19.5	23.0	22.0	22.5	18.5	17.5	18.0
2	16.5	13.5	15.0	20.0	18.5	19.5	23.5	22.5	23.0	18.5	17.5	18.0
3	15.0	13.5	14.0	20.5	20.0	20.0	23.0	22.5	22.5	18.5	17.5	18.0
4	14.5	13.5	13.5	20.5	20.0	20.5	22.5	22.0	22.5	18.5	18.0	18.0
5	14.5	13.5	14.0	21.0	20.0	20.5	22.5	22.0	22.5	19.0	18.0	18.5
6	14.5	14.0	14.5	21.0	20.0	20.5	22.5	22.0	22.0	19.0	18.5	18.5
7	15.0	14.0	14.5	20.5	19.5	20.0	22.5	22.0	22.0	18.5	18.0	18.5
8	16.5	14.0	15.0	20.5	20.0	20.5	22.5	22.0	22.0	18.5	17.5	18.0
9	16.5	15.0	16.0	21.0	20.0	20.5	22.5	22.0	22.0	17.5	16.5	17.0
10	17.5	15.5	16.0	21.5	20.5	21.0	22.0	21.0	21.5	16.5	16.0	16.5
11	18.0	16.5	17.0	21.5	20.5	21.0	21.5	20.5	21.0	16.0	15.5	15.5
12	18.0	17.0	17.5	22.5	21.0	22.0	21.5	21.0	21.5	15.5	14.5	15.0
13	18.0	16.5	17.0	23.0	22.0	22.5	21.5	21.0	21.0	15.0	14.5	14.5
14	18.0	17.0	17.5	22.5	22.0	22.5	21.5	21.0	21.5	14.5	14.0	14.0
15	18.0	17.0	17.5	23.0	22.0	22.5	21.5	20.5	21.0	14.0	13.5	14.0
16	18.0	17.0	17.5	23.0	22.5	23.0	21.5	21.0	21.0	13.5	13.0	13.5
17	18.0	17.0	17.5	23.0	22.5	23.0	21.5	20.5	21.0	13.0	12.0	12.5
18	20.0	17.0	18.0	23.5	22.5	23.0	21.5	20.5	21.0	12.0	11.5	11.5
19	20.0	19.0	19.5	23.0	22.0	23.0	21.5	20.5	21.0	11.5	11.0	11.5
20	19.5	18.5	19.0	24.0	22.5	23.5	21.5	21.0	21.0	11.5	11.0	11.0
21	18.5	18.0	18.0	24.0	23.5	23.5	21.0	20.5	20.5	11.5	11.0	11.5
22	18.0	17.0	17.5	24.5	23.0	23.5	21.0	20.5	20.5	12.0	11.0	11.5
23	17.0	16.0	16.0	24.5	23.0	24.0	20.5	20.0	20.5	12.5	12.0	12.0
24	16.0	14.0	15.0	24.0	23.5	24.0	21.0	20.0	20.5	12.5	12.0	12.5
25	14.5	13.5	14.0	24.0	23.0	23.5	21.0	20.0	21.0	13.0	12.5	12.5
26	16.0	14.0	14.5	23.5	23.0	23.5	21.5	20.5	21.0	13.5	13.0	13.5
27	17.0	15.0	16.0	23.5	22.5	23.0	21.0	20.5	21.0	14.0	13.5	13.5
28	17.5	16.0	16.5	23.5	22.5	23.0	20.5	20.0	20.5	13.5	13.0	13.0
29	18.5	16.0	17.0	23.0	22.0	22.5	20.0	18.5	19.5	13.5	13.0	13.0
30	20.0	18.0	19.0	23.5	21.5	22.5	18.5	17.0	17.5	13.5	12.5	12.5
31	---	---	---	23.5	23.0	23.0	18.0	16.5	17.5	---	---	---
MONTH	20.0	13.5	16.5	24.5	18.5	22.0	23.5	16.5	21.0	19.0	11.0	14.5

GALLATIN RIVER BASIN

06043500 GALLATIN RIVER NEAR GALLATIN GATEWAY, MT

LOCATION.--Lat 45°29'51", long 111°16'11" (NAD 27), in SE<sup>1</sup>/<sub>4</sub>SE<sup>1</sup>/<sub>4</sub>SE<sup>1</sup>/<sub>4</sub> sec.7, T.4 S., R.4 E., Gallatin County, Hydrologic Unit 10020008, on left bank 0.3 mi downstream from Spanish Creek, 7.3 mi south of Gallatin Gateway and at river mile 47.7.

DRAINAGE AREA.--825 mi<sup>2</sup>.

PERIOD OF RECORD.--August 1889 to September 1894, June 1930 to September 1969, annual maximum, water years 1970-71, October 1971 to September 1981, October 1984 to current year. Monthly discharge only for some periods, published in WSP 1309. Published as West Gallatin River near Bozeman 1889-94.

REVISED RECORDS.--WSP 1389: 1892(M), 1893-94. WSP 1559: Drainage area. WDR MT-85-1 (M), WDR MT-02-1: 1970-71 (M).

GAGE.--Water-stage recorder. Elevation of gage is 5,167.67 ft (NGVD 29). Prior to Oct. 20, 1932, nonrecording gages at several different sites and elevations within 0.8 mi of present site.

REMARKS.--Records good. Diversions for irrigation of about 1,400 acres upstream from station. U.S. Geological Survey satellite telemeter at station. Several observations of water temperature and conductance were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	369	230	282	245	287	246	316	575	5390	1210	493	358
2	362	257	298	242	287	233	320	562	4380	1150	478	351
3	361	264	300	247	272	225	307	563	3650	1080	476	348
4	364	264	295	250	255	240	270	590	3260	1020	523	345
5	361	277	289	253	259	237	269	636	2760	975	486	343
6	354	307	283	251	233	237	278	625	2610	938	468	355
7	348	301	266	233	213	241	264	601	2280	906	450	378
8	348	319	257	211	254	244	268	591	2300	879	438	364
9	345	324	249	217	249	247	285	580	2740	839	440	366
10	339	317	266	197	247	256	329	570	2960	795	454	361
11	340	312	269	196	243	264	373	553	2890	766	430	371
12	330	300	270	207	230	271	432	569	2740	744	419	362
13	328	314	268	233	233	280	509	672	2610	723	411	374
14	339	310	287	243	244	337	557	748	2630	698	403	362
15	333	306	290	254	257	328	566	958	2450	681	401	350
16	340	292	277	244	258	320	487	1200	2290	664	443	363
17	336	300	281	219	259	293	446	1220	2320	638	422	397
18	328	294	259	231	253	278	447	1240	2270	621	420	371
19	321	295	229	224	248	267	413	1060	2230	602	404	360
20	332	309	233	243	240	262	397	944	2160	590	397	354
21	331	303	241	252	248	272	431	914	2100	573	388	349
22	334	300	241	257	262	273	503	1020	1790	556	388	343
23	323	309	245	261	245	307	597	1460	1570	541	381	334
24	319	284	196	263	214	274	638	2090	1420	550	373	332
25	304	243	153	255	202	272	696	2930	1300	560	374	328
26	299	244	165	264	233	280	745	3930	1220	742	366	325
27	296	294	214	280	243	269	629	4120	1200	656	370	321
28	341	302	243	274	244	265	589	4460	1240	579	380	322
29	321	303	252	267	---	259	563	5420	1240	540	372	320
30	264	297	248	265	---	268	563	5860	1220	520	370	317
31	239	---	242	268	---	289	---	5640	---	502	362	---
TOTAL	10249	8771	7888	7546	6912	8334	13487	52901	71220	22838	12980	10524
MEAN	331	292	254	243	247	269	450	1706	2374	737	419	351
MAX	369	324	300	280	287	337	745	5860	5390	1210	523	397
MIN	239	230	153	196	202	225	264	553	1200	502	362	317
AC-FT	20330	17400	15650	14970	13710	16530	26750	104900	141300	45300	25750	20870

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1889 - 2003, BY WATER YEAR (WY)\*

	1889	1890	1891	1892	1893	1894	1895	1896	1897	1898	1899	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
MEAN	454	382	321	307	304	311	501	1802	2937	1287	609	490																																																																																																							
MAX	743	589	549	468	430	465	899	3135	5110	3669	1162	788																																																																																																							
(WY)	1893	1960	1893	1893	1893	1960	1990	1976	1997	1975	1993	1968																																																																																																							
MIN	238	247	214	200	220	206	263	873	643	345	269	233																																																																																																							
(WY)	1932	1937	1935	1931	1935	1935	1937	1953	1934	1934	1934	1931																																																																																																							

SUMMARY STATISTICS FOR 2002 CALENDAR YEAR FOR 2003 WATER YEAR WATER YEARS 1889 - 2003\*

ANNUAL TOTAL	227495	233650	
ANNUAL MEAN	623	640	811
HIGHEST ANNUAL MEAN			1184
LOWEST ANNUAL MEAN			408
HIGHEST DAILY MEAN	4960	Jun 2	5860
LOWEST DAILY MEAN	153	Dec 25	153
ANNUAL SEVEN-DAY MINIMUM	208	Dec 21	208
MAXIMUM PEAK FLOW			6710
MAXIMUM PEAK STAGE		5.71	May 30
INSTANTANEOUS LOW FLOW		a147	Dec 25
ANNUAL RUNOFF (AC-FT)	451200	463400	c117
10 PERCENT EXCEEDS	1740	1240	587700
50 PERCENT EXCEEDS	332	334	2040
90 PERCENT EXCEEDS	226	243	429
			268

\*--During periods of operation (August 1889 to September 1894, June 1930 to September 1969, October 1971 to September 1981, October 1984 to current year).

a--Gage height, 0.91 ft, result of freezeup.

b--Gage height, 6.71 ft.

c--Gage height, 0.68 ft, result of freezeup.

## GALLATIN RIVER BASIN

## 06048700 EAST GALLATIN RIVER BELOW BRIDGER CREEK, NEAR BOZEMAN, MT

LOCATION.--Lat 45°43'30", long 111°04'08" (NAD 27), in NE<sup>1</sup>/<sub>4</sub>SW<sup>1</sup>/<sub>4</sub>NE<sup>1</sup>/<sub>4</sub> sec.26, T.1 S., R.5 E., Gallatin County, Hydrologic Unit 10020008, on left bank 600 ft downstream from Bozeman Wastewater Treatment Plant, 0.2 mi downstream from bridge on Montana Secondary Highway 411, 3.2 mi downstream from Bridger Creek, 2.0 mi northwest of Bozeman, and at river mile 33.0.

DRAINAGE AREA.--226 mi<sup>2</sup>.

PERIOD OF RECORD.--October 2001 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 4,610 ft (NGVD 29).

REMARKS.--Records good except those for estimated daily discharges, which are fair. Some regulation or diurnal effect from wastewater treatment plant upstream. Numerous diversions for irrigation upstream from station. U.S. Geological Survey satellite telemeter at station. Several observations of water temperature and conductance were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	45	e25	35	29	104	30	142	264	380	80	25	19
2	43	e28	36	29	67	30	164	258	314	76	22	17
3	43	32	35	29	49	31	139	250	273	77	23	17
4	45	35	34	29	44	30	105	257	241	71	31	16
5	43	37	34	32	39	31	96	318	211	68	28	15
6	43	39	32	30	31	31	94	316	229	65	26	17
7	40	39	29	28	35	31	84	322	215	60	24	20
8	39	40	29	27	40	27	86	311	193	57	21	20
9	39	40	30	26	40	31	98	287	186	58	21	22
10	38	39	30	21	39	36	138	274	199	53	24	21
11	39	38	32	24	36	44	159	249	185	48	23	21
12	40	37	32	28	35	60	181	244	165	46	24	20
13	43	38	32	30	36	107	228	350	155	45	23	23
14	41	38	33	30	36	184	268	353	149	42	20	22
15	38	38	33	31	35	167	319	366	137	41	18	21
16	39	37	32	26	34	139	265	395	131	41	e17	19
17	39	37	32	24	36	103	225	377	118	38	e19	25
18	39	36	28	28	34	86	248	367	111	37	e22	27
19	39	35	27	30	33	72	222	340	105	35	e21	24
20	39	36	24	30	32	71	201	298	105	34	e20	23
21	41	38	30	e28	34	74	203	273	156	33	20	22
22	39	37	31	e22	35	76	234	285	137	31	21	20
23	38	37	29	30	e22	108	350	314	130	28	21	20
24	35	30	23	32	e18	84	423	357	123	29	20	19
25	37	27	21	33	e20	74	428	397	127	36	20	19
26	39	34	25	36	e25	69	431	446	112	48	18	17
27	38	36	29	78	e28	70	360	428	100	44	19	17
28	41	37	32	67	30	67	299	392	94	37	21	18
29	39	37	32	47	---	65	267	368	90	30	20	18
30	e26	36	30	45	---	77	263	346	84	27	22	19
31	e23	---	30	51	---	120	---	353	---	27	20	---
TOTAL	1210	1073	941	1030	1047	2225	6720	10155	4955	1442	674	598
MEAN	39.0	35.8	30.4	33.2	37.4	71.8	224	328	165	46.5	21.7	19.9
MAX	45	40	36	78	104	184	431	446	380	80	31	27
MIN	23	25	21	21	18	27	84	244	84	27	17	15
AC-FT	2400	2130	1870	2040	2080	4410	13330	20140	9830	2860	1340	1190

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 2002 - 2003, BY WATER YEAR (WY)

	2002	2003	2002	2003	2002	2003	2002	2003	2002	2003	2002	2003
MEAN	39.8	38.5	31.7	34.6	35.5	54.4	162	270	215	58.6	29.6	28.2
MAX	40.6	41.2	33.0	36.0	37.4	71.8	224	328	265	70.6	37.5	36.5
(WY)	2002	2002	2002	2002	2003	2003	2003	2003	2002	2002	2002	2002
MIN	39.0	35.8	30.4	33.2	33.7	37.0	100	212	165	46.5	21.7	19.9
(WY)	2003	2003	2003	2003	2002	2002	2002	2002	2003	2003	2003	2003

SUMMARY STATISTICS

FOR 2002 CALENDAR YEAR

FOR 2003 WATER YEAR

WATER YEARS 2002 - 2003

ANNUAL TOTAL	28409	32070		
ANNUAL MEAN	77.8	87.9	83.3	
HIGHEST ANNUAL MEAN			87.9	2003
LOWEST ANNUAL MEAN			78.6	2002
HIGHEST DAILY MEAN	447	Jun 3	447	Jun 3 2002
LOWEST DAILY MEAN	21	Dec 25	15	Sep 5 2003
ANNUAL SEVEN-DAY MINIMUM	26	Dec 20	17	Aug 31 2003
MAXIMUM PEAK FLOW			467	May 26 2002
MAXIMUM PEAK STAGE			3.57	May 26 2002
INSTANTANEOUS LOW FLOW			a8.0	Jan 10 2003
ANNUAL RUNOFF (AC-FT)	56350	63610	60310	
10 PERCENT EXCEEDS	200	267	250	
50 PERCENT EXCEEDS	38	37	39	
90 PERCENT EXCEEDS	30	21	25	

a--Gage height, 1.45 ft, result of freezeup.

e--Estimated.



GALLATIN RIVER BASIN

06052500 GALLATIN RIVER AT LOGAN, MT

LOCATION.--Lat 45°53'07", long 111°26'15" (NAD 27), in SE<sup>1</sup>/<sub>4</sub>NW<sup>1</sup>/<sub>4</sub>NE<sup>1</sup>/<sub>4</sub> sec.35, T.2 N., R.2 E., Gallatin County, Hydrologic Unit 10020008, on right bank at former county road bridge site, 0.2 mi upstream from present county bridge, 0.5 mi west of Logan, and at river mile 6.3.

DRAINAGE AREA.--1,795 mi<sup>2</sup>.

WATER-DISCHARGE RECORDS

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

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

GAGE.--Water-stage recorder. Elevation of gage is 4,086.42 ft (NGVD 29). Prior to Aug. 10, 1928, nonrecording gages at several sites within 0.5 mi of present site at various elevations. Aug. 10, 1928, to Oct. 7, 1941, nonrecording gage at present site and elevation.

REMARKS.--Water-discharge records good except those for estimated daily discharges, which are poor. Some regulation by Middle Creek Reservoir (station number 06049500). Diversions for irrigation of about 110,000 acres upstream from station. U.S. Army Corps of Engineers satellite telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	450	e480	636	563	744	e560	715	1040	5320	637	215	269
2	436	e450	631	560	734	e570	802	1020	4780	549	210	254
3	446	e520	655	560	663	576	810	954	3830	458	221	250
4	460	e560	647	560	620	564	749	958	3350	390	271	241
5	456	601	643	573	603	e560	690	1060	2860	355	283	243
6	452	625	631	572	e580	559	674	1090	2590	340	284	245
7	447	635	611	554	e550	547	659	1040	2370	337	276	262
8	435	643	e580	e530	e570	543	627	1000	2190	314	262	274
9	435	667	e570	e500	587	e540	612	965	2270	296	264	284
10	430	668	e580	e470	588	549	644	946	2620	270	252	278
11	424	666	592	e480	573	654	704	901	2640	247	256	291
12	435	656	597	e520	e550	893	757	888	2500	236	256	306
13	456	659	598	555	562	1090	851	980	2350	236	250	317
14	460	671	603	583	589	1390	968	1050	2290	241	239	328
15	456	671	626	589	576	1190	1080	1090	2180	232	231	327
16	455	660	625	e580	568	925	1120	1280	2000	232	233	322
17	459	653	618	e560	578	835	964	1480	1880	230	262	352
18	454	645	605	e560	568	752	1120	1490	1760	216	267	379
19	445	636	e560	e580	561	704	1100	1460	1680	202	268	373
20	437	639	e560	e600	554	674	959	1270	1640	196	253	353
21	447	645	e570	570	562	664	910	1140	1810	193	244	342
22	447	644	578	e530	592	664	909	1090	1710	192	252	337
23	469	661	581	e500	e500	708	1080	1250	1540	190	244	325
24	485	636	e550	e530	e430	709	1330	1780	1320	192	245	316
25	497	e580	e500	563	e400	660	1290	2520	1230	224	251	317
26	508	e550	e450	592	e450	657	1350	3560	1070	265	237	308
27	517	601	e520	764	e500	679	1290	4170	928	373	253	304
28	536	644	576	740	e540	671	1150	4310	801	340	273	308
29	609	650	591	660	---	655	1070	4710	754	281	270	306
30	582	647	574	627	---	640	1060	5350	720	258	275	317
31	e520	---	563	667	---	671	---	5480	---	231	278	---
TOTAL	14545	18663	18221	17792	15892	22053	28044	57322	64983	8953	7875	9128
MEAN	469	622	588	574	568	711	935	1849	2166	289	254	304
MAX	609	671	655	764	744	1390	1350	5480	5320	637	284	379
MIN	424	450	450	470	400	540	612	888	720	190	210	241
AC-FT	28850	37020	36140	35290	31520	43740	55630	113700	128900	17760	15620	18110

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1894 - 2003, BY WATER YEAR (WY)\*

	MEAN	MAX	(WY)	MIN	(WY)							
MEAN	767	815	743	687	701	789	1042	2127	2974	1007	487	641
MAX	1265	1186	1049	971	1249	1290	1993	4686	5957	3899	1658	1269
(WY)	1983	1976	1976	1976	1963	1960	1952	1901	1997	1975	1993	1968
MIN	333	328	450	400	385	478	429	176	280	162	167	238
(WY)	1935	1935	1894	1894	1936	1904	1934	1934	1934	1934	1934	1934

GALLATIN RIVER BASIN

06052500 GALLATIN RIVER AT LOGAN, MT--Continued

SUMMARY STATISTICS	FOR 2002 CALENDAR YEAR			FOR 2003 WATER YEAR		WATER YEARS 1894 - 2003*		
ANNUAL TOTAL	275912			283471				
ANNUAL MEAN	756			777		1065		
HIGHEST ANNUAL MEAN						1673 1997		
LOWEST ANNUAL MEAN						454 1934		
HIGHEST DAILY MEAN	5200	Jun	3	5480	May	31	b9840	Jun 21 1899
LOWEST DAILY MEAN	256	Aug	20	190	Jul	23	c130	Jul 19 1939
ANNUAL SEVEN-DAY MINIMUM	264	Aug	16	197	Jul	18	147	Jul 16 1934
MAXIMUM PEAK FLOW				5830		b9840 Jun 21 1899		
MAXIMUM PEAK STAGE				8.24		May 30 d11.88 Feb 5 1963		
INSTANTANEOUS LOW FLOW				a182		Jul 22 c130 Jul 19 1939		
ANNUAL RUNOFF (AC-FT)	547300			562300		771500		
10 PERCENT EXCEEDS	1680			1340		2120		
50 PERCENT EXCEEDS	552			576		756		
90 PERCENT EXCEEDS	304			254		420		

\*--During periods of operation (October 1893 to December 1905, August 1928 to current year).  
a--Gage height, 3.31 ft.  
b--Observed, gage height, 6.25 ft, site and datum then in use.  
c--Observed, gage height, 2.04 ft.  
d--From floodmark, backwater from ice.  
e--Estimated.

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1949, 1951, 1957, 1965, 1979-86, 1999 to present.

PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: August 1979 to September 1985, October 1999 to present (seasonal records).

INSTRUMENTATION.--Temperature probe installed Sept. 14, 1999.

REMARKS--Daily water temperature record good except for the period for July 6-21, which are poor due to low-flow conditions. Unpublished records of instantaneous specific conductance and temperature data are available in files of the District office.

EXTREMES FOR PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: Maximum, 28.5°C, July 19-21, 2003; minimum, 0.0°C, on many days during winter periods.

EXTREMES FOR CURRENT YEAR.--

WATER TEMPERATURE: During period of seasonal operation, maximum, 28.5°C, July 19-21; minimum 3.5°C, April 4.

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

Date	Time	Instan- taneous dis- charge, cfs (00061)	pH, water, unfltrd field, std units (00400)	Specif. conduc- tance, wat unf uS/cm 25 degC (00095)	Temper- ature, air, deg C (00020)	Temper- ature, water, deg C (00010)	Ammonia + org-N, water, unfltrd mg/L as N (00625)	Nitrite + nitrate water fltrd, mg/L as N (00631)	Nitrite water, fltrd, mg/L as N (00613)
APR 2003									
16...	1345	1100	8.3	327	10.0	8.0	.71	.405	.006
MAY									
20...	1500	1260	8.6	300	16.0	11.0	.35	.266	.005
JUN									
04...	1215	3430	8.2	187	17.0	11.5	.40	.152	E.002
JUL									
29...	1445	287	8.9	341	30.0	25.0	.23	<.022	E.002

Date	Ortho- phos- phate, water, fltrd, mg/L as P (00671)	Phos- phorus, water, unfltrd mg/L (00665)	Suspnd. sedi- ment, sieve diametr percent <.063mm (70331)	Sus- pended sedi- ment concen- tration mg/L (80154)	Sus- pended sedi- ment load, tons/d (80155)
APR 2003					
16...	.024	.179	86	106	315
MAY					
20...	.016	.080	79	49	167
JUN					
04...	.019	.185	65	159	1470
JUL					
29...	<.007	.016	82	5	3.9

E--Estimated.

GALLATIN RIVER BASIN

06052500 GALLATIN RIVER AT LOGAN, MT--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003--Continued

Date	Time	Hardness, water, unfltrd mg/L as CaCO3 (00900)	Calcium water, fltrd, mg/L (00915)	Magnesium, water, fltrd, mg/L (00925)	Potassium, water, fltrd, mg/L (00935)	Sodium adsorption ratio (00931)	Sodium, water, fltrd, mg/L (00930)	Alkalinity, wat flt lab, mg/L as CaCO3 (29801)	Chloride, water, fltrd, mg/L (00940)	Fluoride, water, fltrd, mg/L (00950)	Silica, water, fltrd, mg/L (00955)
MAY 2003											
20...	1500	150	40.5	11.2	1.98	.3	7.07	135	3.52	.2	15.4
JUL											
29...	1445	170	42.6	14.9	3.23	.3	9.15	150	4.78	.2	20.9

Date	Sulfate water, fltrd, mg/L (00945)	Residue water, fltrd, sum of constituents mg/L (70301)	Residue water, fltrd, tons/acre-ft (70303)	Residue water, fltrd, tons/d (70302)	Arsenic water, unfltrd ug/L (01002)	Cadmium water, unfltrd ug/L (01027)	Chromium, water, unfltrd recover -able, ug/L (01034)	Copper, water, unfltrd recover -able, ug/L (01042)	Lead, water, unfltrd recover -able, ug/L (01051)	Nickel, water, unfltrd recover -able, ug/L (01067)	Zinc, water, unfltrd recover -able, ug/L (01092)
MAY 2003											
20...	22.0	184	.25	626	E2	E.1	1.2	2.3	.74	1.55	6
JUL											
29...	28.0	216	.29	167	E1	<.04	<.8	1.0	.07	1.12	E1

E--Estimated.

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR APRIL 2003 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	APRIL			MAY			JUNE			JULY		
1	8.5	7.0	8.0	11.5	8.5	9.5	14.0	10.0	11.5	22.0	16.5	19.5
2	9.0	6.0	7.5	12.0	8.0	10.0	12.0	9.5	10.5	21.5	17.0	19.0
3	7.5	4.5	6.0	10.5	8.0	9.5	13.5	8.0	10.5	22.5	15.5	19.0
4	8.5	3.5	6.0	13.5	9.0	11.0	13.0	10.0	11.5	23.5	16.5	20.0
5	9.0	4.0	6.5	10.5	8.5	9.5	13.5	8.5	11.0	23.5	16.0	19.5
6	9.0	5.5	7.0	11.5	7.0	9.5	12.5	9.0	10.5	24.5	15.5	19.5
7	10.0	4.5	7.5	13.0	8.5	10.5	14.5	8.0	11.5	25.0	16.5	20.5
8	11.5	5.5	8.5	11.0	9.0	10.0	16.5	10.0	13.0	22.0	17.5	19.5
9	12.5	7.0	10.0	10.5	7.5	9.0	16.5	12.0	14.0	24.0	14.5	19.5
10	14.0	8.5	11.0	11.5	7.5	9.5	16.5	12.5	14.5	26.0	15.0	21.0
11	13.0	9.0	11.0	12.0	7.5	10.0	16.5	12.0	14.0	27.0	17.0	22.0
12	13.5	8.5	11.5	11.0	9.5	10.5	17.0	11.0	14.0	27.5	17.5	22.5
13	12.5	9.5	11.0	14.5	9.5	12.0	15.5	12.0	14.0	26.5	18.0	22.0
14	12.0	9.5	11.0	16.0	10.5	13.5	16.5	11.0	13.5	26.0	15.5	21.0
15	10.5	7.0	8.5	16.0	12.0	14.5	17.5	12.0	14.5	26.5	16.0	21.5
16	10.0	5.0	7.5	15.0	10.5	13.0	18.5	12.0	15.0	27.0	17.5	22.0
17	10.0	7.0	9.0	13.5	9.0	11.5	19.5	13.5	16.5	27.0	18.0	22.5
18	9.5	7.0	8.0	11.0	7.5	9.0	19.0	14.0	16.5	27.5	18.0	23.0
19	11.5	6.5	9.0	10.5	5.5	8.0	17.5	14.0	16.0	28.5	19.0	23.5
20	13.5	8.0	10.5	12.5	7.0	10.0	16.5	13.0	14.5	28.5	20.0	24.0
21	14.0	9.0	11.5	13.5	10.5	12.0	17.0	12.5	14.0	28.5	19.0	23.5
22	14.0	10.0	12.5	16.5	11.0	13.5	14.5	11.5	12.5	27.0	19.0	23.0
23	13.0	10.0	11.0	18.0	13.0	15.5	15.0	10.0	12.5	26.5	19.0	23.0
24	13.0	9.5	11.0	18.5	13.0	16.0	13.5	11.0	12.0	26.0	19.5	22.5
25	12.5	9.5	11.0	17.0	13.0	15.0	15.0	10.5	13.0	23.5	20.0	21.5
26	10.5	8.0	9.0	15.0	11.0	13.0	17.0	12.0	14.5	25.5	19.5	22.5
27	11.0	5.5	8.5	15.5	10.0	12.5	20.0	13.5	16.5	25.5	19.5	22.5
28	10.0	8.0	9.0	15.5	11.0	13.0	21.5	16.0	19.0	25.5	19.0	22.5
29	9.0	7.0	8.0	15.5	11.5	13.5	22.5	16.5	19.5	25.0	18.5	22.0
30	11.0	7.5	9.0	13.5	11.0	12.0	22.0	17.0	19.5	25.5	18.0	22.0
31	---	---	---	13.0	10.0	11.5	---	---	---	25.5	19.0	22.0
MONTH	14.0	3.5	9.0	18.5	5.5	11.5	22.5	8.0	14.0	28.5	14.5	21.5

## GALLATIN RIVER BASIN

06052500 GALLATIN RIVER AT LOGAN, MT--Continued

WATER TEMPERATURE, DEGREES CELSIUS, APRIL 2003 TO SEPTEMBER 2003--Continued

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

MISSOURI RIVER MAIN STEM

06054500 MISSOURI RIVER AT TOSTON, MT

LOCATION.--Lat 46°08'46", long 111°25'11" (NAD 27), in NW1/4SE1/4NW1/4 sec.36, T.5 N., R.2 E., Broadwater County, Hydrologic Unit 10030101, on left bank 2.2 mi southeast of Toston, 4.8 mi upstream from Crow Creek, 7.8 mi downstream from Sixteenmile Creek, and at river mile 2,296.1. DRAINAGE AREA.--14,669 mi<sup>2</sup>

WATER-DISCHARGE RECORDS

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. Elevation of gage is 3,905.68 ft (NGVD 29). Prior to Dec. 20, 1916, nonrecording gages at site 2.5 mi downstream at different elevations.

REMARKS.--Water-discharge records good. Some regulation by six reservoirs on tributaries and Clark Canyon Reservoir (station 06015300). Diversions for irrigation of about 555,400 acres of which 12,000 acres lies downstream from station. U.S. Army Corps of Engineers satellite telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003 DAILY MEAN VALUES

Table with 13 columns: DAY, OCT, NOV, DEC, JAN, FEB, MAR, APR, MAY, JUN, JUL, AUG, SEP. Rows 1-31 show daily discharge values. Summary rows include TOTAL, MEAN, MAX, MIN, and AC-FT.

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1890 - 2003, BY WATER YEAR (WY)\*

Table with 13 columns: MEAN, MAX, (WY), MIN, (WY). Rows show monthly mean data for water years 1890-2003.

SUMMARY STATISTICS FOR 2002 CALENDAR YEAR FOR 2003 WATER YEAR WATER YEARS 1890 - 2003\*

Table with 4 columns: 2002 Calendar Year, 2003 Water Year, and Water Years 1890-2003\*. Rows include ANNUAL TOTAL, ANNUAL MEAN, HIGHEST ANNUAL MEAN, LOWEST ANNUAL MEAN, HIGHEST DAILY MEAN, LOWEST DAILY MEAN, ANNUAL SEVEN-DAY MINIMUM, MAXIMUM PEAK FLOW, MAXIMUM PEAK STAGE, INSTANTANEOUS LOW FLOW, ANNUAL RUNOFF (AC-FT), 10 PERCENT EXCEEDS, 50 PERCENT EXCEEDS, 90 PERCENT EXCEEDS.

\*--During periods of operation (1911-16, 1942 to current year). a--Gage height, 2.41 ft, result of regulation. b--Gage height, 1.68 ft, result of regulation. e--Estimated.

## MISSOURI RIVER MAIN STEM

06054500 MISSOURI RIVER AT TOSTON, MT--Continued

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1949-53, 1965, 1972 to current year. Sampling location moved in October 1978, from old bridge on U. S. Highway 287 at Toston, to cableway 2.4 miles upstream.

## PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: April 1973 to September 1981.

WATER TEMPERATURE: May 1949 to June 1953, April 1973 to current year.

SUSPENDED-SEDIMENT DISCHARGE: March 1949 to June 1953.

INSTRUMENTATION.--Temperature recorder since July 6, 1977.

REMARKS.--Daily water temperature record good. Unpublished records of instantaneous water temperature and specific conductance are available in files of the District office.

## EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE : Maximum daily, 524 microsiemens per centimeter ( $\mu\text{S}/\text{cm}$ ) at 25°C, Mar. 4, 1978; minimum daily, 159  $\mu\text{S}/\text{cm}$  at 25°C, May 28, 1979.

WATER TEMPERATURE: Maximum, 29.0°C, July 31, 1988, July 20, 1989; minimum, 0.0°C on many days during winter.

SEDIMENT CONCENTRATION: Maximum daily mean, 670 mg/L, Mar. 22, 25, 1951; minimum daily mean, 5 mg/L, Jul. 12, 1951.

SEDIMENT LOAD: Maximum daily, 16,100 tons, May 5, 1952; minimum daily, 51 tons Feb. 1, 1951.

## EXTREMES FOR CURRENT YEAR.--

WATER TEMPERATURE: Maximum, 27.5°C, July 20; minimum, 0.0°C, many days October through March.

## WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

Date	Time	Instan- taneous dis- charge, cfs (00061)	pH, water, unfltrd field, std units (00400)	Specif. conduc- tance, wat unfltrd uS/cm 25 degC (00095)	Temper- ature, air, deg C (00020)	Temper- ature, water, deg C (00010)	Ammonia + org-N, water, unfltrd mg/L as N (00625)	Nitrite + nitrate water, fltrd, mg/L as N (00631)	Nitrite water, fltrd, mg/L as N (00613)		
APR 2003 17...	1015	5230	8.2	292	10.0	9.5	.60	.172	.004		
MAY 21...	1600	4860	8.5	280	13.5	13.0	.33	.052	E.002		
JUN 04...	1500	14700	8.2	193	17.0	14.5	.87	.072	.005		
JUL 24...	1000	1540	8.6	316	27.0	24.5	.25	E.015	E.002		
<b>Ortho-phosphate, water, fltrd, mg/L as P (00671)</b>											
<b>Phos-phorus, water, unfltrd mg/L (00665)</b>											
<b>Suspnd. sedi-ment, sieve diametr percent &lt;.063mm (70331)</b>											
<b>Sus-pended sedi-ment concen-tration mg/L (80154)</b>											
<b>Sus-pended sedi-ment load, tons/d (80155)</b>											
APR 2003 17...			.023	.107	96	38	537				
MAY 21...			.012	.052	96	18	236				
JUN 04...			.031	.195	69	146	5790				
JUL 24...			.013	.043	95	13	54				
<b>Hard-ness, water, unfltrd mg/L as CaCO3 (00900)</b>											
<b>Calcium water, fltrd, mg/L (00915)</b>											
<b>Magnes-ium, water, fltrd, mg/L (00925)</b>											
<b>Potas-sium, water, fltrd, mg/L (00935)</b>											
<b>Sodium adsorp-tion ratio (00931)</b>											
<b>Sodium, water, fltrd, mg/L (00930)</b>											
<b>Alka-linity, wat flt fxd end lab, mg/L as CaCO3 (29801)</b>											
<b>Chlor-ide, water, fltrd, mg/L (00940)</b>											
<b>Fluor-ide, water, fltrd, mg/L (00950)</b>											
<b>Silica, water, fltrd, mg/L (00955)</b>											
MAY 2003 21...	1600	110	29.3	8.46	2.93	.7	16.6	106	8.49	.9	21.0
JUL 24...	1000	100	26.8	8.39	3.69	1	26.3	114	14.4	1.8	25.9

E--Estimated.

MISSOURI RIVER MAIN STEM

06054500 MISSOURI RIVER AT TOSTON, MT--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003--Continued

Date	Sulfate water, fltrd, (00945) mg/L	Residue water, fltrd, sum of consti- tuents (70301) mg/L	Residue water, fltrd, tons/ acre-ft (70303)	Residue water, fltrd, tons/d (70302)	Arsenic water unfltrd (01002) ug/L	Cadmium water, unfltrd (01027) ug/L	Chrom- ium, water, unfltrd recover- able, (01034) ug/L	Copper, water, unfltrd recover- able, (01042) ug/L	Lead, water, unfltrd recover- able, (01051) ug/L	Nickel, water, unfltrd recover- able, (01067) ug/L	Zinc, water, unfltrd recover- able, (01092) ug/L
MAY 2003											
21...	24.2	176	.24	2310	25	<.2	E.6	5.1	1.04	.93	6
JUL											
24...	21.7	197	.27	820	31	<.04	<.8	3.4	1.38	1.20	3

E--Estimated.

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
1	11.5	9.0	10.5	1.0	0.0	0.5	1.0	0.5	0.5	0.5	0.0	0.5
2	9.0	8.5	8.5	1.0	0.0	0.5	1.5	0.5	1.0	1.0	0.5	0.5
3	9.0	8.5	9.0	1.0	0.0	0.5	2.5	1.5	2.0	0.5	0.5	0.5
4	9.0	8.0	8.5	1.0	0.0	0.5	2.0	1.5	1.5	0.5	0.0	0.5
5	10.0	9.0	9.5	1.0	0.0	0.5	1.5	1.0	1.5	0.5	0.5	0.5
6	9.5	8.5	9.0	1.0	0.5	0.5	1.5	1.0	1.5	1.0	0.0	0.5
7	10.5	9.0	9.5	1.0	0.5	0.5	1.0	0.5	1.0	1.0	0.0	0.5
8	11.0	10.0	10.5	1.0	0.5	0.5	0.5	0.0	0.5	1.0	0.0	0.5
9	11.0	10.0	10.5	1.5	0.5	1.0	0.5	0.0	0.5	0.5	0.0	0.5
10	11.0	10.0	10.5	2.5	1.5	2.5	0.5	0.0	0.5	0.5	0.0	0.5
11	10.0	8.5	9.5	3.0	2.5	2.5	0.5	0.5	0.5	0.5	0.0	0.5
12	8.5	7.0	8.0	3.5	3.0	3.0	0.5	0.5	0.5	1.0	0.5	0.5
13	7.5	6.5	7.0	3.0	2.5	3.0	0.5	0.5	0.5	1.0	0.5	0.5
14	8.5	7.0	7.5	4.0	3.0	3.5	2.5	0.5	1.5	0.5	0.0	0.5
15	8.0	7.5	8.0	3.5	2.5	3.0	3.5	2.5	3.0	0.5	0.0	0.5
16	8.0	7.5	7.5	3.5	3.0	3.0	3.5	2.0	3.0	0.5	0.0	0.5
17	8.0	7.5	7.5	3.0	2.5	3.0	2.0	2.0	2.0	0.5	0.0	0.5
18	8.0	7.0	7.5	3.0	2.5	3.0	2.0	0.5	1.0	1.0	0.0	0.5
19	8.0	7.0	7.5	3.0	2.5	2.5	0.5	0.0	0.5	1.0	0.5	0.5
20	8.0	7.0	7.5	4.0	3.0	3.5	0.5	0.0	0.5	0.5	0.5	0.5
21	9.0	8.0	8.5	4.5	4.0	4.5	0.5	0.5	0.5	0.5	0.0	0.0
22	8.5	6.5	8.0	4.5	3.5	4.0	0.5	0.0	0.5	0.5	0.0	0.5
23	6.5	5.0	5.5	4.0	3.5	4.0	0.5	0.0	0.5	1.0	0.0	0.5
24	5.0	3.5	4.0	3.5	1.0	2.0	0.5	0.0	0.5	1.0	0.0	0.5
25	4.0	3.0	3.5	1.0	0.0	0.5	0.5	0.0	0.5	0.5	0.5	0.5
26	4.0	3.0	3.5	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.5	0.5
27	4.0	3.0	3.5	0.5	0.0	0.5	1.0	0.5	0.5	0.5	0.5	0.5
28	4.5	3.5	4.0	0.5	0.0	0.5	0.5	0.5	0.5	0.5	0.0	0.5
29	4.5	1.5	3.5	0.5	0.0	0.5	0.5	0.5	0.5	0.5	0.0	0.5
30	1.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	1.0	0.5	0.5
31	1.0	0.0	0.5	---	---	---	0.5	0.5	0.5	1.0	0.5	1.0
MONTH	11.5	0.0	7.0	4.5	0.0	2.0	3.5	0.0	1.0	1.0	0.0	0.5

## MISSOURI RIVER MAIN STEM

06054500 MISSOURI RIVER AT TOSTON, MT--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003--Continued

	FEBRUARY			MARCH			APRIL			MAY		
1	3.0	1.0	1.5	1.0	0.0	0.5	9.5	8.0	9.0	11.0	10.0	10.5
2	3.0	2.5	3.0	1.0	0.0	0.5	8.0	7.0	7.5	11.5	10.5	11.0
3	3.0	1.5	2.5	0.5	0.0	0.5	7.5	6.0	6.5	11.5	10.5	11.0
4	1.5	1.5	1.5	1.0	0.0	0.5	6.5	5.5	6.0	11.5	10.0	10.5
5	1.5	0.5	1.0	1.0	0.0	0.5	7.0	6.0	6.0	11.5	10.5	10.5
6	1.0	0.0	0.5	1.0	0.0	0.5	7.5	6.5	7.0	10.5	9.5	10.0
7	0.5	0.0	0.5	1.0	0.0	0.5	8.0	6.5	7.0	12.0	10.0	10.5
8	1.0	0.0	0.5	1.0	0.0	0.5	9.0	7.5	8.5	12.0	10.5	11.0
9	1.0	0.0	0.5	1.0	0.0	0.5	10.5	9.0	9.5	10.5	9.5	10.0
10	1.0	0.0	0.5	1.0	0.0	0.5	12.0	10.0	11.0	10.5	9.0	9.5
11	1.0	0.0	0.5	1.0	0.5	0.5	13.0	11.5	12.0	11.5	10.0	10.5
12	1.0	0.0	0.5	1.0	0.5	0.5	13.0	12.0	12.5	12.0	11.5	11.5
13	1.0	0.5	0.5	1.0	0.5	0.5	13.0	12.5	12.5	13.0	11.5	12.0
14	1.0	0.5	0.5	5.5	1.0	4.5	12.5	11.5	12.0	15.0	13.0	13.5
15	2.0	1.0	1.5	6.0	5.5	6.0	11.5	9.0	10.5	16.0	15.0	15.5
16	2.0	1.5	1.5	6.5	5.5	6.0	9.5	8.0	8.5	16.0	14.0	14.5
17	2.5	1.0	2.0	6.0	5.0	5.5	10.0	9.5	9.5	14.5	13.0	13.5
18	3.0	2.0	2.5	6.0	5.5	5.5	10.0	9.0	9.5	13.5	10.5	12.0
19	2.5	1.5	2.0	6.0	5.0	5.5	10.5	8.5	9.5	11.0	9.5	10.0
20	2.5	2.0	2.5	6.5	5.5	6.0	12.0	10.5	11.0	12.0	10.5	11.0
21	3.0	2.0	2.5	7.0	6.5	7.0	12.5	11.5	12.0	13.5	12.0	13.0
22	3.0	1.5	2.5	7.5	7.0	7.0	13.5	12.5	13.0	15.0	13.5	14.0
23	1.5	0.0	0.5	8.0	7.5	7.5	13.5	12.0	13.0	17.5	15.0	16.0
24	1.0	0.0	0.5	8.0	6.0	7.0	12.5	11.5	12.0	19.0	17.0	18.0
25	1.5	0.0	0.5	6.0	5.5	6.0	13.0	11.5	12.0	19.5	18.0	19.0
26	1.5	0.0	0.5	6.0	5.0	5.5	11.5	9.5	10.5	18.0	17.0	17.5
27	1.0	0.0	0.5	5.5	5.0	5.5	10.0	8.5	9.0	18.0	15.5	16.5
28	1.0	0.0	0.5	5.0	4.5	5.0	10.0	9.0	9.5	19.0	16.5	17.5
29	---	---	---	6.5	5.0	6.0	9.0	8.0	8.5	19.0	17.5	18.5
30	---	---	---	8.5	6.5	7.5	10.0	8.5	9.0	19.0	16.5	17.5
31	---	---	---	9.5	8.5	9.0	---	---	---	17.0	15.5	16.0
MONTH	3.0	0.0	1.0	9.5	0.0	4.0	13.5	5.5	10.0	19.5	9.0	13.5
	JUNE			JULY			AUGUST			SEPTEMBER		
1	17.0	15.0	16.0	22.5	21.5	22.0	25.5	22.5	23.5	21.5	17.5	19.0
2	17.0	14.5	15.0	22.5	21.0	21.5	26.0	23.0	24.0	21.0	17.5	19.0
3	15.5	13.5	14.5	21.0	20.0	20.5	26.0	23.0	24.0	21.0	17.5	19.0
4	15.5	14.5	15.0	22.0	20.0	21.0	24.5	22.0	23.5	21.5	18.0	19.5
5	16.0	13.5	14.5	22.5	20.5	21.5	24.5	22.0	23.0	21.0	18.0	19.0
6	15.5	14.0	14.5	21.0	20.5	20.5	24.0	21.0	22.5	20.5	18.0	19.0
7	15.5	13.0	14.0	22.5	20.5	21.5	24.5	21.0	22.5	20.5	18.0	19.0
8	17.0	15.0	15.5	22.5	20.5	22.0	24.0	21.5	22.5	19.5	17.5	18.5
9	17.5	16.5	17.0	22.0	20.0	21.0	24.5	21.0	22.5	19.0	16.0	17.5
10	18.0	17.0	17.5	23.5	20.0	21.5	24.5	21.0	22.5	17.5	15.0	16.0
11	18.0	16.5	17.5	24.5	21.5	23.0	24.5	21.5	22.5	16.0	14.5	15.0
12	18.5	17.0	17.5	25.5	22.5	24.0	23.5	21.0	22.0	14.5	13.5	14.0
13	18.5	17.5	18.0	26.0	23.0	24.0	24.5	20.5	22.0	15.0	13.0	13.5
14	18.0	17.0	17.5	24.0	22.0	23.0	25.0	21.5	23.0	15.0	12.5	13.5
15	19.0	17.5	18.0	24.5	21.5	23.0	25.5	21.5	23.0	15.0	13.0	14.0
16	19.5	18.5	19.0	25.0	22.5	23.5	25.5	22.0	23.0	14.5	12.0	13.5
17	20.5	19.5	20.0	25.5	23.0	24.0	24.0	21.0	22.5	13.0	11.5	12.0
18	20.5	20.0	20.5	26.0	23.5	24.5	22.5	20.0	21.0	12.0	10.5	11.0
19	21.0	19.5	20.0	26.5	23.5	25.0	23.0	19.5	21.0	12.5	10.0	11.5
20	19.5	18.0	18.5	27.5	24.0	25.5	23.5	20.0	21.5	13.5	11.5	12.5
21	18.5	17.0	17.5	27.0	24.0	25.5	24.0	21.0	22.0	14.5	12.5	13.0
22	17.0	15.0	16.0	27.0	24.0	25.0	23.5	20.5	21.5	14.0	12.5	13.0
23	15.5	14.0	14.5	26.5	24.0	25.0	23.0	20.0	21.0	14.5	12.5	13.5
24	15.5	14.0	15.0	26.0	23.5	24.5	23.0	19.5	21.0	14.5	13.0	13.5
25	15.0	13.5	14.0	25.0	23.5	24.0	23.0	19.5	21.0	15.0	13.0	14.0
26	16.5	14.5	15.5	25.5	23.0	23.5	23.5	20.0	21.5	15.5	14.0	14.5
27	18.5	16.5	17.5	25.5	23.0	24.0	23.0	20.0	21.0	16.0	14.0	15.0
28	21.0	18.5	20.0	26.5	24.0	25.0	22.0	19.0	20.5	15.5	14.0	14.5
29	22.0	20.5	21.5	25.5	23.5	24.5	21.0	17.5	19.0	15.0	13.5	14.0
30	22.5	21.5	22.0	25.5	23.0	24.0	20.5	17.0	18.5	14.5	13.0	13.5
31	---	---	---	25.5	23.0	24.0	21.0	17.5	19.0	---	---	---
MONTH	22.5	13.0	17.0	27.5	20.0	23.5	26.0	17.0	22.0	21.5	10.0	15.0



## MISSOURI RIVER MAIN STEM

## 06058500 CANYON FERRY LAKE NEAR HELENA, MT

LOCATION.--Lat 46°38'57", long 111°43'39" (NAD 27), in SE<sup>1</sup>/<sub>4</sub>SE<sup>1</sup>/<sub>4</sub> sec.4, T.10 N., R.1 W., Lewis and Clark County, Hydrologic Unit 10030101, in block 17 of Canyon Ferry Dam, 15 mi east of Helena, and at river mile 2,252.8.

DRAINAGE AREA.--15,904 mi<sup>2</sup>.

PERIOD OF RECORD.--April 1953 to current year (monthend contents only). Prior to October 1981, published as Canyon Ferry Reservoir near Helena. 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. Daily elevations and contents on file in Helena district office.

REVISED RECORDS.--WSP 1559: Drainage area.

GAGE.--Water-stage recorder in powerhouse control room. Elevation of gage is 3,650.0 ft (NGVD 29).

REMARKS.--Reservoir is formed by concrete dam; construction began in 1949, completed in 1953. Storage began in March 1953. All elevations are referenced to the National Geodetic Vertical Datum of 1929. Usable capacity, 1,993,000 acre-ft between elevation 3,770.00 ft, invert of outlet works, and 3,800.00 ft, controlled spillway elevation. Dead storage, 1,060 acre-ft, below elevation 3,650.00 ft. Minimum operating level, 396,000 acre-ft, at elevation 3,728.00 ft, for on-site power generation. 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.

EXTREMES FOR 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, 3,800.0 ft; minimum since first filling, 1,017,000 acre-ft, Apr. 11, 1967, elevation, 3,764.70 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 1,913,000 acre-ft, June 25, elevation, 3,797.66 ft; minimum, 1,546,000 acre-ft, Sept. 30, elevation, 3,786.31 ft.

## MONTHEND ELEVATION AND CONTENTS AT 2400 HOURS, SEPTEMBER 2002 TO SEPTEMBER 2003

Date	Elevation (feet)	Contents (acre-feet)	Change in Contents (acre-feet)
Sept. 30	3,790.25	1,687,000	--
Oct. 31	3,790.21	1,669,000	-18,000
Nov. 30	3,790.06	1,664,000	-5,000
Dec. 31	3,789.20	1,637,000	-27,000
CALENDAR YEAR 2002			+245,000
Jan. 31	3,788.15	1,604,000	-33,000
Feb. 28	3,787.23	1,575,000	-29,000
Mar. 31	3,787.70	1,590,000	+15,000
Apr. 30	3,790.18	1,668,000	+78,000
May 31	3,793.07	1,762,000	+94,000
June 30	3,797.30	1,901,000	+139,000
July 31	3,792.71	1,750,000	-151,000
Aug. 31	3,788.89	1,627,000	-123,000
Sept. 30	3,786.31	1,546,000	-81,000
WATER YEAR 2003			-141,000

## PRICKLY PEAR CREEK BASIN

06061500 PRICKLY PEAR CREEK NEAR CLANCY, MT

LOCATION.--Lat 46°31'09", long 111°56'45" (NAD 27), in NE<sup>1</sup>/<sub>4</sub>SE<sup>1</sup>/<sub>4</sub>SW<sup>1</sup>/<sub>4</sub> sec. 23, T.9 N., R.3 W., Jefferson County, Hydrologic Unit 10030101, on right bank 3.5 mi downstream from Lump Gulch Creek, 4 mi northeast of Clancy, 7 mi southeast of Helena, and at river mile 24.4.

DRAINAGE AREA.--192 mi<sup>2</sup>.

PERIOD OF RECORD.--May 1999 to current year.

REMARKS.--Data for Nov. 14, 2002 collected as part of a research project.

## WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

Date	Time	Instantaneous discharge, cfs (00061)	pH, water, unfltrd field, std units (00400)	Specific conductance, wat unfltrd, uS/cm 25 degC (00095)	Temperature, air, deg C (00020)	Temperature, water, deg C (00010)	Ammonia + org-N, water, unfltrd, mg/L as N (00625)	Nitrite + nitrate, water, fltrd, mg/L as N (00631)	Nitrite, water, fltrd, mg/L as N (00613)
NOV 2002									
14...	1200	17	7.9	303	5.0	4.5	--	--	--
APR 2003									
17...	1330	43	8.2	232	7.0	6.5	.20	.125	<.002
MAY									
20...	0900	64	8.0	200	11.0	4.0	.21	.128	E.002
JUN									
02...	1330	98	7.9	140	13.0	10.5	.34	.089	<.002
JUL									
22...	1500	12	8.5	332	29.5	24.5	.20	.201	.004

Date	Ortho-phosphate, water, fltrd, mg/L as P (00671)	Phosphorus, water, unfltrd, mg/L (00665)	Suspnd. sedi-ment, sieve diametr <.063mm (70331)	Sus-pended sedi-ment concen-tration, mg/L (80154)	Sus-pended sedi-ment load, tons/d (80155)
NOV 2002					
14...	--	--	--	--	--
APR 2003					
17...	E.005	.024	78	7	.81
MAY					
20...	E.004	.025	62	13	2.2
JUN					
02...	E.005	.045	68	22	5.8
JUL					
22...	E.004	.017	74	2	.06

Date	Time	Hardness, water, unfltrd, mg/L as CaCO3 (00900)	Calcium, water, fltrd, mg/L (00915)	Magnesium, water, fltrd, mg/L (00925)	Potassium, water, fltrd, mg/L (00935)	Sodium adsorp-tion ratio (00931)	Sodium, water, fltrd, mg/L (00930)	Alka-linity, wat flt fxd end lab, mg/L as CaCO3 (29801)	Chloride, water, fltrd, mg/L (00940)	Fluoride, water, fltrd, mg/L (00950)	Silica, water, fltrd, mg/L (00955)
NOV 2002											
14...	1200	--	--	--	--	--	--	--	--	--	--
MAY 2003											
20...	0900	78	23.1	5.03	1.98	.4	8.78	53	3.02	.2	18.1
JUL											
22...	1500	120	34.8	7.88	3.20	.8	21.3	87	6.15	.6	20.4

E--Estimated.

PRICKLY PEAR CREEK BASIN

06061500 PRICKLY PEAR CREEK NEAR CLANCY, MT--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003--Continued

Date	Sulfate water, fltrd, mg/L (00945)	Residue water, fltrd, sum of constituents mg/L (70301)	Residue water, fltrd, tons/ acre-ft (70303)	Residue water, fltrd, tons/d (70302)	Arsenic water fltrd ug/L (01000)	Arsenic water unfltrd ug/L (01002)	Cadmium water, unfltrd ug/L (01027)	Chromium, water, unfltrd recover-able, ug/L (01034)	Copper, water, unfltrd recover-able, ug/L (01042)
NOV 2002 14...	--	--	--	--	4	--	--	--	--
MAY 2003 20...	38.1	131	.18	22.6	--	5	.3	<.8	4.8
JUL 22...	65.5	213	.29	6.89	--	9	.13	<.8	3.8

Date	Lead, water, unfltrd recover-able, ug/L (01051)	Mangan-ese, water fltrd, ug/L (01056)	Nickel, water, unfltrd recover-able, ug/L (01067)	Zinc, water fltrd, ug/L (01090)	Zinc, water, unfltrd recover-able, ug/L (01092)
NOV 2002 14...	--	34	--	69	--
MAY 2003 20...	5.86	--	.58	--	112
JUL 22...	2.54	--	.97	--	37

E--Estimated.

## TENMILE CREEK BASIN

462522112172402 08N06W24DDCD02

LOCATION.--Lat 46°25'21.8", long 112°17'23.5", (NAD 83) in SW<sup>1</sup>/<sub>4</sub>SE<sup>1</sup>/<sub>4</sub>SE<sup>1</sup>/<sub>4</sub> sec. 24, T.8 N., R.6 W., Lewis and Clark County, Hydrologic Unit 10030101.

HYDROGEOLOGIC UNIT.--Tertiary volcanics.

WELL CHARACTERISTICS.--Drilled in June 2000, casing diameter 2 in., depth 84 ft.

DATUM.--Measuring point, top of PVC casing, 3.10 ft above land surface datum. Elevation of land-surface datum is 7,579.6 ft (NGVD 29).

PERIOD OF RECORD.--October 2001 to current year.

REMARKS.--All water levels are reported as distance, in feet below land-surface datum.

MEASURED WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM,  
WATER YEAR OCTOBER 2002 THROUGH SEPTEMBER 2003

DATE	WATER LEVEL
Jul 2	32.29
Aug 8	50.58
Aug 29	58.34

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

Date	Time	Flow rate, instantaneous, gal/min (00059)	Pump or flow period prior to sampling, minutes (72004)	Sampling depth, feet (00003)	Turbidity, water, unfltrd field, NTU (61028)	Dissolved oxygen, mg/L (00300)	pH, water, unfltrd field, std units (00400)	Specif. conductance, wat unfltrd uS/cm 25 degC (00095)	Temperature, water, deg C (00010)	Hardness, water, unfltrd mg/L as CaCO3 (00900)
JUL 2003 02...	1000	1.0	60	80	60	9.4	4.2	51	6.0	10
AUG 29...	1200	.40	9	80	220	7.3	3.7	118	7.0	4

Date	Calcium water, fltrd, mg/L (00915)	Magnesium, water, fltrd, mg/L (00925)	Potassium, water, fltrd, mg/L (00935)	Sodium adsorption ratio (00931)	Sodium, water, fltrd, mg/L (00930)	Alkalinity, wat flt inc tit field, mg/L as CaCO3 (39086)	Chloride, water, fltrd, mg/L (00940)	Fluoride, water, fltrd, mg/L (00950)	Silica, water, fltrd, mg/L (00955)	Sulfate, water, fltrd, mg/L (00945)	Aluminum, water, fltrd, ug/L (01106)
JUL 2003 02...	2.93	.723	2.14	.1	.97	.0	1.11	<.2	7.46	15.9	254
AUG 29...	1.46	.285	1.57	.1	.47	.0	.67	<.2	7.46	22.3	724

Date	Antimony, water, fltrd, ug/L (01095)	Arsenic, water, fltrd, ug/L (01000)	Beryllium, water, fltrd, ug/L (01010)	Cadmium, water, fltrd, ug/L (01025)	Chromium, water, fltrd, ug/L (01030)	Cobalt, water, fltrd, ug/L (01035)	Copper, water, fltrd, ug/L (01040)	Iron, water, fltrd, ug/L (01046)	Lead, water, fltrd, ug/L (01049)	Manganese, water, fltrd, ug/L (01056)	Nickel, water, fltrd, ug/L (01065)
JUL 2003 02...	<.30	E.2	<.06	.06	E.5	.277	1.6	54	3.62	5.2	1.46
AUG 29...	<.30	<.3	.06	.25	2.5	2.14	11.6	276	8.90	7.1	5.92

Date	Selenium, water, fltrd, ug/L (01145)	Silver, water, fltrd, ug/L (01075)	Thallium, water, fltrd, ug/L (01057)	Vanadium, water, fltrd, ug/L (01085)	Zinc, water, fltrd, ug/L (01090)
JUL 2003 02...	<.5	<.2	.20	<.1	16
AUG 29...	<.5	<.2	.22	<.1	42

E--Estimated.

TENMILE CREEK BASIN

462522112172401 08N06W24DDCD01

LOCATION.--Lat 46°25'21.8", long 112°17'23.5" (NAD 83), in SW<sup>1</sup>/<sub>4</sub>SE<sup>1</sup>/<sub>4</sub> sec. 24, T.8 N., R.6 W., Lewis and Clark County, Hydrologic Unit 10030101.

HYDROGEOLOGIC UNIT.--Boulder batholith quartz monzonite.

WELL CHARACTERISTICS.--Drilled in June 1999, casing diameter 4 in., depth 227 ft.

DATUM.--Measuring point, top of PVC casing, 1.70 ft above land surface datum. Elevation of land-surface datum is 7,579.8 ft (NGVD 29).

PERIOD OF RECORD.-- October 2001 to current year.

REMARKS.--All water levels are reported as distance, in feet below land-surface datum. Well was pumped extensively one day prior to each sampling date in an attempt to remove sediment and standing water from the well casing.

MEASURED WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM,  
WATER YEAR OCTOBER 2002 THROUGH SEPTEMBER 2003

DATE	WATER LEVEL
Jul 2	120.65
Aug 8	119.05
Aug 28	121.96

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

Date	Time	Flow rate, instantaneous, gal/min (00059)	Pump or flow period to sampling, minutes (72004)	Sampling depth, feet (00003)	Turbidity, water, unfltrd field, NTU (61028)	Dissolved oxygen, mg/L (00300)	pH, water, unfltrd field, std units (00400)	Specif. conductance, wat unfltrd, uS/cm 25 degC (00095)	Temperature, water, deg C (00010)	Hardness, water, unfltrd, mg/L as CaCO3 (00900)	Calcium water, fltrd, mg/L (00915)	
Date		Magnesium, water, fltrd, mg/L (00925)	Potassium, water, fltrd, mg/L (00935)	Sodium adsorption ratio (00931)	Sodium, water, fltrd, mg/L (00930)	Alkalinity, wat flt lab, mg/L as CaCO3 (29801)	Alkalinity, wat flt field, mg/L as CaCO3 (39086)	Bicarbonate, wat flt incrm. titr., mg/L (00453)	Carbonate, wat flt incrm. titr., mg/L (00452)	Chloride, water, fltrd, mg/L (00940)	Fluoride, water, fltrd, mg/L (00950)	Silica, water, fltrd, mg/L (00955)
JUL 2003	03... 1000	.25	150	195	>1000	.4	6.5	310	9.5	23	7.28	
AUG 29... 1100	.20	15	190	--	6.6	6.7	285	8.0	4	1.25		
JUL 2003	03... 1.18	6.08	5	58.9	68	67	81	.0	2.93	.3	26.3	
AUG 29... .141	3.08	13	56.7	69	60	74	.0	1.97	.3	28.6		
Date		Sulfate water, fltrd, mg/L (00945)	Residue sum of water, constituents, mg/L (70301)	Residue water, fltrd, tons/acre-ft (70303)	Aluminum, water, fltrd, ug/L (01106)	Antimony, water, fltrd, ug/L (01095)	Arsenic, water, fltrd, ug/L (01000)	Beryllium, water, fltrd, ug/L (01010)	Cadmium, water, fltrd, ug/L (01025)	Chromium, water, fltrd, ug/L (01030)	Cobalt, water, fltrd, ug/L (01035)	Copper, water, fltrd, ug/L (01040)
JUL 2003	03... 72.3	216	.29	2	<.30	1.4	<.06	.05	<.8	3.41	.6	
AUG 29... 62.4	191	.26	3	E.15	.8	<.06	E.02	9.4	.451	.5		
Date		Iron, water, fltrd, ug/L (01046)	Lead, water, fltrd, ug/L (01049)	Manganese, water, fltrd, ug/L (01056)	Nickel, water, fltrd, ug/L (01065)	Selenium, water, fltrd, ug/L (01145)	Silver, water, fltrd, ug/L (01075)	Thallium, water, fltrd, ug/L (01057)	Vanadium, water, fltrd, ug/L (01085)	Zinc, water, fltrd, ug/L (01090)		
JUL 2003	03... 317	E.07	238	2.18	<.5	<.2	.28	.3	28			
AUG 29... 45	E.05	41.7	.49	<.5	<.2	.12	.2	3				

E--Estimated.

TENMILE CREEK BASIN

462720112165101 TENMILE CREEK ABOVE MONITOR CREEK, NEAR RIMINI, MT

LOCATION.--Lat 46°27'19.0", long 112°16'52.3" (NAD 27), SW<sup>1</sup>/<sub>4</sub>NE<sup>1</sup>/<sub>4</sub>SW<sup>1</sup>/<sub>4</sub> sec. 7, T.8N., R.5W., Lewis and Clark County, Hydrologic Unit 10020006, 30 ft above confluence with Monitor Creek and 2.9 mi south of Rimini.

DRAINAGE AREA.--Indeterminate.

PERIOD OF RECORD.--July 2003 to September 2003.

GAGE.--None. Elevation at sampling site is 6,230 ft (NGVD 29).

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

Date	Time	Instantaneous discharge, cfs (00061)	Dissolved oxygen, mg/L (00300)	pH, water, unfltrd field, std units (00400)	Specific conductance, wat unfltrd uS/cm 25 degC (00095)	Temperature, air, deg C (00020)	Temperature, water, deg C (00010)	Hardness, water, unfltrd mg/L as CaCO3 (00900)	Calcium, water, fltrd, mg/L (00915)	Magnesium, water, fltrd, mg/L (00925)	Potassium, water, fltrd, mg/L (00935)
JUL 2003 10...	0930	.82	--	6.8	32	15.0	10.5	10	3.03	.629	.89
SEP 04...	1030	.02	9.1	7.5	44	--	10.0	14	4.10	.852	1.15

Date	Sodium adsorption ratio (00931)	Sodium, water, fltrd, mg/L (00930)	Alkalinity, wat flt fxd end lab, mg/L as CaCO3 (29801)	Chloride, water, fltrd, mg/L (00940)	Fluoride, water, fltrd, mg/L (00950)	Silica, water, fltrd, mg/L (00955)	Sulfate, water, fltrd, mg/L (00945)	Residue, water, fltrd, sum of constituents mg/L (70301)	Residue, water, fltrd, tons/acre-ft (70303)	Residue, water, fltrd, tons/d (70302)	Ammonia, water, fltrd, mg/L as N (00608)
JUL 2003 10...	.3	2.48	12	<.20	<.2	15.2	3.0	E33	E.04	E.00	<.04
SEP 04...	.4	3.78	17	.26	<.2	12.1	5.5	38	.05	.00	<.04

Date	Nitrite + nitrate water, fltrd, mg/L as N (00631)	Nitrite water, fltrd, mg/L as N (00613)	Orthophosphate, water, fltrd, mg/L as P (00671)	Aluminum, water, fltrd, ug/L (01106)	Aluminum, water, unfltrd recover, ug/L (01105)	Antimony, water, fltrd, ug/L (01095)	Antimony, water, unfltrd recover, ug/L (01097)	Arsenic, water, fltrd, ug/L (01000)	Arsenic, water, unfltrd recover, ug/L (01002)	Beryllium, water, fltrd, ug/L (01010)	Beryllium, water, unfltrd recover, ug/L (01012)
JUL 2003 10...	<.06	<.008	<.02	70	104	<.30	<.6	1.9	3	.15	.15
SEP 04...	<.06	<.008	<.18	16	19	<.30	<.6	1.5	2	E.05	E.06

Date	Cadmium, water, fltrd, ug/L (01025)	Cadmium, water, unfltrd recover, ug/L (01027)	Chromium, water, fltrd, ug/L (01030)	Chromium, water, unfltrd recover, ug/L (01034)	Cobalt, water, fltrd, ug/L (01035)	Cobalt, water, unfltrd recover, ug/L (01037)	Copper, water, fltrd, ug/L (01040)	Copper, water, unfltrd recover, ug/L (01042)	Iron, water, fltrd, ug/L (01046)	Iron, water, unfltrd recover, ug/L (01045)	Lead, water, fltrd, ug/L (01049)
JUL 2003 10...	E.03	.04	<.8	<.8	.039	.047	1.5	1.8	132	150	.23
SEP 04...	E.03	E.03	<.8	<.8	.228	.179	.9	.9	126	140	E.06

Date	Lead, water, unfltrd recover, ug/L (01051)	Manganese, water, fltrd, ug/L (01056)	Manganese, water, unfltrd recover, ug/L (01055)	Nickel, water, fltrd, ug/L (01065)	Nickel, water, unfltrd recover, ug/L (01067)	Selenium, water, fltrd, ug/L (01145)	Selenium, water, unfltrd recover, ug/L (01147)	Silver, water, fltrd, ug/L (01075)	Silver, water, unfltrd recover, ug/L (01077)
JUL 2003 10...	.34	4.4	6	.31	.29	<.5	<.5	<.2	<.16
SEP 04...	.08	28.6	30	.21	.26	<.5	E.3	<.2	<.16

## TENMILE CREEK BASIN

462720112165101 TENMILE CREEK ABOVE MONITOR CREEK, NEAR RIMINI, MT--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 200--Continued

Date	Thall- ium, water, fltrd, ug/L (01057)	Thall- ium, water, unfltrd ug/L (01059)	Vanad- ium, water, fltrd, ug/L (01085)	Vanad- ium, water, unfltrd ug/L (01087)	Zinc, water, fltrd, ug/L (01090)	Zinc, water, unfltrd recover- able, ug/L (01092)
JUL 2003						
10...	<.04	<.4	.2	<1	6	7
SEP						
04...	<.04	<.4	.2	<1	3	3

## TENMILE CREEK BASIN

462542112173101 MONITOR CREEK SS 12, NEAR RIMINI, MT

LOCATION.--Lat 46°25'41.6", long 112°17'30.6" (NAD 27), NW<sup>1</sup>/<sub>4</sub>NE<sup>1</sup>/<sub>4</sub>SE<sup>1</sup>/<sub>4</sub> sec. 24, T.8N., R.6W., Lewis and Clark County, Hydrologic Unit 10020006, 1.95 mi upstream of confluence with Tennmile Creek, 5.4 mi south of Rimini.

DRAINAGE AREA.--Indeterminate.

PERIOD OF RECORD.--July 2003 to September 2003.

GAGE.--None. Elevation at sampling site is 7,230 ft (NGVD 29).

## WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

Date	Time	Instantaneous discharge, cfs (00061)	Dissolved oxygen, mg/L (00300)	pH, water, unfltrd field, std units (00400)	Specific conductance, wat unfltrd, uS/cm 25 degC (00095)	Temperature, air, deg C (00020)	Temperature, water, deg C (00010)	Hardness, water, unfltrd mg/L as CaCO3 (00900)	Calcium water, fltrd, mg/L (00915)	Magnesium, water, fltrd, mg/L (00925)	Potassium, water, fltrd, mg/L (00935)	
JUL 2003	10...	1420	.15	--	3.7	253	31.0	15.0	43	12.4	3.01	5.81
SEP	05...	1000	.07	9.2	3.5	227	--	9.0	38	10.8	2.69	6.90
Date		Sodium adsorption ratio (00931)	Sodium, water, fltrd, mg/L (00930)	Chloride, water, fltrd, mg/L (00940)	Fluoride, water, fltrd, mg/L (00950)	Silica, water, fltrd, mg/L (00955)	Sulfate, water, fltrd, mg/L (00945)	Ammonia water, fltrd, mg/L as N (00608)	Nitrite + nitrate water, fltrd, mg/L as N (00631)	Nitrite water, fltrd, mg/L as N (00613)	Orthophosphate, water, fltrd, mg/L as P (00671)	Aluminum, water, fltrd, ug/L (01106)
JUL 2003	10...	.1	1.51	.55	<.2	22.5	102	<.04	.35	<.008	<.02	4620
SEP	05...	.1	1.96	.57	.2	30.7	97.2	<.04	.16	<.008	<.18	4350
Date		Aluminum, water, unfltrd recoverable, ug/L (01105)	Antimony, water, fltrd, ug/L (01095)	Antimony, water, unfltrd, ug/L (01097)	Arsenic, water, fltrd, ug/L (01000)	Arsenic, water, unfltrd, ug/L (01002)	Beryllium, water, fltrd, ug/L (01010)	Beryllium, water, unfltrd recoverable, ug/L (01012)	Cadmium, water, fltrd, ug/L (01025)	Cadmium, water, unfltrd, ug/L (01027)	Chromium, water, fltrd, ug/L (01030)	Chromium, water, unfltrd recoverable, ug/L (01034)
JUL 2003	10...	4440	<.30	<.6	.5	<2	3.83	3.06	8.96	8.59	<.8	<.8
SEP	05...	4340	<.30	<.6	.5	<2	2.69	2.65	6.76	6.77	<.8	<.8
Date		Cobalt, water, fltrd, ug/L (01035)	Cobalt, water, unfltrd recoverable, ug/L (01037)	Copper, water, fltrd, ug/L (01040)	Copper, water, unfltrd recoverable, ug/L (01042)	Iron, water, fltrd, ug/L (01046)	Iron, water, unfltrd recoverable, ug/L (01045)	Lead, water, fltrd, ug/L (01049)	Lead, water, unfltrd recoverable, ug/L (01051)	Manganese, water, fltrd, ug/L (01056)	Manganese, water, unfltrd recoverable, ug/L (01055)	Nickel, water, fltrd, ug/L (01065)
JUL 2003	10...	15.8	14.9	28.8	29.6	312	350	35.4	34.0	597	556	13.8
SEP	05...	14.7	13.8	24.8	24.6	628	650	29.9	29.6	545	513	11.6
Date		Nickel, water, unfltrd recoverable, ug/L (01067)	Selenium, water, fltrd, ug/L (01145)	Selenium, water, unfltrd, ug/L (01147)	Silver, water, fltrd, ug/L (01075)	Silver, water, unfltrd recoverable, ug/L (01077)	Thallium, water, fltrd, ug/L (01057)	Thallium, water, unfltrd, ug/L (01059)	Vanadium, water, fltrd, ug/L (01085)	Vanadium, water, unfltrd, ug/L (01087)	Zinc, water, fltrd, ug/L (01090)	Zinc, water, unfltrd recoverable, ug/L (01092)
JUL 2003	10...	13.2	2.1	1.9	<.2	<.16	.57	.5	<.1	<.1	597	574
SEP	05...	11.1	1.4	1.4	<.2	<.16	.43	E.4	<.1	<.1	481	498

E--Estimated.



TENMILE CREEK BASIN

462721112164801 MONITOR CREEK AT MOUTH, NEAR RIMINI, MT

LOCATION.--Lat 46°27'21", long 112°16'48" (NAD 27), SW<sup>1</sup>/<sub>4</sub>NE<sup>1</sup>/<sub>4</sub>SW<sup>1</sup>/<sub>4</sub> sec. 7, T.8N., R.5W., Lewis and Clark County, Hydrologic Unit 10020006, 20 ft upstream from mouth and 4.0 mi southwest of Rimini.

DRAINAGE AREA.--Indeterminate.

PERIOD OF RECORD.--July and October 1997, July 2003 to September 2003.

GAGE.--None. Elevation at sampling site is 6,220 ft (NGVD 29).

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

Date	Time	Instantaneous discharge, cfs (00061)	Dissolved oxygen, mg/L (00300)	pH, water, unfltrd field, std units (00400)	Specific conductance, wat unfltrd uS/cm 25 degC (00095)	Temperature, water, deg C (00010)	Hardness, water, unfltrd mg/L as CaCO3 (00900)	Calcium water, fltrd, mg/L (00915)	Magnesium, water, fltrd, mg/L (00925)	Potassium, water, fltrd, mg/L (00935)	Sodium adsorption ratio (00931)	
JUL 2003	10...	1015	.63	--	6.5	74	9.0	23	6.47	1.66	2.02	.2
SEP	04...	1100	.11	9.2	6.8	105	9.5	36	10.2	2.49	2.78	.2

Date	Time	Sodium water, fltrd, mg/L (00930)	Alkalinity, wat flt fxd end lab, mg/L as CaCO3 (29801)	Chloride, water, fltrd, mg/L (00940)	Fluoride, water, fltrd, mg/L (00950)	Silica, water, fltrd, mg/L (00955)	Sulfate water, fltrd, mg/L (00945)	Residue water, fltrd, sum of constituents mg/L (70301)	Residue water, fltrd, tons/acre-ft (70303)	Residue water, fltrd, tons/d (70302)	Ammonia water, fltrd, mg/L as N (00608)	Nitrite + nitrate water, fltrd, mg/L as N (00631)
JUL 2003	10...	2.23	6	.22	.2	19.3	23.2	59	.08	.10	<.04	<.06
SEP	04...	2.94	7	.35	.2	21.2	37.5	82	.11	.02	<.04	<.06

Date	Time	Nitrite water, fltrd, mg/L as N (00613)	Orthophosphate, water, fltrd, mg/L as P (00671)	Aluminum, water, fltrd, ug/L (01106)	Antimony, water, fltrd, ug/L (01095)	Antimony, water, unfltrd, ug/L (01097)	Arsenic water, fltrd, ug/L (01000)	Arsenic water, unfltrd, ug/L (01002)	Beryllium, water, fltrd, ug/L (01010)	Beryllium, water, unfltrd, recoverable, ug/L (01012)	Cadmium water, fltrd, ug/L (01025)	Cadmium water, unfltrd, ug/L (01027)
JUL 2003	10...	<.008	<.02	113	<.30	<.6	.6	<2	.37	.35	.92	.90
SEP	04...	<.008	<.18	28	<.30	<.6	.5	<2	.14	.15	.55	.56

Date	Time	Chromium, water, fltrd, ug/L (01030)	Chromium, water, unfltrd, recoverable, ug/L (01034)	Cobalt water, fltrd, ug/L (01035)	Cobalt water, unfltrd, recoverable, ug/L (01037)	Copper, water, fltrd, ug/L (01040)	Copper, water, unfltrd, recoverable, ug/L (01042)	Iron, water, fltrd, ug/L (01046)	Iron, water, unfltrd, recoverable, ug/L (01045)	Lead, water, fltrd, ug/L (01049)	Lead, water, unfltrd, recoverable, ug/L (01051)	Manganese, water, fltrd, ug/L (01056)
JUL 2003	10...	<.8	<.8	.526	.542	2.4	3.0	32	50	.45	.86	30.7
SEP	04...	<.8	<.8	.169	.157	1.5	1.5	18	20	E.06	.18	14.9

Date	Time	Manganese, water, unfltrd, recoverable, ug/L (01055)	Nickel, water, fltrd, ug/L (01065)	Nickel, water, unfltrd, recoverable, ug/L (01067)	Selenium, water, fltrd, ug/L (01145)	Selenium, water, unfltrd, ug/L (01147)	Silver, water, fltrd, ug/L (01075)	Silver, water, unfltrd, recoverable, ug/L (01077)
JUL 2003	10...	31	2.08	2.05	<.5	E.4	<.2	<.16
SEP	04...	15	1.38	1.46	<.5	<.5	<.2	<.16

E--Estimated.

## TENMILE CREEK BASIN

462721112164801 MONITOR CREEK AT MOUTH, NEAR RIMINI, MT--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003--Continued

Date	Thall- ium, water, fltrd, ug/L (01057)	Thall- ium, water, unfltrd ug/L (01059)	Vanad- ium, water, fltrd, ug/L (01085)	Vanad- ium, water, unfltrd ug/L (01087)	Zinc, water, fltrd, ug/L (01090)	Zinc, water, unfltrd recover- able, ug/L (01092)
JUL 2003 10...	.04	<.4	E.1	<1	91	90
SEP 04...	E.02	<.4	<.1	<1	72	70

E--Estimated.

TENMILE CREEK BASIN

462544112162001 RUBY CREEK RC2A, ABOVE SCOTT RESERVOIR, NEAR RIMINI, MT

LOCATION.--Lat 46°25'44.1", long 112°16'19.7" (NAD 27), NE<sup>1</sup>/<sub>4</sub>NW<sup>1</sup>/<sub>4</sub>SE<sup>1</sup>/<sub>4</sub> sec. 19, T.8N., R.5W., Lewis and Clark County, Hydrologic Unit 10020006, 200 ft above confluence with unnamed tributary, 0.3 mi upstream from Scott Reservoir, and 0.45 mi south of Rimini.

DRAINAGE AREA.--Indeterminate.

PERIOD OF RECORD.--July 2003.

GAGE.--None. Elevation at sampling site is 7,380 ft (NGVD 29).

REMARKS.--Stream was dry on site visits in August and September.

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

Date	Time	Instantaneous discharge, cfs (00061)	pH, water, unfltrd field, std units (00400)	Specif. conductance, wat unfltrd, uS/cm 25 degC (00095)	Temperature, water, deg C (00010)	Hardness, water, unfltrd, mg/L as CaCO3 (00900)	Calcium, water, fltrd, mg/L (00915)	Magnesium, water, fltrd, mg/L (00925)	Potassium, water, fltrd, mg/L (00935)	Sodium adsorption ratio (00931)	Sodium, water, unfltrd, mg/L (00930)	
JUL 2003	10...	1320	.03	6.1	17	11.0	6	1.96	.317	.52	.2	.92
Date		Alkalinity, wat flt fxd end lab, mg/L as CaCO3 (29801)	Chloride, water, fltrd, mg/L (00940)	Fluoride, water, fltrd, mg/L (00950)	Silica, water, fltrd, mg/L (00955)	Sulfate, water, fltrd, mg/L (00945)	Ammonia, water, fltrd, as N (00608)	Nitrite + nitrate, water, fltrd, mg/L as N (00631)	Nitrite, water, fltrd, mg/L as N (00613)	Orthophosphate, water, fltrd, mg/L as P (00671)	Aluminum, water, fltrd, ug/L (01106)	Aluminum, water, unfltrd recoverable, ug/L (01105)
JUL 2003	10...	7	<.20	<.2	7.14	1.3	<.04	<.06	<.008	<.02	103	137
Date		Antimony, water, fltrd, ug/L (01095)	Antimony, water, unfltrd, ug/L (01097)	Arsenic, water, fltrd, ug/L (01000)	Arsenic, water, unfltrd, ug/L (01002)	Beryllium, water, fltrd, ug/L (01010)	Beryllium, water, unfltrd recoverable, ug/L (01012)	Cadmium, water, fltrd, ug/L (01025)	Cadmium, water, unfltrd, ug/L (01027)	Chromium, water, fltrd, ug/L (01030)	Chromium, water, unfltrd recoverable, ug/L (01034)	Cobalt, water, fltrd, ug/L (01035)
JUL 2003	10...	<.30	<.6	1.2	<2	.09	.10	<.04	E.03	<.8	<.8	.037
Date		Cobalt, water, unfltrd recoverable, ug/L (01037)	Copper, water, fltrd, ug/L (01040)	Copper, water, unfltrd recoverable, ug/L (01042)	Iron, water, fltrd, ug/L (01046)	Iron, water, unfltrd recoverable, ug/L (01045)	Lead, water, fltrd, ug/L (01049)	Lead, water, unfltrd recoverable, ug/L (01051)	Manganese, water, fltrd, ug/L (01056)	Manganese, water, unfltrd recoverable, ug/L (01055)	Nickel, water, fltrd, ug/L (01065)	Nickel, water, unfltrd recoverable, ug/L (01067)
JUL 2003	10...	.049	1.7	1.7	57	70	.21	.23	3.2	4	.24	.25
Date		Selenium, water, fltrd, ug/L (01145)	Selenium, water, unfltrd, ug/L (01147)	Silver, water, fltrd, ug/L (01075)	Silver, water, unfltrd recoverable, ug/L (01077)	Thallium, water, fltrd, ug/L (01057)	Thallium, water, unfltrd, ug/L (01059)	Vanadium, water, fltrd, ug/L (01085)	Vanadium, water, unfltrd, ug/L (01087)	Zinc, water, fltrd, ug/L (01090)	Zinc, water, unfltrd recoverable, ug/L (01092)	
JUL 2003	10...	<.5	.5	<.2	<.16	<.04	<.4	.1	<1	5	4	

E--Estimated.

## TENMILE CREEK BASIN

462657112143501 BANNER CREEK AT BRIDGE, 0.5 MILE ABOVE CITY DIVERSION, NEAR RIMINI, MT

LOCATION.--Lat 46°23'57", long 112°15'25" (NAD 27), in NW<sup>1</sup>/<sub>4</sub> NW<sup>1</sup>/<sub>4</sub> SW<sup>1</sup>/<sub>4</sub> sec. 16, T. 8 N., R. 5 W., Lewis and Clark County, Hydrologic Unit 10030101, at bridge near the downstream edge of meadow, about 0.5 mi upstream from city diversion, and 2.5 mi south of Rimini.

DRAINAGE AREA.--2.6 mi<sup>2</sup>.

PERIOD OF RECORD.--April 2000 to current year.

GAGE--None. Elevation at site is 6,700 ft (NGVD 29).

## WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

Date	Time	Instan- taneous dis- charge, cfs (00061)	pH, water, unfltrd field, std units (00400)	Specif. conduc- tance, wat unfl uS/cm 25 degC (00095)	Temper- ature, air, deg C (00020)	Temper- ature, water, deg C (00010)	Hard- ness, water, unfltrd mg/L as CaCO3 (00900)	Calcium water, fltrd, mg/L (00915)	Magnes- ium, water, fltrd, mg/L (00925)	Potas- sium, water, fltrd, mg/L (00935)	Sodium adsorp- tion ratio (00931)	
MAR 2003												
24...	1045	.20	7.5	68	1.5	0.0	33	9.95	1.93	--	--	
JUL												
22...	0930	.16	7.3	73	16.0	10.0	29	9.03	1.67	.83	.1	
AUG												
21...	1340	.11	7.3	80	15.5	19.0	38	12.0	1.88	--	--	
SEP												
25...	1050	.15	7.7	87	17.0	6.0	36	10.8	2.08	--	--	
Date		Sodium, water, fltrd, mg/L (00930)	Alka- linity, wat flt fxd end lab, mg/L as CaCO3 (29801)	Chlor- ide, water, fltrd, mg/L (00940)	Fluor- ide, water, fltrd, mg/L (00950)	Silica, water, fltrd, mg/L (00955)	Sulfate water, fltrd, mg/L (00945)	Residue water, fltrd, sum of consti- tuents mg/L (70301)	Residue water, fltrd, tons/ acre-ft (70303)	Residue water, fltrd, tons/d (70302)	Alum- inum, water, fltrd, ug/L (01106)	Alum- inum, water, unfltrd recover- able, ug/L (01105)
MAR 2003												
24...	--	--	--	--	--	--	--	--	--	--	--	--
JUL												
22...	1.82	26	.33	<.2	12.4	8.6	50	.07	.02	4	43	
AUG												
21...	--	--	--	--	--	--	--	--	--	--	--	--
SEP												
25...	--	--	--	--	--	--	--	--	--	--	--	--
Date		Anti- mony, water, fltrd, ug/L (01095)	Anti- mony, water, unfltrd ug/L (01097)	Arsenic water, fltrd, ug/L (01000)	Arsenic water, unfltrd ug/L (01002)	Cadmium water, fltrd, ug/L (01025)	Cadmium water, unfltrd ug/L (01027)	Chrom- ium, water, fltrd, ug/L (01030)	Chrom- ium, water, recover- able, ug/L (01034)	Copper, water, fltrd, ug/L (01040)	Copper, water, unfltrd recover- able, ug/L (01042)	Iron, water, fltrd, ug/L (01046)
MAR 2003												
24...	--	--	.8	E2	.12	.13	--	--	1.2	1.6	--	
JUL												
22...	<.30	<.6	1.1	<2	.10	.11	<.8	<.8	3.5	3.2	286	
AUG												
21...	--	--	1.2	E1	.05	.07	--	--	1.4	1.6	--	
SEP												
25...	--	--	.4	<2	.09	.08	--	--	1.5	1.2	--	

E--Estimated.

TENMILE CREEK BASIN

462657112143501 BANNER CREEK AT BRIDGE, 0.5 MILE ABOVE CITY DIVERSION, NEAR RIMINI, MT--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003--Continued

Date	Iron, water, unfltrd recover- able, ug/L (01045)	Lead, water, fltrd, ug/L (01049)	Lead, water, unfltrd recover- able, ug/L (01051)	Mangan- ese, water, unfltrd recover- able, ug/L (01056)	Mangan- ese, water, unfltrd recover- able, ug/L (01055)	Mercury water, unfltrd recover- able, ug/L (71890)	Mercury water, unfltrd recover- able, ug/L (71900)	Nickel, water, fltrd, ug/L (01065)	Nickel, water, unfltrd recover- able, ug/L (01067)
MAR 2003 24...	--	.10	.52	--	--	--	--	--	--
JUL 22...	550	.15	.36	143	136	<.02	<.02	.65	.54
AUG 21...	--	.13	.30	--	--	--	--	--	--
SEP 25...	--	E.08	.10	--	--	--	--	--	--

Date	Silver, water, fltrd, ug/L (01075)	Silver, water, unfltrd recover- able, ug/L (01077)	Zinc, water, fltrd, ug/L (01090)	Zinc, water, unfltrd recover- able, ug/L (01092)	Suspnd. sedi- ment, sieve diametr percent <.063mm (70331)	Sus- pended sedi- ment concen- tration mg/L (80154)	Sus- pended sedi- ment load, tons/d (80155)
MAR 2003 24...	--	--	37	26	75	3	<.01
JUL 22...	<.2	<.16	17	20	75	4	<.01
AUG 21...	--	--	8	8	90	1	<.01
SEP 25...	--	--	21	20	67	1	<.01

E--Estimated.

## TENMILE CREEK BASIN

462838112143901 POISON CREEK AT MOUTH, NEAR RIMINI, MT

LOCATION.--Lat 46°28'38", long 112°14'39" (NAD 27), in SW<sup>1</sup>/<sub>4</sub> NW<sup>1</sup>/<sub>4</sub> NW<sup>1</sup>/<sub>4</sub> sec. 4, T. 8 N., R. 5 W., Lewis and Clark County, Hydrologic Unit 10030101, at culvert crossing on Rimini Road about 1 mi south of Rimini.

DRAINAGE AREA.--0.32 mi<sup>2</sup>.

PERIOD OF RECORD.--May 1999 to current year.

GAGE--None. Elevation at site is 5,500 ft (NGVD 29).

## WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

Date	Time	Instantaneous discharge, cfs (00061)	pH, water, unfltrd field, std units (00400)	Specific conductance, wat unfltrd uS/cm 25 degC (00095)	Temperature, air, deg C (00020)	Temperature, water, deg C (00010)	Hardness, water, unfltrd mg/L as CaCO3 (00900)	Calcium, water, fltrd, mg/L (00915)	Magnesium, water, fltrd, mg/L (00925)	Potassium, water, fltrd, mg/L (00935)	Sodium adsorption ratio (00931)
JUN 2003											
18...	0800	.17	6.5	98	14.0	10.0	31	9.53	1.70	1.32	.1
JUL											
22...	0945	.05	5.9	107	18.0	12.0	34	10.5	1.99	--	--
AUG											
26...	0840	.03	6.8	111	12.0	12.0	41	13.1	2.08	--	--
SEP											
25...	1130	.01	6.2	126	18.0	7.5	43	13.0	2.50	--	--

Date	Time	Sodium, water, fltrd, mg/L (00930)	Alkalinity, wat flt fxd end, mg/L as CaCO3 (29801)	Chloride, water, fltrd, mg/L (00940)	Fluoride, water, fltrd, mg/L (00950)	Silica, water, fltrd, mg/L (00955)	Sulfate, water, fltrd, mg/L (00945)	Residue water, fltrd, sum of constituents mg/L (70301)	Residue water, fltrd, tons/acre-ft (70303)	Residue water, fltrd, tons/d (70302)	Aluminum, water, fltrd, ug/L (01106)	Aluminum, water, unfltrd, recoverable, ug/L (01105)
JUN 2003												
18...	1.90	4	.46	.2	24.2	32.5	76	.10	.03	61	189	
JUL												
22...	--	--	--	--	--	--	--	--	--	--	--	--
AUG												
26...	--	--	--	--	--	--	--	--	--	--	--	--
SEP												
25...	--	--	--	--	--	--	--	--	--	--	--	--

Date	Time	Antimony, water, fltrd, ug/L (01095)	Antimony, water, unfltrd, ug/L (01097)	Arsenic, water, fltrd, ug/L (01000)	Arsenic, water, unfltrd, ug/L (01002)	Cadmium, water, fltrd, ug/L (01025)	Cadmium, water, unfltrd, ug/L (01027)	Chromium, water, fltrd, ug/L (01030)	Chromium, water, unfltrd, recoverable, ug/L (01034)	Copper, water, fltrd, ug/L (01040)	Copper, water, unfltrd, recoverable, ug/L (01042)
JUN 2003											
18...	1.81	1.9	17.6	40	8.57	8.69	<.8	<.8	27.7	33.1	
JUL											
22...	--	--	16.3	28	8.87	8.59	--	--	27.1	29.7	
AUG											
26...	--	--	19.3	24	8.95	8.39	--	--	34.2	32.6	
SEP											
25...	--	--	14.4	16	9.02	8.95	--	--	32.2	30.0	

Date	Time	Iron, water, fltrd, ug/L (01046)	Iron, water, unfltrd, recoverable, ug/L (01045)	Lead, water, fltrd, ug/L (01049)	Lead, water, unfltrd, recoverable, ug/L (01051)	Manganese, water, fltrd, ug/L (01056)	Manganese, water, unfltrd, recoverable, ug/L (01055)	Mercury, water, fltrd, ug/L (71890)	Mercury, water, unfltrd, recoverable, ug/L (71900)	Nickel, water, fltrd, ug/L (01065)	Nickel, water, unfltrd, recoverable, ug/L (01067)
JUN 2003											
18...	17	110	1.53	8.59	411	402	<.02	<.02	2.97	2.88	
JUL											
22...	--	--	1.89	7.06	--	--	--	--	--	--	--
AUG											
26...	--	--	3.04	7.17	--	--	--	--	--	--	--
SEP											
25...	--	--	2.76	2.92	--	--	--	--	--	--	--

TENMILE CREEK BASIN

462838112143901 POISON CREEK AT MOUTH, NEAR RIMINI, MT--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003--Continued

Date	Silver, water, fltrd, ug/L (01075)	Silver, water, unfltrd recover- able, ug/L (01077)	Zinc, water, fltrd, ug/L (01090)	Zinc, water, unfltrd recover- able, ug/L (01092)	Suspnd. sedi- ment, sieve diametr percent <.063mm (70331)	Sus- pended sedi- ment concen- tration mg/L (80154)	Sus- pended sedi- ment load, tons/d (80155)
JUN 2003							
18...	<.3	.33	1080	1150	73	3	<.01
JUL							
22...	--	--	1140	1160	67	1	<.01
AUG							
26...	--	--	1300	1240	62	2	<.01
SEP							
25...	--	--	1430	1370	38	2	<.01

## TENMILE CREEK BASIN

462853112144101 TENMILE CREEK ABOVE CITY DIVERSION, NEAR RIMINI, MT

LOCATION.--Lat 46°28'53", long 112°14'10" (NAD 27), in NW<sup>1</sup>/<sub>4</sub> NW<sup>1</sup>/<sub>4</sub> NW<sup>1</sup>/<sub>4</sub> sec. 4, T. 8 N., R. 5 W., Lewis and Clark County, Hydrologic Unit 10030101, about 0.25 mile upstream from city diversion, about 100 feet west of Rimini road, and 0.125 mi south of Rimini.

DRAINAGE AREA.--15.2 mi<sup>2</sup>.

PERIOD OF RECORD.--May 1999 to current year.

GAGE--None. Elevation at site is 5,350 ft (NGVD 29).

## WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

Date	Time	Instantaneous discharge, cfs (00061)	pH, water, unfltrd field, std units (00400)	Specific conductance, wat unfltrd uS/cm 25 degC (00095)	Temperature, air, deg C (00020)	Temperature, water, deg C (00010)	Hardness, water, unfltrd mg/L as CaCO3 (00900)	Calcium, water, fltrd, mg/L (00915)	Magnesium, water, fltrd, mg/L (00925)	Potassium, water, fltrd, mg/L (00935)	Sodium adsorption ratio (00931)	
JUN 2003	17...	1145	22	7.4	44	20.0	11.0	15	4.53	.960	.96	.2
JUL	22...	1000	9.0	7.0	41	18.0	10.5	14	4.20	.921	--	--
AUG	26...	0930	1.4	7.3	75	12.5	11.5	33	10.3	1.75	--	--
SEP	29...	0850	1.1	7.6	82	5.0	5.0	32	9.34	2.07	--	--

Date	Sodium, water, fltrd, mg/L (00930)	Alkalinity, lab, fxd end mg/L as CaCO3 (29801)	Chloride, water, fltrd, mg/L (00940)	Fluoride, water, fltrd, mg/L (00950)	Silica, water, fltrd, mg/L (00955)	Sulfate, water, fltrd, mg/L (00945)	Residue sum of constituents mg/L (70301)	Residue water, fltrd, tons/acre-ft (70303)	Residue water, fltrd, tons/d (70302)	Aluminum, water, fltrd, ug/L (01106)	Aluminum, water, unfltrd recoverable, ug/L (01105)
JUN 2003	1.66	11	.35	<.2	13.9	7.1	37	.05	2.14	85	171
JUL	--	--	--	--	--	--	--	--	--	--	--
AUG	--	--	--	--	--	--	--	--	--	--	--
SEP	--	--	--	--	--	--	--	--	--	--	--

Date	Antimony, water, fltrd, ug/L (01095)	Antimony, water, unfltrd, ug/L (01097)	Arsenic, water, fltrd, ug/L (01000)	Arsenic, water, unfltrd, ug/L (01002)	Cadmium, water, fltrd, ug/L (01025)	Cadmium, water, unfltrd, ug/L (01027)	Chromium, water, fltrd, ug/L (01030)	Copper, water, fltrd, ug/L (01040)	Copper, water, unfltrd recoverable, ug/L (01042)
JUN 2003	E.17	<.6	2.8	4	.54	.57	<.8	4.1	4.6
JUL	--	--	4.5	7	.64	.71	--	4.8	5.1
AUG	--	--	6.3	8	1.67	1.64	--	3.1	3.4
SEP	--	--	6.0	10	1.95	2.00	--	2.7	2.7

Date	Iron, water, fltrd, ug/L (01046)	Iron, water, unfltrd recoverable, ug/L (01045)	Lead, water, fltrd, ug/L (01049)	Lead, water, unfltrd recoverable, ug/L (01051)	Manganese, water, fltrd, ug/L (01056)	Manganese, water, unfltrd recoverable, ug/L (01055)	Mercury, water, fltrd, ug/L (71890)	Mercury, water, unfltrd recoverable, ug/L (71900)	Nickel, water, fltrd, ug/L (01065)	Nickel, water, unfltrd recoverable, ug/L (01067)
JUN 2003	80	190	.76	1.89	20.5	25	<.02	E.01	.66	.64
JUL	--	--	.99	3.04	--	--	--	--	--	--
AUG	--	--	.77	1.77	--	--	--	--	--	--
SEP	--	--	.33	1.12	--	--	--	--	--	--



TENMILE CREEK BASIN

462853112144101 TENMILE CREEK ABOVE CITY DIVERSION, NEAR RIMINI, MT--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003--Continued

Date	Silver, water, fltrd, ug/L (01075)	Silver, water, unfltrd recover -able, ug/L (01077)	Zinc, water, fltrd, ug/L (01090)	Zinc, water, unfltrd recover -able, ug/L (01092)	Suspnd. sedi- ment, sieve diametr percent <.063mm (70331)	Sus- pended sedi- ment concen- tration mg/L (80154)	Sus- pended sedi- ment load, tons/d (80155)
JUN 2003 17...	<.3	<.16	102	105	84	3	.18
JUL 22...	--	--	116	146	87	4	.10
AUG 26...	--	--	444	370	94	2	.01
SEP 29...	--	--	472	471	75	2	.01

## TENMILE CREEK BASIN

## 462758112123001 BEAVER CREEK TRIBUTARY NO. 2 NEAR RIMINI, MT

LOCATION.--Lat 46°27'58", long 112°12'30" (NAD 27), in SW<sup>1</sup>/<sub>4</sub> SE<sup>1</sup>/<sub>4</sub> SE<sup>1</sup>/<sub>4</sub> sec. 3, T. 8 N., R. 5 W., Lewis and Clark County, Hydrologic Unit 10030101, about 40 ft upstream from inlet structure to Banner Creek flume, about 100 ft. upstream from Banner Creek flume, and about 2.5 mi southwest of Rimini.

DRAINAGE AREA.--0.67 mi<sup>2</sup>.

PERIOD OF RECORD.--April 2000 to current year.

GAGE--None. Elevation at site is 6,330 ft (NGVD 29).

## WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

Date	Time	Instantaneous discharge, cfs (00061)	pH, water, unfltrd field, std units (00400)	Specific conductance, wat unfltrd uS/cm 25 degC (00095)	Temperature, air, deg C (00020)	Temperature, water, deg C (00010)	Hardness, water, unfltrd mg/L as CaCO3 (00900)	Calcium, water, fltrd, mg/L (00915)	Magnesium, water, fltrd, mg/L (00925)	Potassium, water, fltrd, mg/L (00935)	Sodium adsorption ratio (00931)	
JUN 2003												
18...	1000	.82	7.3	64	22.0	7.0	18	5.63	.953	1.34	.2	
JUL												
22...	1300	.20	7.6	60	27.0	10.5	19	6.04	1.03	--	--	
AUG												
25...	1330	.12	7.3	62	28.0	12.0	20	6.32	1.04	--	--	
SEP												
25...	1330	.14	7.2	64	24.5	6.5	21	6.61	1.12	--	--	
Date		Sodium, water, fltrd, mg/L (00930)	Alkalinity, wat flt fxd end lab, mg/L as CaCO3 (29801)	Chloride, water, fltrd, mg/L (00940)	Fluoride, water, fltrd, mg/L (00950)	Silica, water, fltrd, mg/L (00955)	Sulfate, water, fltrd, mg/L (00945)	Residue sum of constituents, fltrd, mg/L (70301)	Residue water, fltrd, tons/acre-ft (70303)	Residue water, fltrd, tons/d (70302)	Aluminum, water, fltrd, ug/L (01106)	Aluminum, water, unfltrd recover-able, ug/L (01105)
JUN 2003												
18...	2.17	12	.27	<.2	16.5	13.0	48	.06	.11	10	42	
JUL												
22...	--	--	--	--	--	--	--	--	--	--	--	--
AUG												
25...	--	--	--	--	--	--	--	--	--	--	--	--
SEP												
25...	--	--	--	--	--	--	--	--	--	--	--	--
Date		Anti-mony, water, fltrd, ug/L (01095)	Anti-mony, water, unfltrd, ug/L (01097)	Arsenic, water, fltrd, ug/L (01000)	Arsenic, water, unfltrd, ug/L (01002)	Cadmium, water, fltrd, ug/L (01025)	Cadmium, water, unfltrd, ug/L (01027)	Chromium, water, fltrd, ug/L (01030)	Chromium, water, unfltrd recover-able, ug/L (01034)	Copper, water, fltrd, ug/L (01040)	Copper, water, unfltrd recover-able, ug/L (01042)	Iron, water, fltrd, ug/L (01046)
JUN 2003												
18...	<.30	<.6	5.1	9	3.46	3.56	<.8	<.8	11.2	12.5	11	
JUL												
22...	--	--	7.3	8	2.22	2.11	--	--	6.9	7.2	--	
AUG												
25...	--	--	7.8	9	2.23	2.20	--	--	7.7	9.0	--	
SEP												
25...	--	--	6.5	8	2.01	1.96	--	--	6.4	5.9	--	
Date		Iron, water, unfltrd recover-able, ug/L (01045)	Lead, water, unfltrd recover-able, fltrd, ug/L (01049)	Lead, water, unfltrd recover-able, ug/L (01051)	Manganese, water, fltrd, ug/L (01056)	Manganese, water, unfltrd recover-able, ug/L (01055)	Manganese, water, unfltrd recover-able, ug/L (71890)	Mercury, water, unfltrd recover-able, ug/L (71900)	Nickel, water, fltrd, ug/L (01065)	Nickel, water, unfltrd recover-able, ug/L (01067)		
JUN 2003												
18...	70	.32	2.27	6.7	8	<.02	<.02	.56	.50			
JUL												
22...	--	.18	.65	--	--	--	--	--	--			
AUG												
25...	--	.21	1.40	--	--	--	--	--	--			
SEP												
25...	--	.20	.18	--	--	--	--	--	--			

TENMILE CREEK BASIN

462758112123001 BEAVER CREEK TRIBUTARY NO. 2 NEAR RIMINI, MT--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003--Continued

Date	Silver, water, fltrd, ug/L (01075)	Silver, water, unfltrd recover -able, ug/L (01077)	Zinc, water, fltrd, ug/L (01090)	Zinc, water, unfltrd recover -able, ug/L (01092)	Suspnd. sedi- ment, sieve diametr percent <.063mm (70331)	Sus- pended sedi- ment concen- tration mg/L (80154)	Sus- pended sedi- ment load, tons/d (80155)
JUN 2003 18...	<.3	<.16	570	574	75	1	<.01
JUL 22...	--	--	288	324	67	2	<.01
AUG 25...	--	--	349	324	50	2	<.01
SEP 25...	--	--	337	322	83	1	<.01

TENMILE CREEK BASIN

462922112145401 TENMILE CREEK BELOW SPRING CREEK, AT RIMINI, MT

LOCATION.--Lat 46°29'22", long 112°14'54" (NAD 27), in NW<sup>1</sup>/<sub>4</sub> SW<sup>1</sup>/<sub>4</sub> SW<sup>1</sup>/<sub>4</sub> sec. 33, T. 8 N., R. 5 W., Lewis and Clark County, Hydrologic Unit 10030101, at bridge crossing on road to private residence in Rimini.

DRAINAGE AREA.--22.8 mi<sup>2</sup>.

PERIOD OF RECORD.--May 1997 to current year.

GAGE--None. Elevation at site is 5,220 ft (NGVD 29).

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

Date	Time	Instantaneous discharge, cfs (00061)	pH, water, unfltrd field, std units (00400)	Specific conductance, wat unfltrd uS/cm 25 degC (00095)	Temperature, air, deg C (00020)	Temperature, water, deg C (00010)	Hardness, water, unfltrd mg/L as CaCO3 (00900)	Calcium, water, fltrd, mg/L (00915)	Magnesium, water, fltrd, mg/L (00925)	Potassium, water, fltrd, mg/L (00935)	Sodium adsorption ratio (00931)
JUN 2003											
17...	1230	28	7.5	47	21.0	11.0	16	4.75	1.06	.95	.2
JUL											
22...	1130	.10	7.0	116	22.0	18.5	39	10.6	2.98	--	--
AUG											
26...	1015	.08	6.6	225	20.0	14.0	84	22.8	6.54	--	--
SEP											
29...	0940	.11	6.5	458	6.5	4.5	110	29.8	9.57	--	--

Date	Sodium, water, fltrd, mg/L (00930)	Alkalinity, wat flt fxd end lab, mg/L as CaCO3 (29801)	Chloride, water, fltrd, mg/L (00940)	Fluoride, water, fltrd, mg/L (00950)	Silica, water, fltrd, mg/L (00955)	Sulfate, water, fltrd, mg/L (00945)	Residue water, fltrd, sum of constituents mg/L (70301)	Residue water, fltrd, tons/ acre-ft (70303)	Residue water, fltrd, tons/d (70302)	Aluminum, water, fltrd, ug/L (01106)	Aluminum, water, unfltrd recover -able, ug/L (01105)
JUN 2003											
17...	1.75	12	.38	<.2	15.2	8.6	40	.05	2.99	79	188
JUL											
22...	--	--	--	--	--	--	--	--	--	--	--
AUG											
26...	--	--	--	--	--	--	--	--	--	--	--
SEP											
29...	--	--	--	--	--	--	--	--	--	--	--

Date	Antimony, water, fltrd, ug/L (01095)	Antimony, water, unfltrd ug/L (01097)	Arsenic, water, fltrd, ug/L (01000)	Arsenic, water, unfltrd ug/L (01002)	Cadmium, water, fltrd, ug/L (01025)	Cadmium, water, unfltrd ug/L (01027)	Chromium, water, fltrd, ug/L (01030)	Chromium, water, unfltrd recover -able, ug/L (01034)	Copper, water, fltrd, ug/L (01040)	Copper, water, unfltrd recover -able, ug/L (01042)	Iron, water, fltrd, ug/L (01046)
JUN 2003											
17...	E.20	<.6	5.0	8	.85	.90	<.8	<.8	5.8	6.7	107
JUL											
22...	--	--	11.3	13	5.09	4.99	--	--	7.4	8.7	--
AUG											
26...	--	--	44.8	77	20.1	18.8	--	--	12.5	16.0	--
SEP											
29...	--	--	233	425	23.2	22.9	--	--	8.8	14.5	--

Date	Iron, water, unfltrd recover -able, ug/L (01045)	Lead, water, fltrd, ug/L (01049)	Lead, water, unfltrd recover -able, ug/L (01051)	Manganese, water, fltrd, ug/L (01056)	Manganese, water, unfltrd recover -able, ug/L (01055)	Mercury, water, fltrd, ug/L (71890)	Mercury, water, unfltrd recover -able, ug/L (71900)	Nickel, water, fltrd, ug/L (01065)	Nickel, water, unfltrd recover -able, ug/L (01067)
JUN 2003									
17...	260	.97	3.20	31.3	40	<.02	E.01	.69	.73
JUL									
22...	--	.94	3.41	--	--	--	--	--	--
AUG									
26...	--	4.81	12.0	--	--	--	--	--	--
SEP									
29...	--	.20	7.32	--	--	--	--	--	--

E--Estimated.

TENMILE CREEK BASIN

462922112145401 TENMILE CREEK BELOW SPRING CREEK, AT RIMINI, MT--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003--Continued

Date	Silver, water, unfltrd water, fltrd, ug/L (01075)	Silver, water, recover -able, ug/L (01077)	Zinc, water, fltrd, ug/L (01090)	Zinc, water, unfltrd recover -able, ug/L (01092)	Suspnd. sedi- ment, sieve diametr percent <.063mm (70331)	Sus- pended sedi- ment concen- tration mg/L (80154)	Sus- pended sedi- ment load, tons/d (80155)
JUN 2003							
17...	<.3	<.16	132	142	46	8	.60
JUL							
22...	--	--	597	689	12	33	.01
AUG							
26...	--	--	2810	2700	97	4	<.01
SEP							
29...	--	--	3800	3810	98	13	<.01

E--Estimated.

## TENMILE CREEK BASIN

462932112145801 MOORES SPRING CREEK AT MOUTH, NEAR RIMINI, MT

LOCATION.--Lat 46°29'32", long 112°14'58" (NAD 27), in NW<sup>1</sup>/<sub>4</sub> NW<sup>1</sup>/<sub>4</sub> SW<sup>1</sup>/<sub>4</sub> sec. 33, T. 8 N., R. 5 W., Lewis and Clark County, Hydrologic Unit 10030101, at culvert crossing on Rimini Road in Rimini.

DRAINAGE AREA.--0.6 mi<sup>2</sup>.

PERIOD OF RECORD.--May 2000 to current year.

GAGE--None. Elevation at site is 5,180 ft (NGVD 29).

## WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

Date	Time	Instan- taneous dis- charge, cfs (00061)	pH, water, unfltrd field, std units (00400)	Specif. conduc- tance, wat unfltrd uS/cm 25 degC (00095)	Temper- ature, air, deg C (00020)	Temper- ature, water, deg C (00010)	Hard- ness, water, unfltrd mg/L as CaCO3 (00900)	Calcium water, fltrd, mg/L (00915)	Magnes- ium, water, fltrd, mg/L (00925)	Potas- sium, water, fltrd, mg/L (00935)	Sodium adsorp- tion ratio (00931)
JUN 2003											
18...	0845	.09	7.9	210	14.0	11.0	89	24.4	6.86	2.06	.2
JUL											
22...	1200	.01	8.1	257	24.0	14.5	110	30.8	8.81	--	--
AUG											
26...	1045	.01	7.6	297	23.0	13.0	130	34.5	11.2	--	--
SEP											
25...	1200	.01	8.1	276	24.0	9.5	130	35.3	10.8	--	--

Date	Sodium, water, fltrd, mg/L (00930)	Alka- linity, wat flt fxd end lab, mg/L as CaCO3 (29801)	Chlor- ide, water, fltrd, mg/L (00940)	Fluor- ide, water, fltrd, mg/L (00950)	Silica, water, fltrd, mg/L (00955)	Sulfate water, fltrd, mg/L (00945)	Residue water, fltrd, sum of consti- tuents mg/L (70301)	Residue water, fltrd, tons/ acre-ft (70303)	Residue water, fltrd, tons/d (70302)	Alum- inum, water, fltrd, ug/L (01106)	Alum- inum, water, unfltrd recover- able, ug/L (01105)
JUN 2003											
18...	5.01	49	.93	<.2	24.4	47.4	141	.19	.03	50	109
JUL											
22...	--	--	--	--	--	--	--	--	--	--	--
AUG											
26...	--	--	--	--	--	--	--	--	--	--	--
SEP											
25...	--	--	--	--	--	--	--	--	--	--	--

Date	Anti- mony, water, fltrd, ug/L (01095)	Anti- mony, water, unfltrd ug/L (01097)	Arsenic water, fltrd, ug/L (01000)	Arsenic water, unfltrd ug/L (01002)	Cadmium water, fltrd, ug/L (01025)	Cadmium water, unfltrd ug/L (01027)	Chrom- ium, water, fltrd, ug/L (01030)	Chrom- ium, water, unfltrd recover- able, ug/L (01034)	Copper, water, fltrd, ug/L (01040)	Copper, water, unfltrd recover- able, ug/L (01042)	Iron, water, fltrd, ug/L (01046)
JUN 2003											
18...	.91	1.0	60.7	63	5.15	5.45	<.8	E.5	8.3	9.3	21
JUL											
22...	--	--	85.7	90	4.00	3.81	--	--	6.3	6.1	--
AUG											
26...	--	--	84.5	79	4.75	4.74	--	--	5.5	5.7	--
SEP											
25...	--	--	81.4	82	4.47	4.45	--	--	5.4	5.1	--

Date	Iron, water, unfltrd recover- able, ug/L (01045)	Lead, water, fltrd, ug/L (01049)	Lead, unfltrd recover- able, ug/L (01051)	Mangan- ese, water, fltrd, ug/L (01056)	Mangan- ese, unfltrd recover- able, ug/L (01055)	Mangan- ese, water, unfltrd recover- able, ug/L (01055)	Mercury water, fltrd, ug/L (71890)	Mercury unfltrd recover- able, ug/L (71900)	Nickel, water, fltrd, ug/L (01065)	Nickel, water, unfltrd recover- able, ug/L (01067)
JUN 2003										
18...	120	.22	4.02	200	211	<.02	<.02	2.66	2.54	
JUL										
22...	--	E.04	.50	--	--	--	--	--	--	--
AUG										
26...	--	E.04	.40	--	--	--	--	--	--	--
SEP										
25...	--	E.05	.06	--	--	--	--	--	--	--

E--Estimated.

TENMILE CREEK BASIN

462932112145801 MOORES SPRING CREEK AT MOUTH, NEAR RIMINI, MT--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003--Continued

Date	Silver, water, unfltrd, fltrd, ug/L (01075)	Silver, water, recover- able, ug/L (01077)	Zinc, water, fltrd, ug/L (01090)	Zinc, water, unfltrd, recover- able, ug/L (01092)	Suspnd. sedi- ment, sieve diametr percent <.063mm (70331)	Sus- pended sedi- ment concentra- tion mg/L (80154)	Sus- pended sedi- ment load, tons/d (80155)
JUN 2003							
18...	<.3	<.16	676	706	83	3	<.01
JUL							
22...	--	--	455	502	67	1	<.01
AUG							
26...	--	--	674	649	67	1	<.01
SEP							
25...	--	--	721	696	75	1	<.01

## TENMILE CREEK BASIN

462917112165601 MINNEHAHA CREEK BELOW ARMSTRONG MINE, NEAR RIMINI, MT

LOCATION.--Lat 46°29'17", long 112°16'56" (NAD 27), in SW<sup>1</sup>/<sub>4</sub> SW<sup>1</sup>/<sub>4</sub> NW<sup>1</sup>/<sub>4</sub> sec. 31, T. 9 N., R. 5 W., Lewis and Clark County, Hydrologic Unit 10030101, 0.6 mi downstream from the Armstrong mine road and 1.4 mi southwest of Rimini.

DRAINAGE AREA.--1.75 mi<sup>2</sup>.

PERIOD OF RECORD.--April 1998 to current year.

GAGE--None. Elevation at site is 5,650 ft (NGVD 29).

## WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

Date	Time	Instan- taneous dis- charge, cfs (00061)	pH, water, unfltrd field, std units (00400)	Specif. conduc- tance, wat unfltrd uS/cm 25 degC (00095)	Temper- ature, air, deg C (00020)	Temper- ature, water, deg C (00010)	Hard- ness, water, unfltrd mg/L as CaCO3 (00900)	Calcium water, fltrd, mg/L (00915)	Magnes- ium, water, fltrd, mg/L (00925)	Potas- sium, water, fltrd, mg/L (00935)	Sodium adsorp- tion ratio (00931)
JUN 2003 17...	0950	2.7	7.2	58	20.0	7.5	17	4.68	1.25	1.16	.3
JUL 23...	0930	.51	7.4	60	--	10.0	17	4.60	1.25	--	--
AUG 25...	1040	.35	7.2	58	17.5	12.0	17	4.82	1.27	--	--
SEP 29...	1130	.31	7.2	65	7.0	5.0	20	5.61	1.54	--	--

Date	Sodium, water, fltrd, mg/L (00930)	Alka- linity, wat flt fxd end mg/L as CaCO3 (29801)	Chlor- ide, water, fltrd, mg/L (00940)	Fluor- ide, water, fltrd, mg/L (00950)	Silica, water, fltrd, mg/L (00955)	Sulfate water, fltrd, mg/L (00945)	Residue water, fltrd, sum of consti- tuents mg/L (70301)	Residue water, fltrd, tons/ acre-ft (70303)	Residue water, fltrd, tons/d (70302)	Alum- inum, water, fltrd, ug/L (01106)	Alum- inum, water, unfltrd recover- able, ug/L (01105)
JUN 2003 17...	2.64	11	.54	<.2	25.4	12.9	56	.08	.40	81	163
JUL 23...	--	--	--	--	--	--	--	--	--	--	--
AUG 25...	--	--	--	--	--	--	--	--	--	--	--
SEP 29...	--	--	--	--	--	--	--	--	--	--	--

Date	Anti- mony, water, fltrd, ug/L (01095)	Anti- mony, water, unfltrd ug/L (01097)	Arsenic water, fltrd, ug/L (01000)	Arsenic water, unfltrd ug/L (01002)	Cadmium water, fltrd, ug/L (01025)	Cadmium water, unfltrd ug/L (01027)	Chrom- ium, water, fltrd, ug/L (01030)	Chrom- ium, water, unfltrd recover- able, ug/L (01034)	Copper, water, fltrd, ug/L (01040)	Copper, water, unfltrd recover- able, ug/L (01042)
JUN 2003 17...	<.30	<.6	5.0	6	3.84	4.04	<.8	<.8	16.0	16.6
JUL 23...	--	--	4.9	5	3.05	2.99	--	--	9.2	9.7
AUG 25...	--	--	5.3	6	3.18	3.17	--	--	7.8	8.1
SEP 29...	--	--	4.6	5	3.26	3.34	--	--	6.2	7.0

Date	Iron, water, fltrd, ug/L (01046)	Iron, water, unfltrd recover- able, ug/L (01045)	Lead, water, fltrd, ug/L (01049)	Lead, water, unfltrd recover- able, ug/L (01051)	Mangan- ese, water, fltrd, ug/L (01056)	Mangan- ese, water, unfltrd recover- able, ug/L (01055)	Mercury water, fltrd, ug/L (71890)	Mercury water, unfltrd recover- able, ug/L (71900)	Nickel, water, fltrd, ug/L (01065)	Nickel, water, unfltrd recover- able, ug/L (01067)
JUN 2003 17...	27	80	.92	2.30	32.9	36	<.02	<.02	1.54	1.50
JUL 23...	--	--	.14	.59	--	--	--	--	--	--
AUG 25...	--	--	.17	.37	--	--	--	--	--	--
SEP 29...	--	--	.14	.35	--	--	--	--	--	--



TENMILE CREEK BASIN

462917112165601 MINNEHAHA CREEK BELOW ARMSTRONG MINE, NEAR RIMINI, MT--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003--Continued

Date	Silver, water, unfltrd, fltrd, ug/L (01075)	Silver, water, unfltrd recover- able, ug/L (01077)	Zinc, water, unfltrd, fltrd, ug/L (01090)	Zinc, water, unfltrd recover- able, ug/L (01092)	Suspnd. sedi- ment, sieve diametr percent <.063mm (70331)	Sus- pended sedi- ment concen- tration mg/L (80154)	Sus- pended sedi- ment load, tons/d (80155)
JUN 2003							
17...	<.3	<.16	588	592	75	2	.01
JUL							
23...	--	--	378	451	75	1	<.01
AUG							
25...	--	--	511	489	71	1	<.01
SEP							
29...	--	--	550	548	50	14	.01

## TENMILE CREEK BASIN

462918112170801 BEATRICE MINE TRIBUTARY AT MOUTH, NEAR RIMINI, MT

LOCATION.--Lat 46°29'18", long 112°17'08" (NAD 27), in SW<sup>1</sup>/<sub>4</sub> SW<sup>1</sup>/<sub>4</sub> SW<sup>1</sup>/<sub>4</sub> sec. 31, T. 9 N., R. 5 W., Lewis and Clark County, Hydrologic Unit 10030101, 400 ft upstream from old logging road crossing, about 1,000 ft upstream from confluence with Minnehaha Creek, and 1.5 mi southwest of Rimini.

DRAINAGE AREA.--0.24 mi<sup>2</sup>.

PERIOD OF RECORD.--May 2000 to current year.

GAGE--None. Elevation at site is 5,660 ft (NGVD 29).

## WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

Date	Time	Instantaneous discharge, cfs (00061)	pH, water, unfltrd field, std units (00400)	Specific conductance, wat unfltrd uS/cm 25 degC (00095)	Temperature, air, deg C (00020)	Temperature, water, deg C (00010)	Hardness, water, unfltrd mg/L as CaCO3 (00900)	Calcium, water, fltrd, mg/L (00915)	Magnesium, water, fltrd, mg/L (00925)	Potassium, water, fltrd, mg/L (00935)	Sodium adsorption ratio (00931)	
JUN 2003												
17...	1020	.27	7.5	80	20.0	9.0	21	6.57	1.16	1.50	.3	
JUL												
23...	0900	.03	7.6	113	28.0	12.0	36	11.0	2.08	--	--	
AUG												
25...	1000	.02	7.2	109	17.0	12.0	40	12.8	2.04	--	--	
SEP												
29...	1100	.02	7.1	102	7.0	6.0	33	9.97	1.86	--	--	
Date		Sodium, water, fltrd, mg/L (00930)	Alkalinity, wat flt fxd end lab, mg/L as CaCO3 (29801)	Chloride, water, fltrd, mg/L (00940)	Fluoride, water, fltrd, mg/L (00950)	Silica, water, fltrd, mg/L (00955)	Sulfate, water, fltrd, mg/L (00945)	Residue water, fltrd, sum of constituents mg/L (70301)	Residue water, fltrd, tons/acre-ft (70303)	Residue water, fltrd, tons/d (70302)	Aluminum, water, fltrd, ug/L (01106)	Aluminum, water, unfltrd recoverable, ug/L (01105)
JUN 2003												
17...	3.25	13	.40	<.2	34.0	15.3	70	.10	.05	27	61	
JUL												
23...	--	--	--	--	--	--	--	--	--	--	--	--
AUG												
25...	--	--	--	--	--	--	--	--	--	--	--	--
SEP												
29...	--	--	--	--	--	--	--	--	--	--	--	--
Date		Antimony, water, fltrd, ug/L (01095)	Antimony, water, unfltrd, ug/L (01097)	Arsenic, water, fltrd, ug/L (01000)	Arsenic, water, unfltrd, ug/L (01002)	Cadmium, water, fltrd, ug/L (01025)	Cadmium, water, unfltrd, ug/L (01027)	Chromium, water, fltrd, ug/L (01030)	Chromium, water, unfltrd recoverable, ug/L (01034)	Copper, water, fltrd, ug/L (01040)	Copper, water, unfltrd recoverable, ug/L (01042)	Iron, water, fltrd, ug/L (01046)
JUN 2003												
17...	<.30	<.6	.8	<2	.04	.04	<.8	<.8	11.3	11.9	20	
JUL												
23...	--	--	.6	<2	.07	.06	--	--	7.4	7.5	--	
AUG												
25...	--	--	.8	<2	.07	.08	--	--	7.9	7.9	--	
SEP												
29...	--	--	.6	<2	.06	.05	--	--	6.8	6.9	--	
Date		Iron, water, unfltrd recoverable, ug/L (01045)	Lead, water, fltrd, ug/L (01049)	Lead, water, unfltrd recoverable, ug/L (01051)	Manganese, water, fltrd, ug/L (01056)	Manganese, water, unfltrd recoverable, ug/L (01055)	Mercury, water, fltrd, ug/L (71890)	Mercury, water, unfltrd recoverable, ug/L (71900)	Nickel, water, fltrd, ug/L (01065)	Nickel, water, unfltrd recoverable, ug/L (01067)		
JUN 2003												
17...	80	E.04	.27	.6	3	<.02	<.02	.34	.33			
JUL												
23...	--	E.05	<.06	--	--	--	--	--	--			
AUG												
25...	--	<.08	E.05	--	--	--	--	--	--			
SEP												
29...	--	<.08	<.06	--	--	--	--	--	--			

E--Estimated.

TENMILE CREEK BASIN

462918112170801 BEATRICE MINE TRIBUTARY AT MOUTH, NEAR RIMINI, MT--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003--Continued

Date	Silver, water, fltrd, ug/L (01075)	Silver, water, unfltrd recover -able, ug/L (01077)	Zinc, water, fltrd, ug/L (01090)	Zinc, water, unfltrd recover -able, ug/L (01092)	Suspnd. sedi- ment, sieve diametr percent <.063mm (70331)	Sus- pended sedi- ment concen- tration mg/L (80154)	Sus- pended sedi- ment load, tons/d (80155)
JUN 2003							
17...	<.3	<.16	6	6	75	1	<.01
JUL							
23...	--	--	7	10	67	1	<.01
AUG							
25...	--	--	8	6	75	1	<.01
SEP							
29...	--	--	7	6	57	1	<.01

TENMILE CREEK BASIN

463023112153701 MINNEHAHA CREEK ABOVE CITY DIVERSION, NEAR RIMINI, MT

LOCATION.--Lat 46°30'23", long 112°15'37" (NAD 27), in NW<sup>1</sup>/<sub>4</sub> NW<sup>1</sup>/<sub>4</sub> SE<sup>1</sup>/<sub>4</sub> sec. 29, T. 9 N., R. 5 W., Lewis and Clark County, Hydrologic Unit 10030101, about 75 feet upstream from city diversion structure, about 200 feet upstream from mouth and about 3 mi north of Rimini.

DRAINAGE AREA.--5.35 mi<sup>2</sup>.

PERIOD OF RECORD.--April 1998 to current year.

GAGE--None. Elevation at site is 5,040 ft (NGVD 29).

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

Date	Time	Instantaneous discharge, cfs (00061)	pH, water, unfltrd field, std units (00400)	Specif. conductance, wat unfltrd, uS/cm 25 degC (00095)	Temperature, air, deg C (00020)	Temperature, water, deg C (00010)	Hardness, water, unfltrd, mg/L as CaCO3 (00900)	Calcium, water, fltrd, mg/L (00915)	Magnesium, water, fltrd, mg/L (00925)	Potassium, water, fltrd, mg/L (00935)	Sodium adsorption ratio (00931)	
JUN 2003	17...	0855	4.9	7.5	61	14.0	8.5	19	5.47	1.29	1.21	.3
JUL	23...	1030	.31	7.5	66	28.5	13.5	22	6.15	1.53	--	--
AUG	25...	1130	.57	7.4	--	17.0	15.0	23	6.57	1.59	--	--
SEP	29...	1230	.41	7.5	76	11.0	5.0	26	7.33	1.84	--	--

Date	Sodium, water, fltrd, mg/L (00930)	Alkalinity, wat flt fxd end, mg/L as CaCO3 (29801)	Chloride, water, fltrd, mg/L (00940)	Fluoride, water, fltrd, mg/L (00950)	Silica, water, fltrd, mg/L (00955)	Sulfate, water, fltrd, mg/L (00945)	Residue, water, fltrd, sum of constituents, mg/L (70301)	Residue, water, fltrd, tons/acre-ft (70303)	Residue, water, fltrd, tons/d (70302)	Aluminum, water, fltrd, ug/L (01106)	Aluminum, water, unfltrd, recoverable, ug/L (01105)	
JUN 2003	17...	3.14	16	.30	<.2	25.1	9.3	56	.08	.74	35	163
JUL	23...	--	--	--	--	--	--	--	--	--	--	--
AUG	25...	--	--	--	--	--	--	--	--	--	--	--
SEP	29...	--	--	--	--	--	--	--	--	--	--	--

Date	Antimony, water, fltrd, ug/L (01095)	Antimony, water, unfltrd, ug/L (01097)	Arsenic, water, fltrd, ug/L (01000)	Arsenic, water, unfltrd, ug/L (01002)	Cadmium, water, fltrd, ug/L (01025)	Cadmium, water, unfltrd, ug/L (01027)	Chromium, water, fltrd, ug/L (01030)	Chromium, water, unfltrd, recoverable, ug/L (01034)	Copper, water, fltrd, ug/L (01040)	Copper, water, unfltrd, recoverable, ug/L (01042)	Iron, water, fltrd, ug/L (01046)	
JUN 2003	17...	<.30	<.6	2.6	3	1.55	1.60	<.8	<.8	7.8	9.0	31
JUL	23...	--	--	3.2	3	1.36	1.51	--	--	5.0	6.3	--
AUG	25...	--	--	3.1	3	1.45	1.41	--	--	4.7	4.8	--
SEP	29...	--	--	2.4	2	1.47	1.46	--	--	3.3	8.1	--

Date	Iron, water, unfltrd, recoverable, ug/L (01045)	Lead, water, fltrd, ug/L (01049)	Lead, water, unfltrd, recoverable, ug/L (01051)	Manganese, water, fltrd, ug/L (01056)	Manganese, water, unfltrd, recoverable, ug/L (01055)	Mercury, water, fltrd, ug/L (71890)	Mercury, water, unfltrd, recoverable, ug/L (71900)	Nickel, water, fltrd, ug/L (01065)	Nickel, water, unfltrd, recoverable, ug/L (01067)	
JUN 2003	17...	140	.21	1.04	2.9	8	<.02	<.02	.79	.82
JUL	23...	--	E.07	.79	--	--	--	--	--	--
AUG	25...	--	E.08	.14	--	--	--	--	--	--
SEP	29...	--	<.08	.09	--	--	--	--	--	--

E--Estimated.

TENMILE CREEK BASIN

463023112153701 MINNEHAHA CREEK ABOVE CITY DIVERSION, NEAR RIMINI, MT--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003--Continued

Date	Silver, water, fltrd, ug/L (01075)	Silver, water, unfltrd recover- able, ug/L (01077)	Zinc, water, fltrd, ug/L (01090)	Zinc, water, unfltrd recover- able, ug/L (01092)	Suspnd. sedi- ment, sieve diametr percent <.063mm (70331)	Sus- pended sedi- ment concen- tration mg/L (80154)	Sus- pended sedi- ment load, tons/d (80155)
JUN 2003 17...	<.3	<.16	249	262	73	3	.04
JUL 23...	--	--	191	233	68	2	<.01
AUG 25...	--	--	242	235	71	1	<.01
SEP 29...	--	--	264	260	75	1	<.01

## TENMILE CREEK BASIN

## 06062500 TENMILE CREEK NEAR RIMINI, MT

LOCATION.--Lat 46°31'27", long 112°15'22" (NAD 27), in NE<sup>1</sup>/<sub>4</sub>SW<sup>1</sup>/<sub>4</sub>NE<sup>1</sup>/<sub>4</sub> sec. 20, T.9 N., R.5 W., Lewis and Clark County, Hydrologic Unit 10030101, Helena National Forest, on left bank at U.S. Forest Service Moose Creek campground, 500 ft upstream from Moose Creek, 2.5 mi north of Rimini, and at river mile 20.4.

DRAINAGE AREA.--30.9 mi<sup>2</sup>.

PERIOD OF RECORD.--July 1914 to September 1994, May 1997 to current year. Monthly discharge only for some periods, published in WSP 1309.

REVISED RECORDS.--WSP 1309: 19417, 1921, 1924-25. WSP 1509: 1915, 1916-17(M), 1920(M), 1927(m), 1928-1930, 1947(m), 1948, 1950(M).

WSP 1559: Drainage area. WSP 1709: 1959. WDR-MT-97-1: Drainage area.

GAGE.--Water-stage recorder and concrete control. Elevation of gage is 4,850 ft (NGVD 29). Prior to Dec. 17, 1934, water-stage recorder at site 40 ft downstream at different elevation and different control.

REMARKS.--Records good except those below 1.0 ft<sup>3</sup>/s and those for estimated daily discharges, which are poor. Flow regulated by Chessman and Scott Reservoirs on tributaries upstream from station, combined capacity, 2,340 acre-feet. Small diversions upstream from station for water supply for city of Helena. U.S. Geological Survey satellite telemeter at station. Several observations of water temperature and specific conductance were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.42	0.37	e0.94	0.36	3.8	e0.34	8.1	42	129	5.8	0.35	0.31
2	0.39	0.39	e0.90	0.37	2.2	e0.35	6.6	41	108	4.9	0.46	0.28
3	0.39	0.38	0.67	0.37	1.4	e0.36	5.8	43	91	4.2	0.59	0.27
4	0.39	0.36	0.57	0.36	1.1	e0.37	4.5	51	80	3.4	1.8	0.25
5	0.37	0.38	0.57	0.41	0.84	e0.37	4.0	48	69	2.7	0.91	0.23
6	0.38	0.38	0.53	0.38	0.67	e0.38	3.7	46	64	2.2	0.63	0.21
7	0.36	0.38	0.49	0.34	0.64	e0.40	3.4	44	54	1.6	0.64	0.21
8	0.35	0.41	0.44	0.31	0.59	e0.44	3.8	42	47	1.7	0.74	0.24
9	0.35	0.39	0.43	0.29	0.55	e0.45	8.3	40	44	1.7	0.61	0.29
10	0.34	0.36	0.41	e0.27	0.54	e0.47	15	38	44	1.3	0.44	0.27
11	0.34	0.34	0.49	e0.25	0.56	0.48	20	37	40	1.2	0.40	0.29
12	0.36	0.33	0.45	0.20	0.53	0.61	28	40	34	7.0	0.39	0.76
13	0.34	0.33	0.46	0.43	0.52	1.0	36	44	37	7.6	0.38	0.96
14	0.34	0.29	0.50	0.47	0.50	2.1	38	50	37	0.95	0.34	0.46
15	0.34	0.29	0.53	0.40	0.49	2.9	34	65	29	1.0	0.39	0.38
16	0.34	0.30	0.48	0.33	0.50	2.8	29	75	28	0.86	0.56	0.62
17	0.33	0.32	0.43	0.31	0.48	2.5	26	66	29	0.78	0.37	1.4
18	0.34	0.31	0.35	0.29	0.44	1.8	24	60	23	0.72	0.35	0.60
19	0.34	0.35	e0.35	e0.27	0.43	1.5	23	54	24	0.69	0.31	0.48
20	0.33	0.44	0.30	e0.25	0.43	1.5	24	48	30	0.63	0.32	0.43
21	0.33	0.46	e0.32	e0.24	0.43	1.4	28	47	26	0.57	0.29	0.43
22	0.35	0.44	e0.30	e0.24	e0.43	1.9	35	57	22	0.47	0.31	0.42
23	0.34	0.85	e0.30	e0.24	e0.43	3.9	53	85	19	0.47	1.0	0.39
24	0.27	0.56	0.28	0.26	e0.40	2.7	71	114	20	0.72	0.51	0.37
25	0.29	0.55	e0.27	0.31	e0.37	2.0	74	150	17	1.1	0.37	0.35
26	0.30	0.80	0.22	0.35	e0.34	1.7	62	168	15	0.51	0.33	0.31
27	0.31	0.83	0.25	0.95	e0.30	1.4	50	164	12	0.45	0.34	0.30
28	0.38	0.79	0.33	0.80	e0.33	1.3	45	163	9.9	0.40	0.33	0.29
29	0.29	0.89	0.35	0.56	---	1.3	41	170	8.6	0.37	0.31	0.29
30	e0.29	0.91	0.36	0.54	---	1.9	40	159	7.3	0.38	0.31	0.30
31	e0.32	---	0.38	1.1	---	5.3	---	153	---	0.37	0.30	---
TOTAL	10.61	14.18	13.65	12.25	20.24	45.92	844.2	2404	1197.8	56.74	15.38	12.39
MEAN	0.34	0.47	0.44	0.40	0.72	1.48	28.1	77.5	39.9	1.83	0.50	0.41
MAX	0.42	0.91	0.94	1.1	3.8	5.3	74	170	129	7.6	1.8	1.4
MIN	0.27	0.29	0.22	0.20	0.30	0.34	3.4	37	7.3	0.37	0.29	0.21
AC-FT	21	28	27	24	40	91	1670	4770	2380	113	31	25

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1915 - 2003, BY WATER YEAR (WY)\*

	3.06	2.31	1.75	1.44	1.32	2.50	17.9	83.3	72.7	12.3	2.53	2.33
MEAN	3.06	2.31	1.75	1.44	1.32	2.50	17.9	83.3	72.7	12.3	2.53	2.33
MAX	23.1	13.6	9.64	6.97	5.05	17.5	66.7	300	346	66.4	22.5	22.4
(WY)	1966	1986	1918	1918	1921	1986	1926	1917	1975	1969	1993	1993
MIN	0.19	0.22	0.17	0.14	0.063	0.068	1.50	6.14	3.01	0.34	0.13	0.23
(WY)	1974	1941	1941	1941	2002	2002	1975	2000	2000	1985	2000	1935

SUMMARY STATISTICS	FOR 2002 CALENDAR YEAR	FOR 2003 WATER YEAR	WATER YEARS 1915 - 2003*
ANNUAL TOTAL	3882.47	4647.36	
ANNUAL MEAN	10.6	12.7	16.9
HIGHEST ANNUAL MEAN			53.1
LOWEST ANNUAL MEAN			1.74
HIGHEST DAILY MEAN	124	Jun 15	170
LOWEST DAILY MEAN	0.03	Mar 6	0.20
ANNUAL SEVEN-DAY MINIMUM	0.04	Mar 1	0.24
MAXIMUM PEAK FLOW			193
MAXIMUM PEAK STAGE			3.13
ANNUAL RUNOFF (AC-FT)	7700	9220	12210
10 PERCENT EXCEEDS	45	44	51
50 PERCENT EXCEEDS	0.43	0.51	2.0
90 PERCENT EXCEEDS	0.06	0.30	0.40

\*--During period of operation (1915-1994, May 1997 to current year).

e--Estimated.

TENMILE CREEK BASIN

06062750 TENMILE CREEK AT TENMILE WATER TREATMENT PLANT, NEAR RIMINI, MT

LOCATION.--Lat 46°34'22", long 112°12'52" (NAD 27), in NE<sup>1</sup>/<sub>4</sub>SW<sup>1</sup>/<sub>4</sub>SE<sup>1</sup>/<sub>4</sub> sec. 34, T.10N., R.5W., Lewis and Clark County, Hydrologic Unit 10030101, on left bank near Tenmile Water Treatment Plant, about 0.1 mi south of U.S. Highway 12, and about 8 mi north of Rimini. Formerly published as Tenmile Creek at Helena Water Treatment Plant, near Rimini.

DRAINAGE AREA.--51.1 mi<sup>2</sup>.

PERIOD OF RECORD.--May 1999 to current year.

REMARKS.--No samples collected in August or September due to no flow. Unpublished records of instantaneous water temperature and specific conductance are available in files of the District office.

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

Date	Time	Instantaneous discharge, cfs (00061)	pH, water, unfltrd field, std units (00400)	Specif. conductance, wat unfltrd uS/cm 25 degC (00095)	Temperature, air, deg C (00020)	Temperature, water, deg C (00010)	Hardness, water, unfltrd mg/L as CaCO3 (00900)	Calcium water, fltrd, mg/L (00915)	Magnesium, water, fltrd, mg/L (00925)	Potassium, water, fltrd, mg/L (00935)	Sodium adsorption ratio (00931)	
JUN 2003	17...	0730	25	7.7	68	15.0	9.5	24	7.14	1.60	1.14	.2
JUL	23...	1130	.18	7.6	125	34.0	20.0	61	18.0	3.88	--	--

Date	Sodium, water, fltrd, mg/L (00930)	Alkalinity, wat flt fxd end lab, mg/L as CaCO3 (29801)	Chloride, water, fltrd, mg/L (00940)	Fluoride, water, fltrd, mg/L (00950)	Silica, water, fltrd, mg/L (00955)	Sulfate, water, fltrd, mg/L (00945)	Residue water, fltrd, sum of constituents mg/L (70301)	Residue water, fltrd, tons/acre-ft (70303)	Residue water, fltrd, tons/d (70302)	Ammonia + org-N, unfltrd, mg/L as N (00625)	Nitrite + nitrate, water, fltrd, mg/L as N (00631)	
JUN 2003	17...	2.49	18	.91	<.2	17.0	10.6	52	.07	3.47	.17	E.013
JUL	23...	--	--	--	--	--	--	--	--	--	E.10	<.022

Date	Nitrite water, fltrd, mg/L as N (00613)	Orthophosphate, water, fltrd, mg/L as P (00671)	Phosphorus, water, unfltrd, mg/L (00665)	Aluminum, water, fltrd, ug/L (01106)	Aluminum, water, unfltrd recoverable, ug/L (01105)	Antimony, water, fltrd, ug/L (01095)	Antimony, water, unfltrd, ug/L (01097)	Arsenic, water, fltrd, ug/L (01000)	Arsenic, water, unfltrd, ug/L (01002)	Cadmium, fltrd, ug/L (01025)	Cadmium, water, unfltrd, ug/L (01027)	
JUN 2003	17...	<.002	E.004	.020	48	230	E.27	E.4	11.1	16	.67	.79
JUL	23...	<.002	.007	.012	--	--	--	--	22.9	24	.68	.69

Date	Chromium, water, fltrd, ug/L (01030)	Chromium, water, unfltrd recoverable, ug/L (01034)	Copper, water, fltrd, ug/L (01040)	Copper, water, unfltrd recoverable, ug/L (01042)	Iron, water, fltrd, ug/L (01046)	Iron, water, unfltrd recoverable, ug/L (01045)	Lead, water, fltrd, ug/L (01049)	Lead, water, unfltrd recoverable, ug/L (01051)	Manganese, water, fltrd, ug/L (01056)	Manganese, water, unfltrd recoverable, ug/L (01055)	Mercury, water, fltrd, ug/L (71890)	
JUN 2003	17...	<.8	<.8	6.5	7.7	73	290	.52	3.99	10.3	21	<.02
JUL	23...	--	--	2.7	3.1	--	--	E.05	.21	--	--	--

Date	Mercury water, unfltrd recoverable, ug/L (71900)	Nickel, water, fltrd, ug/L (01065)	Nickel, water, unfltrd recoverable, ug/L (01067)	Silver, water, fltrd, ug/L (01075)	Silver, water, unfltrd recoverable, ug/L (01077)	Zinc, water, fltrd, ug/L (01090)	Zinc, water, unfltrd recoverable, ug/L (01092)	Zinc, water, unfltrd, percent <.063mm (70331)	Suspnd. sedi-ment, sieve concentration, mg/L (80154)	Suspended sediment load, tons/d (80155)	
JUN 2003	17...	E.01	.72	.84	<.3	<.16	137	156	94	12	.80
JUL	23...	--	--	--	--	--	109	104	71	1	<.01

E--Estimated.

## TENMILE CREEK BASIN

463438112091801 TENMILE CREEK BELOW COLORADO GULCH, NEAR HELENA, MT

LOCATION.--Lat 46°34'38", long 112°09'18" (NAD 27), in NW<sup>1</sup>/<sub>4</sub>NW<sup>1</sup>/<sub>4</sub>SE<sup>1</sup>/<sub>4</sub> sec. 31, T.10N., R4W., Lewis and Clark County, Hydrologic Unit 10030101, at U.S. Highway 12 bridge over Tenmile Creek, about 0.5 mi below the mouth of Colorado Gulch, and about 5.0 mi west of Helena.

DRAINAGE AREA.--77.8 mi<sup>2</sup>.

PERIOD OF RECORD.--April 2002 to current year.

GAGE.--None. Elevation of gage is 4,190 ft (NGVD 29).

## WATER-QUALITY DATA, OCTOBER 2002 TO SEPTEMBER 2003

Date	Time	Instantaneous discharge, cfs (00061)	pH, water, unfltrd field, std units (00400)	Specif. conductance, wat unfltrd, uS/cm 25 degC (00095)	Temperature, air, deg C (00020)	Temperature, water, deg C (00010)	Hardness, water, unfltrd mg/L as CaCO3 (00900)	Calcium, water, unfltrd mg/L (00915)	Magnesium, water, unfltrd mg/L (00925)	Ammonia + org-N, water, unfltrd mg/L as N (00625)	Nitrite + nitrate, water, unfltrd mg/L as N (00631)
OCT 2002 09...	0830	2.2	8.1	262	6.0	7.5	110	30.6	7.76	E.10	.232
MAR 2003 13...	0830	24	8.2	162	14.5	3.0	52	14.8	3.66	.90	.169
MAY 27...	1230	151	7.5	56	24.0	7.0	22	6.46	1.42	.43	.022
JUL 23...	1300	2.4	7.9	130	34.0	16.5	94	26.8	6.72	.11	.289

Date	Nitrite water, fltrd, mg/L as N (00613)	Orthophosphate, water, fltrd, mg/L as P (00671)	Phosphorus, water, unfltrd mg/L (00665)	Arsenic water, fltrd, ug/L (01000)	Arsenic water, unfltrd ug/L (01002)	Cadmium water, fltrd, ug/L (01025)	Cadmium water, unfltrd ug/L (01027)	Copper, water, fltrd, ug/L (01040)	Copper, water, unfltrd recoverable, ug/L (01042)	Lead, water, unfltrd recoverable, ug/L (01049)	Lead, water, unfltrd recoverable, ug/L (01051)
OCT 2002 09...	.003	E.006	.013	11.0	10	.09	.10	1.9	1.4	E.06	.13
MAR 2003 13...	.005	.139	.22	6.6	7	.10	.10	2.6	3.9	.18	1.37
MAY 27...	.003	<.007	.052	6.3	18	.45	.82	5.8	9.8	.46	11.4
JUL 23...	E.002	.012	.019	13.9	14	.18	.18	1.5	1.8	E.07	.14

Date	Zinc, water, unfltrd recoverable, ug/L (01090)	Zinc, water, unfltrd recoverable, ug/L (01092)	Suspnd. sediment, sieve diameter <.063mm percent (70331)	Suspended sediment concentration mg/L (80154)	Suspended sediment load, tons/d (80155)
OCT 2002 09...	18	18	--	--	--
MAR 2003 13...	20	28	86	15	.99
MAY 27...	92	143	63	31	13
JUL 23...	24	23	67	1	.01

E--Estimated.



TENMILE CREEK BASIN

06063000 TENMILE CREEK NEAR HELENA, MT

LOCATION.--Lat 46°36'20", long 112°05'20" (NAD 27), in SW<sup>1</sup>/<sub>4</sub>NE<sup>1</sup>/<sub>4</sub>SE<sup>1</sup>/<sub>4</sub> sec. 22, T.10N., R4W., Lewis and Clark County, Hydrologic Unit 10030101, at Williams Street bridge over Tenmile, about 1.2 mi southeast of Fort Harrison, and about 3.5 mi west of Helena.

DRAINAGE AREA.--96.5 mi<sup>2</sup>.

PERIOD OF RECORD.--April 2002 to current year.

GAGE.-- Non-recording wire-weight gage on bridge. Elevation at gage is 3,960 ft (NGVD 29).

WATER-QUALITY DATA, OCTOBER 2002 TO SEPTEMBER 2003

Date	Time	Instantaneous discharge, cfs (00061)	pH, water, unfltrd field, std units (00400)	Specific conductance, wat unfltrd, uS/cm 25 degC (00095)	Temperature, air, deg C (00020)	Temperature, water, deg C (00010)	Hardness, water, unfltrd mg/L as CaCO3 (00900)	Calcium, water, fltrd, mg/L (00915)	Magnesium, water, fltrd, mg/L (00925)	Ammonia + org-N, water, unfltrd mg/L as N (00625)	Nitrite + nitrate, water, fltrd, mg/L as N (00631)
OCT 2002	09...	2.2	7.9	--	10.5	10.5	130	36.1	8.96	.11	.176
MAR 2003	13...	46	7.9	190	15.0	3.5	64	18.6	4.30	.80	.258
MAY	27...	137	7.8	68	18.0	7.0	26	7.70	1.71	.32	.030
JUL	23...	.22	8.3	130	35.0	19.5	120	33.4	7.88	.14	.528

Date	Nitrite water, fltrd, mg/L as N (00613)	Orthophosphate, water, fltrd, mg/L as P (00671)	Phosphorus, water, unfltrd mg/L (00665)	Arsenic water, fltrd, ug/L (01000)	Arsenic water, unfltrd ug/L (01002)	Cadmium water, fltrd, ug/L (01025)	Cadmium water, unfltrd ug/L (01027)	Copper, water, fltrd, ug/L (01040)	Copper, water, unfltrd recoverable, ug/L (01042)	Lead, water, fltrd, ug/L (01049)	Lead, water, unfltrd recoverable, ug/L (01051)	
OCT 2002	09...	.003	<.007	.009	13.2	12	.12	.11	2.0	1.7	.37	.38
MAR 2003	13...	.004	.133	.21	7.7	9	.09	.10	2.6	4.3	.16	1.87
MAY	27...	.003	E.004	.059	7.3	20	.36	.81	5.7	10.2	.56	12.0
JUL	23...	.006	.015	.022	16.9	17	.14	.17	2.8	2.1	<.08	.26

Date	Zinc, water, fltrd, recoverable, ug/L (01090)	Zinc, water, unfltrd recoverable, ug/L (01092)	Suspnd. sedi-ment, sieve diametr <.063mm percent (70331)	Suspended sedi-ment concentration mg/L (80154)	Suspended sedi-ment load, tons/d (80155)	
OCT 2002	09...	13	16	78	11	.07
MAR 2003	13...	14	26	75	22	2.7
MAY	27...	82	141	72	33	12
JUL	23...	16	18	57	2	<.01

E--Estimated.

TENMILE CREEK BASIN

463747112033801 SEVENMILE CREEK AT MOUTH, NEAR HELENA, MT

LOCATION.--Lat 46°37'47", long 112°03'38" (NAD 27), in NW<sup>1</sup>/<sub>4</sub>NW<sup>1</sup>/<sub>4</sub>NW<sup>1</sup>/<sub>4</sub> sec. 13, T.10N., R4W., Lewis and Clark County, Hydrologic Unit 10030101, at railroad bridge over Sevenmile Creek, about 0.15 mi upstream from Tenmile Creek, about 3.2 mi northwest of Helena.

DRAINAGE AREA.--57.2 mi<sup>2</sup>.

PERIOD OF RECORD.--April 2002 to current year.

GAGE.--None. Elevation at site is 3,850 ft (NGVD 29).

WATER-QUALITY DATA, OCTOBER 2002 TO SEPTEMBER 2003

Date	Time	Instantaneous discharge, cfs (00061)	pH, water, unfltrd field, std units (00400)	Specif. conductance, wat unfltrd, uS/cm 25 degC (00095)	Temperature, air, deg C (00020)	Temperature, water, deg C (00010)	Hardness, water, unfltrd, mg/L as CaCO3 (00900)	Calcium, water, fltrd, mg/L (00915)	Magnesium, water, unfltrd, mg/L (00925)	Ammonia + org-N, water, unfltrd, mg/L as N (00625)	Nitrite + nitrate, water, fltrd, mg/L as N (00631)
OCT 2002											
09...	1145	.70	8.0	--	17.0	9.5	340	81.6	33.4	.25	E.014
MAR 2003											
13...	1145	60	7.8	205	18.0	1.0	87	23.2	7.03	4.8	.363
MAY											
27...	0945	7.3	8.1	433	16.0	7.0	220	59.5	17.7	.31	.026
JUL											
24...	1100	2.7	8.4	500	31.0	19.0	240	62.6	20.1	.36	<.022

Date	Nitrite water, fltrd, mg/L as N (00613)	Ortho-phosphate, water, fltrd, mg/L as P (00671)	Phosphorus, water, unfltrd, mg/L (00665)	Arsenic water, fltrd, ug/L (01000)	Arsenic water, unfltrd, ug/L (01002)	Cadmium water, fltrd, ug/L (01025)	Cadmium water, unfltrd, ug/L (01027)	Copper, water, fltrd, ug/L (01040)	Copper, water, unfltrd, recoverable, ug/L (01042)	Lead, water, fltrd, ug/L (01049)	Lead, water, unfltrd, recoverable, ug/L (01051)
OCT 2002											
09...	.003	.021	.046	8.8	8	E.02	.05	1.2	3.1	.12	.97
MAR 2003											
13...	.012	.133	1.61	7.6	28	E.02	.90	2.4	83.0	.39	66.7
MAY											
27...	E.002	.018	.053	12.6	14	E.02	.05	1.7	3.7	E.06	1.31
JUL											
24...	<.002	.034	.068	18.1	19	E.03	.04	1.6	2.4	.12	1.51

Date	Zinc, water, fltrd, recoverable, ug/L (01090)	Zinc, water, unfltrd, recoverable, ug/L (01092)	Suspnd. sedi-ment, sieve diametr percent <.063mm (70331)	Sus-pended sedi-ment concen-tration, mg/L (80154)	Sus-pended sedi-ment load, tons/d (80155)
OCT 2002					
09...	5	14	66	42	.08
MAR 2003					
13...	2	112	80	1790	291
MAY					
27...	4	8	91	22	.43
JUL					
24...	1	4	88	18	.13

E--Estimated.

TENMILE CREEK BASIN

06064100 TENMILE CREEK AT GREEN MEADOW DRIVE, AT HELENA, MT

LOCATION.--Lat 46°37'54", long 112°02'46" (NAD 27), in SW<sup>1</sup>/<sub>4</sub>SE<sup>1</sup>/<sub>4</sub>SE<sup>1</sup>/<sub>4</sub> sec. 12, T.10N., R4W., Lewis and Clark County, Hydrologic Unit 10030101, at Green Meadow Drive bridge over Tenmile Creek, about 1.1 mi north of Custer Avenue, and about 3 mi northwest of Helena.

DRAINAGE AREA.--161 mi<sup>2</sup>.

PERIOD OF RECORD.--May 1997 to September 1998, April 2002 to current year.

GAGE.--None. Elevation at site is 3,820 ft (NGVD 29).

WATER-QUALITY DATA, APRIL 2003 TO OCTOBER 2003

Date	Time	Instantaneous discharge, cfs (00061)	pH, water, unfltrd field, std units (00400)	Specif. conductance, wat unfltrd, uS/cm 25 degC (00095)	Temperature, air, deg C (00020)	Temperature, water, deg C (00010)	Hardness, water, unfltrd, mg/L as CaCO3 (00900)	Calcium, water, fltrd, mg/L (00915)	Magnesium, water, fltrd, mg/L (00925)	Ammonia + org-N, water, unfltrd, mg/L as N (00625)	Nitrite + nitrate, water, fltrd, mg/L as N (00631)
OCT 2002 09...	1300	1.2	8.3	--	17.0	10.0	200	53.9	16.1	.18	<.022
MAR 2003 13...	1300	304	8.1	189	18.0	4.0	71	19.8	5.29	4.6	.296
MAY 27...	0815	161	7.7	90	9.0	7.0	36	10.3	2.48	.45	.030
JUL 24...	1000	1.4	8.5	483	27.0	20.5	230	60.5	19.4	.31	<.022

Date	Nitrite water, fltrd, mg/L as N (00613)	Ortho-phosphate, water, fltrd, mg/L as P (00671)	Phosphorus, water, unfltrd, mg/L (00665)	Arsenic water, fltrd, ug/L (01000)	Arsenic water, unfltrd, ug/L (01002)	Cadmium water, fltrd, ug/L (01025)	Cadmium water, unfltrd, ug/L (01027)	Copper, water, fltrd, ug/L (01040)	Copper, water, unfltrd, recoverable, ug/L (01042)	Lead, water, fltrd, ug/L (01049)	Lead, water, unfltrd, recoverable, ug/L (01051)
OCT 2002 09...	<.002	.009	.021	12.3	12	.05	.06	1.5	1.8	.13	.45
MAR 2003 13...	.009	.141	1.49	8.3	30	E.02	1.46	2.4	78.9	.52	69.3
MAY 27...	.003	E.006	.105	8.3	26	.25	.92	5.3	12.6	.54	17.6
JUL 24...	<.002	.018	.047	19.1	20	.04	.08	3.2	3.2	.11	1.12

Date	Zinc, water, recoverable, fltrd, ug/L (01090)	Zinc, water, unfltrd, recoverable, ug/L (01092)	Suspnd. sediment, sieve diameter <.063mm percent (70331)	Suspended sediment concentration, mg/L (80154)	Suspended sediment load, tons/d (80155)
OCT 2002 09...	4	7	90	4	.01
MAR 2003 13...	4	191	83	1270	1040
MAY 27...	68	148	60	72	31
JUL 24...	3	11	94	10	.04

E--Estimated.

MISSOURI RIVER MAIN STEM

06065500 MISSOURI RIVER BELOW HAUSER DAM, NEAR HELENA, MT

LOCATION.--Lat 46°46'02", long 111°53'27" (NAD 27), in SE<sup>1</sup>/<sub>4</sub>NW<sup>1</sup>/<sub>4</sub>SW<sup>1</sup>/<sub>4</sub> sec. 29, T.12 N., R.2 W., Lewis and Clark County, Hydrologic Unit 10030101, 0.2 mi downstream from Hauser Dam, 1.3 mi upstream from Beaver Creek, 15 miles northeast of Helena, and at river mile 2,237.2.

DRAINAGE AREA.--16,876 mi<sup>2</sup>.

PERIOD OF RECORD.--January 1923 to September 1942, October 1994 to current year. Monthly means for October, November, and December 1922 were from Congressional documents: 73rd Congress, 2nd session, H. Doc. 238, Missouri River. Published figures are in acre feet.

GAGE.--Water-stage recorder. Elevation of gage is 3,580 ft (NGVD 29).

REMARKS.--Records excellent. Flow regulated by eight small irrigation reservoirs and two power plants, Clark Canyon Reservoir (station number 06015300) and Canyon Ferry Lake (station number 06058500). Diversions for irrigation of about 594,400 acres. U.S. Geological Survey satellite telemeter at station. Several observations of water temperature and specific conductance were obtained during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3160	3050	3610	3640	3640	3640	3660	4060	7770	5560	3670	3060
2	3140	3050	3560	3630	3650	3630	3690	4060	8320	5280	3670	3070
3	3060	3050	3580	3630	3640	3660	3670	4070	9440	4940	3680	3030
4	2950	3050	3560	3630	3650	3640	3670	4090	9910	4590	3680	3040
5	2930	3040	3550	3630	3650	3630	3670	4060	8850	4370	3680	3080
6	2900	3070	3550	3620	3640	3660	3670	4080	7380	4260	3680	3120
7	2870	3370	3550	3620	3630	3670	3760	4140	5860	4200	3630	3190
8	2860	3580	3550	3630	3640	3650	3810	4290	5900	4200	3410	3100
9	2940	3640	3610	3580	3640	3640	3810	4540	5960	4190	3240	3160
10	3060	3640	3640	3540	3620	3640	3800	4640	5790	4200	3210	3210
11	3130	3550	3640	3540	3690	3630	3840	4620	5830	4190	3240	3210
12	3120	3500	3640	3540	3690	3620	4050	4700	5810	4180	3070	3210
13	3110	3510	3640	3540	3680	3720	4120	4790	5790	4220	2900	3130
14	3110	3530	3640	3540	3710	4120	4090	5440	5760	4270	2900	3090
15	3110	3610	3640	3600	3690	4400	4120	6030	5680	4270	2920	3110
16	3110	3640	3570	3620	3690	4390	4050	6490	5680	4220	2980	3120
17	3150	3650	3550	3650	3640	4160	4000	6210	5680	3830	3100	3110
18	3200	3640	3550	3630	3440	3900	3950	5950	5670	3540	3150	3090
19	3190	3640	3550	3620	3460	3700	3910	6010	5680	3590	3280	3090
20	3160	3640	3550	3640	3550	3630	3900	6000	5690	3680	3360	3090
21	3150	3640	3550	3680	3540	3630	3910	5910	5700	3670	3370	3100
22	3150	3650	3550	3630	3600	3640	3910	5900	5780	3670	3370	3080
23	3140	3670	3550	3620	3570	3630	3910	5940	5820	3610	3380	3100
24	3130	3650	3540	3620	3540	3620	3910	5960	5840	3590	3390	3080
25	3130	3610	3540	3620	3540	3630	3910	5960	5800	3570	3380	3110
26	3140	3540	3540	3540	3560	3660	3920	6180	5800	3580	3390	3190
27	3120	3540	3540	3540	3610	3670	3920	6470	5810	3570	3370	3200
28	3100	3540	3540	3540	3630	3660	3960	7020	5820	3570	3210	3150
29	3100	3580	3540	3540	---	3660	4000	7540	5690	3590	3070	3100
30	3080	3640	3610	3540	---	3660	4080	7750	5620	3610	3050	3080
31	3030	---	3630	3610	---	3670	---	7760	---	3690	3050	---
TOTAL	95530	104510	110860	111550	101230	115860	116670	170660	190130	125500	102480	93500
MEAN	3082	3484	3576	3598	3615	3737	3889	5505	6338	4048	3306	3117
MAX	3200	3670	3640	3680	3710	4400	4120	7760	9910	5560	3680	3210
MIN	2860	3040	3540	3540	3440	3620	3660	4060	5620	3540	2900	3030
AC-FT	189500	207300	219900	221300	200800	229800	231400	338500	377100	248900	203300	185500

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1923 - 2003, BY WATER YEAR (WY)\*

MEAN	3556	3646	3598	3562	3771	4411	5265	6973	8327	4332	3063	3259
MAX	6489	6021	5622	6665	8101	8271	9227	16340	23540	12020	5797	5684
(WY)	1998	1998	1996	1997	1997	1997	1942	1928	1927	1998	1998	1995
MIN	1944	1998	1935	1896	1666	2398	2585	2381	2546	1208	971	1495
(WY)	1935	1935	1935	1937	1938	1938	1938	1934	1934	1934	1934	1934

SUMMARY STATISTICS

FOR 2002 CALENDAR YEAR

FOR 2003 WATER YEAR

WATER YEARS 1923 - 2003\*

ANNUAL TOTAL	1124840	1438480	
ANNUAL MEAN	3082	3941	4479
HIGHEST ANNUAL MEAN			7862
LOWEST ANNUAL MEAN			2381
HIGHEST DAILY MEAN	3670	Nov 23	9910
LOWEST DAILY MEAN	2640	Jun 24	2860
ANNUAL SEVEN-DAY MINIMUM	2680	Jun 22	2930
MAXIMUM PEAK FLOW			10100
MAXIMUM PEAK STAGE		6.77	Jun 4
INSTANTANEOUS LOW FLOW			280
ANNUAL RUNOFF (AC-FT)	2231000	2853000	3245000
10 PERCENT EXCEEDS	3550	5780	7610
50 PERCENT EXCEEDS	3010	3630	3680
90 PERCENT EXCEEDS	2840	3100	2050

\*--During periods of operation (December 1922 to September 1942, October 1994 to present).

a--Site and elevation then in use.

MISSOURI RIVER MAIN STEM

06066500 MISSOURI RIVER BELOW HOLTER DAM, NEAR WOLF CREEK, MT

LOCATION.--Lat 46°59'41", long 112°00'37" (NAD 27), in NE 1/4 SW 1/4 SE 1/4 sec.5, T.14 N., R.3 W., Lewis and Clark County, Hydrologic Unit 10030102, on left bank 0.4 mi downstream from Holter Dam, 2.8 mi southeast of Wolf Creek, and at river mile 2,210.7.

DRAINAGE AREA.--17,149 mi<sup>2</sup>.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1945 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 3,464.11 ft (NGVD 29).

REMARKS.--Water-discharge records good. Flow regulated by nine smaller irrigation reservoirs and powerplants, Clark Canyon Reservoir (station number 06015300), and Canyon Ferry Lake (station number 06058500). Diversions for irrigation of about 594,400 acres. Bureau of Reclamation satellite telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003 DAILY MEAN VALUES

Table with 13 columns (DAY, OCT, NOV, DEC, JAN, FEB, MAR, APR, MAY, JUN, JUL, AUG, SEP) and 31 rows of daily mean discharge data. Includes summary statistics at the bottom: TOTAL, MEAN, MAX, MIN, AC-FT.

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1946 - 2003, BY WATER YEAR (WY)

Table with 13 columns (MEAN, MAX, MIN, WY) and 4 rows of monthly mean discharge statistics for water years 1946-2003.

SUMMARY STATISTICS FOR 2002 CALENDAR YEAR FOR 2003 WATER YEAR WATER YEARS 1946 - 2003

Table with 4 columns (Statistic, 2002 Calendar Year, 2003 Water Year, 1946-2003) and 13 rows of summary statistics including annual total, mean, highest/lowest annual and daily means, and runoff percentages.

## MISSOURI RIVER MAIN STEM

## 06066500 MISSOURI RIVER BELOW HOLTER DAM, NEAR WOLF CREEK, MT--Continued

SUMMARY STATISTICS	WATER YEARS 1946 - 1952*		WATER YEARS 1953 - 2003**	
ANNUAL MEAN	5882		5375	
HIGHEST ANNUAL MEAN	7787	1948	8497	1984
LOWEST ANNUAL MEAN	4651	1946	3008	2002
HIGHEST DAILY MEAN	34000	Jun 8 1948	25600	Jun 20 1964
LOWEST DAILY MEAN	1560	Aug 31 1946	747	May 27 1962
ANNUAL SEVEN-DAY MINIMUM	2310	Aug 2 1949	1040	May 16 1957
MAXIMUM PEAK FLOW	34800	Jun 8 1948	27100	Jun 19 1964
MAXIMUM PEAK STAGE	11.70	Jun 8 1948	10.04	Jun 19 1964
INSTANTANEOUS LOW FLOW	b742	Nov 25 1949	a250	Jul 26 1968
ANNUAL RUNOFF (AC-FT)	4261000		3894000	
10 PERCENT EXCEEDS	10800		7890	
50 PERCENT EXCEEDS	4520		4790	
90 PERCENT EXCEEDS	3350		3030	

\*--Before Canyon Ferry completion.

\*\*--After Canyon Ferry completion.

a--Gage height, 0.18 ft.

b--Probably less than; during power plant operation.

## WATER-QUALITY RECORDS

PERIOD OF DAILY RECORD.--October 1999 to current year.

WATER TEMPERATURE: October 1999 to current year.

INSTRUMENTATION.--Temperature probe installed Sept. 30, 1999.

REMARKS--Daily water temperature record good except for Aug. 17-18 which are missing due to equipment problems. Unpublished records of instantaneous specific conductance and temperature data are available in files of the District office.

EXTREMES FOR PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: Maximum, 21.0°C, July 25, 2002; minimum, 1.0°C, many days during winter period.

EXTREMES FOR CURRENT YEAR.--

WATER TEMPERATURE: Maximum, 20.0°C, Aug. 3, 4, 10, 25; minimum, 1.0°C, many days January through March.

## WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
1	13.5	13.5	13.5	8.0	7.5	8.0	4.0	4.0	4.0	1.5	1.5	1.5
2	13.5	13.5	13.5	8.0	7.5	7.5	4.0	4.0	4.0	1.5	1.5	1.5
3	13.5	13.0	13.5	7.5	7.0	7.5	4.0	3.5	4.0	2.0	1.5	1.5
4	13.5	13.0	13.0	7.0	7.0	7.0	4.0	3.5	4.0	1.5	1.5	1.5
5	13.0	12.5	13.0	7.0	7.0	7.0	3.5	3.5	3.5	1.5	1.5	1.5
6	13.0	12.5	12.5	7.0	6.5	7.0	4.0	3.5	3.5	1.5	1.5	1.5
7	13.0	12.5	12.5	7.0	6.5	6.5	3.5	3.5	3.5	1.5	1.5	1.5
8	13.0	12.0	12.5	6.5	6.5	6.5	3.5	3.5	3.5	1.5	1.5	1.5
9	12.5	12.5	12.5	6.5	6.5	6.5	3.5	3.0	3.5	1.5	1.5	1.5
10	12.5	12.5	12.5	6.5	6.5	6.5	3.5	3.0	3.0	1.5	1.5	1.5
11	12.5	11.5	12.0	6.5	6.0	6.0	3.5	3.0	3.0	1.5	1.0	1.0
12	12.0	11.5	12.0	6.5	6.0	6.0	3.0	3.0	3.0	1.5	1.0	1.0
13	12.0	11.5	11.5	6.0	6.0	6.0	3.0	3.0	3.0	1.5	1.0	1.5
14	11.5	11.5	11.5	6.0	6.0	6.0	3.5	3.0	3.0	1.5	1.0	1.5
15	11.5	11.5	11.5	6.0	5.5	5.5	3.0	3.0	3.0	1.5	1.0	1.5
16	11.5	11.0	11.5	6.0	5.5	5.5	3.0	3.0	3.0	1.5	1.0	1.0
17	11.5	11.0	11.5	5.5	5.5	5.5	3.0	3.0	3.0	1.0	1.0	1.0
18	11.5	11.0	11.0	5.5	5.0	5.5	3.0	2.5	2.5	1.0	1.0	1.0
19	11.0	11.0	11.0	5.5	5.0	5.0	2.5	2.5	2.5	1.0	1.0	1.0
20	11.0	11.0	11.0	5.5	5.0	5.0	2.5	2.5	2.5	1.5	1.0	1.0
21	11.0	10.5	11.0	5.5	5.0	5.0	2.5	2.0	2.5	1.0	1.0	1.0
22	10.5	10.5	10.5	5.0	5.0	5.0	2.5	2.0	2.5	1.0	1.0	1.0
23	10.5	10.0	10.0	5.0	5.0	5.0	2.0	2.0	2.0	1.0	1.0	1.0
24	10.0	10.0	10.0	5.0	4.5	5.0	2.0	1.5	1.5	1.0	1.0	1.0
25	10.0	10.0	10.0	4.5	4.5	4.5	1.5	1.5	1.5	1.0	1.0	1.0
26	10.0	9.5	9.5	4.5	4.0	4.5	1.5	1.5	1.5	1.5	1.0	1.0
27	9.5	9.5	9.5	4.0	4.0	4.0	1.5	1.5	1.5	1.0	1.0	1.0
28	9.5	9.0	9.5	4.0	4.0	4.0	2.0	1.5	2.0	1.5	1.0	1.0
29	9.0	9.0	9.0	4.0	4.0	4.0	2.0	1.5	2.0	1.0	1.0	1.0
30	9.0	8.5	8.5	4.0	4.0	4.0	2.0	1.5	1.5	1.5	1.0	1.5
31	8.5	8.0	8.5	---	---	---	2.0	1.5	1.5	1.5	1.0	1.5
MONTH	13.5	8.0	11.5	8.0	4.0	5.5	4.0	1.5	2.5	2.0	1.0	1.0

MISSOURI RIVER MAIN STEM

06066500 MISSOURI RIVER BELOW HOLTER DAM, NEAR WOLF CREEK, MT--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003--Continued

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

DAY	JUNE			JULY			AUGUST			SEPTEMBER		
	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
1	13.0	11.0	12.0	15.5	14.5	15.0	19.0	17.5	18.0	18.5	17.5	18.0
2	13.0	10.5	12.0	15.5	13.0	14.5	19.0	18.0	18.5	18.0	17.5	17.5
3	13.0	11.0	12.0	16.5	13.5	15.0	20.0	17.5	18.0	18.5	17.5	18.0
4	12.5	11.5	12.0	16.5	14.0	15.0	20.0	17.5	18.5	19.0	17.5	18.0
5	12.5	11.5	12.0	16.0	14.0	15.5	19.0	18.0	18.5	18.5	17.5	18.0
6	12.5	11.5	12.0	16.5	14.0	15.0	19.5	17.0	18.5	18.5	18.0	18.0
7	13.5	11.5	12.5	16.0	14.5	15.5	19.0	17.5	18.5	19.0	18.0	18.5
8	14.5	11.5	13.0	16.0	15.0	15.0	18.0	17.5	17.5	18.0	17.5	17.5
9	13.0	11.5	12.0	16.5	14.5	15.5	19.5	17.0	18.0	18.0	17.0	18.0
10	14.0	12.0	13.0	16.0	15.0	15.5	20.0	18.0	18.5	17.5	17.0	17.5
11	13.5	12.0	13.0	16.5	15.0	15.5	18.5	17.5	18.0	17.5	17.0	17.5
12	14.0	12.0	13.5	18.0	15.5	16.5	18.5	17.0	18.0	17.5	16.5	17.0
13	15.0	13.0	14.0	17.0	14.5	16.0	18.5	17.5	18.0	17.0	16.5	17.0
14	14.5	13.5	14.0	16.5	15.0	16.0	18.5	17.5	18.0	17.0	16.5	17.0
15	14.5	13.0	13.5	17.0	16.0	17.0	18.5	17.5	18.0	17.0	16.0	16.5
16	14.0	13.0	13.5	17.0	16.5	17.0	19.0	17.5	19.0	16.0	15.5	16.0
17	14.5	13.0	14.0	17.5	15.5	17.0	---	---	---	15.5	15.5	15.5
18	16.5	14.0	15.0	17.0	16.0	17.0	---	---	---	15.5	15.0	15.5
19	16.0	13.5	15.0	18.0	16.0	17.0	19.0	18.0	18.5	15.5	15.0	15.5
20	15.5	13.5	14.5	18.0	15.5	17.0	19.0	17.5	18.5	15.5	15.0	15.0
21	15.0	13.0	14.0	17.5	15.5	17.0	19.5	18.0	18.5	15.0	14.5	15.0
22	15.5	13.5	14.5	19.5	16.5	17.5	19.5	18.0	19.0	15.0	14.5	15.0
23	15.5	13.5	14.5	19.5	16.5	18.0	19.5	18.0	18.5	15.0	14.0	14.5
24	14.0	13.0	13.5	18.5	17.0	18.0	19.5	18.0	18.5	15.0	14.0	14.5
25	15.0	13.5	14.0	19.5	17.0	18.0	20.0	17.5	18.5	15.0	14.5	14.5
26	15.0	13.5	14.0	19.0	16.5	17.5	19.5	17.5	18.5	14.5	14.0	14.5
27	15.0	13.0	14.0	19.0	17.5	18.5	19.0	18.0	18.5	14.5	14.0	14.5
28	14.5	13.0	13.5	19.0	17.0	18.0	18.5	17.5	17.5	14.5	14.0	14.0
29	15.5	14.0	14.5	18.0	17.0	17.5	17.5	17.0	17.5	14.0	13.5	14.0
30	16.0	14.0	15.0	19.0	17.5	18.0	18.5	17.0	18.0	14.5	13.5	14.0
31	---	---	---	18.5	16.5	17.5	19.5	18.0	18.5	---	---	---
MONTH	16.5	10.5	13.5	19.5	13.0	16.5	---	---	---	19.0	13.5	16.0

## LITTLE PRICKLY PEAR CREEK BASIN

## 06071300 LITTLE PRICKLY PEAR CREEK AT WOLF CREEK, MT

LOCATION.--Lat 47°00'19", long 112°04'10" (NAD 27), in NE<sup>1</sup>/<sub>4</sub>NW<sup>1</sup>/<sub>4</sub>NE<sup>1</sup>/<sub>4</sub> sec.2, T.14N., R.4W., Lewis and Clark County, Hydrologic Unit 10030102, on right bank 30 ft downstream from Interstate 15 access road bridge, 500 ft southwest of Wolf Creek Post Office, 0.5 mi downstream from Wolf Creek, and at river mile 3.2.

DRAINAGE AREA.--381 mi<sup>2</sup>.

PERIOD OF RECORD.--May 1962 to September 1967, October 1991 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 3,547.38 ft (NGVD 29). May 10, 1962 to July 6, 1965, water-stage recorder on left bank at present elevation. July 7, 1965 to Apr. 11, 1966, non-recording gage on bridge 0.25 mi upstream at elevation 3.27 ft higher. Apr. 12, 1966 to Sept. 30, 1967, water-stage recorder on right bank 23 ft upstream at present elevation.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Diversions for irrigation of about 2,500 acres upstream from station. U.S.Geological Survey satellite telemeter at station.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of May 7, 1975, reached a stage of 7.45 ft, present elevation, from floodmarks, discharge, 4,500 ft<sup>3</sup>/s.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	36	38	46	41	65	40	109	166	159	60	22	24
2	36	42	46	41	63	41	124	154	150	57	22	23
3	36	43	47	41	54	42	128	147	143	55	24	24
4	37	47	44	40	e45	61	119	202	129	54	26	24
5	38	47	40	38	e40	e35	113	201	121	49	25	23
6	39	48	49	37	e30	e30	108	203	117	50	25	25
7	39	50	45	e35	e35	e25	102	195	111	49	26	25
8	39	50	40	e25	46	e30	100	182	103	49	25	26
9	39	50	41	e20	49	e40	101	177	101	55	24	27
10	39	50	38	e18	48	53	109	188	104	48	22	26
11	39	48	44	19	45	49	128	189	114	45	22	25
12	39	47	44	30	42	88	151	191	105	46	22	28
13	40	48	44	43	40	495	182	175	98	42	22	30
14	41	48	46	49	47	506	208	168	99	40	23	27
15	42	47	47	e30	44	257	212	165	93	40	22	27
16	42	46	47	e20	43	165	198	164	88	35	20	31
17	41	46	45	e25	45	134	160	162	84	39	22	36
18	40	46	39	36	42	115	162	158	80	36	21	33
19	40	46	39	42	43	102	157	149	79	28	21	31
20	40	48	31	e25	42	96	145	134	86	29	21	29
21	44	49	33	e20	e40	94	144	123	88	28	21	29
22	47	48	e32	e22	e30	91	135	117	82	28	22	29
23	47	51	e20	e30	e25	104	150	112	80	24	25	27
24	46	46	e20	e25	e30	100	190	110	82	24	25	27
25	45	41	22	e40	e35	92	210	115	80	27	24	26
26	45	45	28	50	e38	90	225	132	75	31	23	25
27	45	47	38	73	43	86	204	150	70	29	24	25
28	47	48	46	62	40	82	184	154	66	27	27	25
29	44	49	45	50	---	81	174	149	65	25	26	25
30	38	48	40	48	---	82	177	137	62	24	26	26
31	36	---	43	51	---	87	---	166	---	22	25	---
TOTAL	1266	1407	1229	1126	1189	3393	4609	4935	2914	1195	725	808
MEAN	40.8	46.9	39.6	36.3	42.5	109	154	159	97.1	38.5	23.4	26.9
MAX	47	51	49	73	65	506	225	203	159	60	27	36
MIN	36	38	20	18	25	25	100	110	62	22	20	23
AC-FT	2510	2790	2440	2230	2360	6730	9140	9790	5780	2370	1440	1600

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1962 - 2003, BY WATER YEAR (WY)\*

	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973
MEAN	51.5	53.5	49.4	44.1	60.2	68.2	135	231	204	81.0	45.3	48.8
MAX	131	98.5	74.9	69.1	190	109	372	580	684	175	95.4	127
(WY)	1966	1966	1966	1965	1996	2003	1965	1965	1967	1965	1993	1965
MIN	29.5	31.5	26.0	30.8	29.3	42.0	64.8	35.5	25.5	17.7	14.2	18.5
(WY)	1993	1993	2002	1993	2001	2002	2000	1992	1992	2000	2000	2000

SUMMARY STATISTICS FOR 2002 CALENDAR YEAR FOR 2003 WATER YEAR WATER YEARS 1962 - 2003\*

	2002	2003	1962-2003
ANNUAL TOTAL	24551	24796	
ANNUAL MEAN	67.3	67.9	88.5
HIGHEST ANNUAL MEAN			179
LOWEST ANNUAL MEAN			35.2
HIGHEST DAILY MEAN	600	506	2440
LOWEST DAILY MEAN	17	18	10
ANNUAL SEVEN-DAY MINIMUM	22	21	11
MAXIMUM PEAK FLOW		1050	3110
MAXIMUM PEAK STAGE		5.59	7.65
INSTANTANEOUS LOW FLOW			a9.6
ANNUAL RUNOFF (AC-FT)	48700	49180	64080
10 PERCENT EXCEEDS	118	155	171
50 PERCENT EXCEEDS	45	45	53
90 PERCENT EXCEEDS	33	24	28

\*--During periods of operation (May 1962 to September 1967, October 1991 to current year).

a--Gage height, 2.54 ft.

e--Estimated.



DEARBORN RIVER BASIN

06073500 DEARBORN RIVER NEAR CRAIG, MT

LOCATION.--Lat 47°11'57", long 112°05'44" (NAD 27), in NW 1/4 NW 1/4 SE 1/4 sec.27, T. 17 N., R. 4 W., Lewis and Clark County, Hydrologic Unit 10030102, on left bank at upstream side of bridge on U.S. Highway 287, 7.0 mi downstream from South Fork Dearborn River, 10.5 mi northwest of Craig, 13.5 mi north of Wolf Creek, and at river mile 19.0.

DRAINAGE AREA.--325 mi<sup>2</sup>.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1945 to September 1969, October 1993 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 3,800 ft (NGVD 29). Oct. 1, 1945 to Sept. 30, 1946, nonrecording gage; Oct. 1, 1946 to June 9, 1964, water-stage recorder on upstream side of bridge; June 10, 1964 to May 31, 1965, nonrecording gage; June 1, 1965 to Sept. 30 1969, water-stage recorder on downstream side of abandoned bridge 0.2 mi downstream, all at same previous elevation.

REMARKS.--Water-discharge records good except those for estimated daily discharges, which are poor. U.S. Geological Survey satellite telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003 DAILY MEAN VALUES

Table with 13 columns: DAY, OCT, NOV, DEC, JAN, FEB, MAR, APR, MAY, JUN, JUL, AUG, SEP. Rows show daily discharge values from day 1 to 31, plus summary statistics (TOTAL, MEAN, MAX, MIN, AC-FT).

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1946 - 2003, BY WATER YEAR (WY)\*

Table with 13 columns: MEAN, MAX (WY), MIN (WY) and 12 columns for water years 1946 through 2003.

SUMMARY STATISTICS FOR 2002 CALENDAR YEAR FOR 2003 WATER YEAR WATER YEARS 1946 - 2003\*

Summary statistics table with 4 columns: Metric, 2002 Calendar Year, 2003 Water Year, and Water Years 1946-2003.

\*--During periods of operation (October 1945 to September 1969, October 1993 to current year). a--From rating curve extended above 7,000 ft<sup>3</sup>/s on basis of slope-area measurement of peak flow. b--From floodmark. c--Site and datum then in use. e--Estimated.

## DEARBORN RIVER BASIN

06073500 DEARBORN RIVER NEAR CRAIG, MT--Continued

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--June 1999 to to current year.

PERIOD OF DAILY RECORD.--August to September 1991, November 1993 to current year.

INSTRUMENTATION.--Temperature recorder installed Nov. 3, 1993.

REMARKS.--Daily water temperature record good. Unpublished records of instantaneous water temperature and specific conductance for many days are available in files of the District office.

EXTREMES FOR PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: Maximum, 28.5°C, Aug. 1, 2, 2000; minimum, 0.0°C on many days during winter.

EXTREMES FOR CURRENT YEAR.--

WATER TEMPERATURE: Maximum, 28.0°C, July 19 and Aug. 2; minimum, 0.0°C on many days October through April.

## WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

Date	Time	Instantaneous discharge, cfs (00061)	pH, water, unfltrd field, std units (00400)	Specific conductance, wat unfltrd uS/cm 25 degC (00095)	Temperature, air, deg C (00020)	Temperature, water, deg C (00010)	Ammonia + org-N, water, unfltrd mg/L as N (00625)	Nitrite + nitrate, water, fltrd, mg/L as N (00631)	Nitrite, water, fltrd, mg/L as N (00613)			
APR 2003												
08...	1050	134	8.3	316	11.0	5.0	E.10	E.014	<.002			
MAY												
27...	1530	679	8.4	234	22.0	12.0	.22	.038	<.002			
JUN												
16...	1045	218	8.5	283	24.0	14.5	.12	<.022	<.002			
JUL												
15...	1015	57	8.5	318	30.0	17.0	E.05	<.022	<.002			
Date			Ortho-phosphate, water, fltrd, mg/L as P (00671)	Phosphorus, water, unfltrd mg/L (00665)	Suspended sediment, sieve diameter percent <.063mm (70331)	Suspended sediment concentration, mg/L (80154)	Suspended sediment load, tons/d (80155)					
APR 2003												
08...			<.007	E.004	69	2	.72					
MAY												
27...			<.007	.065	66	98	180					
JUN												
16...			<.007	.004	80	5	2.9					
JUL												
15...			<.007	E.002	51	13	2.0					
Date	Time	Hardness, water, unfltrd mg/L as CaCO3 (00900)	Calcium, water, fltrd, mg/L (00915)	Magnesium, water, fltrd, mg/L (00925)	Potassium, water, fltrd, mg/L (00935)	Sodium adsorption ratio (00931)	Sodium, water, fltrd, mg/L (00930)	Alkalinity, water, lab, mg/L as CaCO3 (29801)	Chloride, water, fltrd, mg/L (00940)	Fluoride, water, fltrd, mg/L (00950)	Silica, water, fltrd, mg/L (00955)	
MAY 2003												
27...	1530	130	35.8	9.13	.57	.0	1.14	118	.55	<.2	5.19	
JUL												
15...	1015	170	45.4	13.7	.84	.1	2.55	162	.85	<.2	6.55	
Date		Sulfate, water, fltrd, mg/L (00945)	Residue sum of constituents, mg/L (70301)	Residue water, fltrd, tons/acre-ft (70303)	Residue water, fltrd, tons/d (70302)	Arsenic, water, unfltrd ug/L (01002)	Cadmium, water, unfltrd ug/L (01027)	Chromium, water, unfltrd recoverable, ug/L (01034)	Copper, water, unfltrd recoverable, ug/L (01042)	Lead, water, unfltrd recoverable, ug/L (01051)	Nickel, water, unfltrd recoverable, ug/L (01067)	Zinc, water, unfltrd recoverable, ug/L (01092)
MAY 2003												
27...	5.6	129	.18	236	<2	.3	E.6	3.8	3.30	1.76	7	
JUL												
15...	11.9	179	.24	27.5	<2	<.04	<.8	2.6	E.05	.98	E1	

E--Estimated.

DEARBORN RIVER BASIN

06073500 DEARBORN RIVER NEAR CRAIG, MT--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003--Continued

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	10.0	7.5	8.5	0.0	0.0	0.0	4.0	1.0	2.5	0.5	0.0	0.5
2	11.5	4.0	7.5	0.5	0.0	0.0	3.5	1.0	2.0	0.5	0.0	0.5
3	8.5	7.0	7.5	0.5	0.0	0.0	2.0	0.0	0.5	0.5	0.0	0.5
4	10.5	6.5	8.0	1.0	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5
5	12.0	7.0	8.5	1.0	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5
6	12.0	6.0	9.0	5.5	0.5	3.0	1.5	0.0	0.5	1.5	0.0	1.0
7	14.5	8.5	11.0	5.5	1.5	3.5	1.5	0.0	0.5	2.5	0.5	1.0
8	12.0	8.0	10.0	4.0	2.0	3.0	1.0	0.0	0.5	2.5	0.0	1.0
9	13.5	7.5	10.0	4.5	2.0	3.5	1.5	0.0	0.5	0.5	0.0	0.0
10	13.0	7.0	9.5	4.0	2.0	3.0	2.0	0.0	0.5	1.0	0.0	0.5
11	10.0	6.0	7.5	4.5	1.5	3.0	1.0	0.0	0.5	0.5	0.0	0.5
12	9.0	2.5	6.0	4.0	2.0	3.0	3.0	0.0	1.0	0.5	0.0	0.0
13	10.5	4.0	7.0	6.5	3.5	4.5	4.0	1.0	2.5	0.5	0.0	0.0
14	10.5	4.0	7.0	4.5	2.5	3.5	5.0	2.0	3.5	0.0	0.0	0.0
15	10.0	3.5	7.0	5.0	2.0	3.5	4.5	2.0	3.5	0.5	0.0	0.0
16	10.0	3.5	7.0	5.0	2.5	3.5	3.0	1.0	2.0	0.5	0.0	0.0
17	11.0	4.0	7.5	4.0	2.0	3.0	2.5	0.0	1.0	0.5	0.0	0.0
18	11.0	4.5	7.5	2.5	1.5	2.0	0.5	0.0	0.5	0.5	0.0	0.0
19	9.5	3.5	7.0	4.5	2.0	3.5	0.5	0.0	0.5	0.5	0.0	0.0
20	11.5	6.0	8.5	8.0	4.0	5.5	0.5	0.0	0.0	0.5	0.0	0.5
21	10.5	4.5	7.5	7.5	4.0	5.5	0.0	0.0	0.0	0.0	0.0	0.0
22	6.0	3.0	4.0	6.0	4.5	5.5	0.5	0.0	0.0	0.0	0.0	0.0
23	5.0	2.5	3.5	4.5	1.0	3.0	0.5	0.0	0.0	0.0	0.0	0.0
24	7.0	1.5	4.0	1.5	0.0	0.5	0.5	0.0	0.0	0.0	0.0	0.0
25	6.5	1.0	3.5	1.0	0.0	0.5	0.5	0.0	0.0	0.0	0.0	0.0
26	3.5	0.5	2.0	1.0	0.0	0.5	0.5	0.0	0.0	0.5	0.0	0.0
27	5.0	1.5	3.5	3.0	0.5	1.5	0.5	0.0	0.0	0.0	0.0	0.0
28	3.5	0.0	3.0	5.5	0.5	3.0	0.5	0.0	0.0	0.5	0.0	0.0
29	1.0	0.0	0.5	5.0	2.0	4.0	0.5	0.0	0.0	0.5	0.0	0.0
30	0.5	0.0	0.5	3.5	0.5	2.0	0.5	0.0	0.0	2.0	0.0	0.5
31	0.5	0.0	0.0	---	---	---	0.5	0.0	0.5	5.5	1.5	3.5
MONTH	14.5	0.0	6.0	8.0	0.0	2.5	5.0	0.0	1.0	5.5	0.0	0.5
	FEBRUARY			MARCH			APRIL			MAY		
1	4.0	1.0	2.5	0.5	0.0	0.0	8.5	5.5	6.5	12.0	5.5	8.5
2	3.5	0.0	1.5	0.5	0.0	0.0	5.5	1.5	4.0	11.0	6.0	8.5
3	1.5	0.0	0.5	0.5	0.0	0.0	6.0	0.0	3.0	10.5	6.5	8.5
4	1.0	0.0	0.5	0.5	0.0	0.0	7.5	1.5	4.5	8.0	5.0	6.0
5	0.5	0.0	0.0	0.5	0.0	0.0	8.0	2.5	5.5	10.0	4.0	7.0
6	0.5	0.0	0.0	0.0	0.0	0.0	8.5	3.0	5.5	12.0	4.5	8.0
7	1.0	0.0	0.5	0.0	0.0	0.0	9.0	1.5	5.0	12.0	5.5	8.5
8	0.5	0.0	0.5	0.0	0.0	0.0	12.0	3.5	7.5	9.5	5.5	6.5
9	0.5	0.0	0.5	0.0	0.0	0.0	13.5	5.5	9.5	6.0	4.5	5.0
10	1.0	0.0	0.5	0.0	0.0	0.0	13.0	5.5	9.0	10.0	4.5	6.5
11	1.5	0.0	0.5	0.3	0.0	0.1	13.0	6.0	9.5	13.0	4.5	8.5
12	2.0	0.0	0.5	0.2	0.0	0.1	11.5	7.0	9.5	12.0	7.0	9.5
13	2.0	0.0	1.0	1.6	0.1	0.7	10.5	7.0	9.0	14.5	6.5	10.5
14	1.0	0.0	0.5	5.9	0.4	2.8	11.0	6.5	8.5	15.0	7.0	11.0
15	1.0	0.0	0.5	6.5	1.5	3.5	8.5	6.0	7.5	14.0	9.0	11.5
16	4.0	0.0	2.0	7.5	2.5	4.5	10.5	3.5	6.5	11.5	6.5	9.0
17	4.5	0.0	2.0	6.5	1.0	3.5	10.5	4.5	7.5	10.0	4.5	7.5
18	4.5	0.0	1.5	6.0	2.0	4.0	8.5	6.0	7.0	8.5	5.5	6.5
19	1.5	0.0	0.5	8.5	1.0	5.0	12.0	5.0	8.0	12.0	4.0	7.5
20	2.5	0.0	1.0	9.0	1.5	5.0	11.5	5.0	8.5	12.0	5.5	9.0
21	1.0	0.0	0.5	7.0	3.0	5.0	13.5	5.5	9.5	12.5	8.0	10.0
22	0.5	0.0	0.0	10.0	3.5	6.5	13.5	6.5	10.0	14.0	8.5	11.0
23	1.0	0.0	0.5	7.5	3.0	5.5	12.0	8.0	10.5	14.0	10.0	12.0
24	0.5	0.0	0.5	5.5	1.0	3.5	13.5	7.5	10.0	17.0	8.5	12.5
25	0.5	0.0	0.5	8.0	1.0	4.0	10.5	6.5	8.5	15.0	10.0	12.5
26	0.5	0.0	0.5	6.0	2.0	4.0	8.5	5.0	7.0	13.5	8.5	11.0
27	0.5	0.0	0.0	5.5	2.0	3.5	10.5	4.0	7.0	14.5	8.5	11.5
28	0.5	0.0	0.0	8.5	1.0	4.5	8.0	4.0	5.5	16.0	8.5	12.5
29	---	---	---	9.0	1.0	5.0	6.0	3.0	4.5	16.0	10.0	13.0
30	---	---	---	10.5	5.0	7.0	7.5	5.5	6.5	14.0	9.0	11.0
31	---	---	---	12.0	6.0	8.5	---	---	---	13.0	9.0	11.0
MONTH	4.5	0.0	0.5	12.0	0.0	3.0	13.5	0.0	7.5	17.0	4.0	9.5

## DEARBORN RIVER BASIN

06073500 DEARBORN RIVER NEAR CRAIG, MT--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003--Continued

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
1	15.5	9.5	12.0	24.0	15.5	19.5	26.5	16.0	21.0	22.5	12.5	17.5
2	14.0	9.0	11.5	23.0	15.0	18.5	28.0	16.0	21.5	22.5	13.0	17.5
3	15.0	8.0	11.5	22.0	13.0	17.0	24.0	18.5	20.5	22.0	12.5	17.0
4	13.0	8.5	11.0	22.5	13.0	17.5	21.5	16.0	19.0	20.5	13.0	17.0
5	14.0	8.0	11.5	22.5	13.5	18.0	24.5	14.5	19.0	21.0	13.5	17.0
6	12.5	10.0	11.0	22.0	13.0	17.5	24.0	16.0	19.0	22.0	13.5	17.5
7	16.5	7.5	12.0	24.0	13.5	18.5	26.0	15.5	19.5	22.5	15.0	18.0
8	16.0	10.5	13.5	21.0	15.5	18.0	26.0	16.0	20.5	18.0	14.0	16.0
9	14.0	11.5	12.5	24.0	14.0	19.0	27.0	16.0	21.0	18.5	10.5	14.0
10	16.5	10.0	13.0	25.5	14.5	20.0	26.0	16.5	21.5	18.5	10.0	14.0
11	15.5	10.5	13.5	26.0	15.5	20.5	23.5	16.0	20.0	17.5	11.0	13.5
12	18.5	10.0	14.5	26.5	16.0	21.0	22.0	16.0	19.0	17.0	11.5	13.5
13	16.5	11.0	14.0	23.5	17.0	20.5	27.0	15.5	20.5	18.5	11.0	14.0
14	20.0	11.0	15.0	24.0	14.5	19.0	26.5	16.0	21.0	15.5	9.5	12.5
15	20.5	13.0	16.5	26.5	14.5	20.0	25.5	16.0	20.5	13.0	11.0	12.0
16	21.5	13.0	17.0	27.0	16.5	21.5	22.5	16.5	19.5	11.5	8.5	10.5
17	22.5	14.0	18.0	27.0	17.0	22.0	24.5	14.5	19.0	10.5	7.0	8.5
18	22.5	14.5	18.5	27.5	16.5	22.0	24.5	16.0	20.0	14.0	5.5	9.5
19	20.5	14.5	17.5	28.0	16.5	22.0	24.0	15.5	19.5	16.5	8.5	12.0
20	16.5	13.5	15.0	26.5	16.5	21.5	24.0	16.0	19.5	17.0	9.5	13.0
21	17.0	10.5	14.0	27.5	16.5	21.5	21.5	14.0	18.0	13.5	9.5	11.0
22	15.5	10.0	13.0	27.5	16.5	22.0	22.5	14.5	18.0	15.5	8.0	11.5
23	18.5	9.5	13.5	26.5	16.5	21.5	23.0	15.0	18.5	14.5	10.0	12.0
24	14.5	11.5	13.0	22.0	17.0	18.5	23.0	13.5	18.0	16.5	9.0	12.5
25	18.0	9.0	13.0	23.5	16.0	19.0	24.0	14.5	19.0	18.5	10.5	14.0
26	19.5	12.0	15.5	26.5	16.5	20.5	22.5	13.5	18.0	18.5	11.0	14.5
27	22.0	13.5	17.5	27.0	17.5	21.5	21.5	16.0	18.0	17.5	9.5	13.0
28	21.0	14.0	17.5	27.5	16.5	21.5	22.0	12.5	16.5	17.0	9.0	12.5
29	23.0	13.5	18.5	27.0	16.5	21.5	21.5	12.5	16.5	15.5	10.5	12.0
30	24.0	15.5	19.5	27.5	16.0	21.5	22.5	11.5	16.5	15.5	7.0	11.0
31	---	---	---	26.5	16.5	21.0	22.5	12.0	17.0	---	---	---
MONTH	24.0	7.5	14.5	28.0	13.0	20.0	28.0	11.5	19.0	22.5	5.5	13.5

SMITH RIVER BASIN

06077200 SMITH RIVER BELOW EAGLE CREEK, NEAR FORT LOGAN, MT

LOCATION.--Lat 46°49'41", long 111°11'29" (NAD 27), in SW 1/4NW 1/4SE 1/4 sec. 2, T.12 S., R.4 E., Meagher County, Hydrologic Unit 10030103, on right bank at downstream side of private bridge, 0.6 mi downstream from Eagle Creek, 11.3 mi north of Fort Logan, and at river mile 80.8. DRAINAGE AREA.--1,088 mi<sup>2</sup>.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1996 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 4,350 ft (NGVD 29).

REMARKS.--Water-discharge records good except those for estimated daily discharges, which are poor. Flow slightly regulated by Smith River Reservoir (station number 06075000). Diversion for irrigation of about 19,300 acres upstream from station. U.S. Geological Survey satellite telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003 DAILY MEAN VALUES

Table with 13 columns: DAY, OCT, NOV, DEC, JAN, FEB, MAR, APR, MAY, JUN, JUL, AUG, SEP. Rows include daily discharge values and summary statistics (TOTAL, MEAN, MAX, MIN, AC-FT).

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1997 - 2003, BY WATER YEAR (WY)

Table with 13 columns: MEAN, MAX, (WY), MIN, (WY). Rows show monthly mean data for water years 1997 through 2003.

SUMMARY STATISTICS FOR 2002 CALENDAR YEAR FOR 2003 WATER YEAR WATER YEARS 1997 - 2003

Table with 4 columns: 2002 CALENDAR YEAR, 2003 WATER YEAR, WATER YEARS 1997 - 2003. Rows include ANNUAL TOTAL, ANNUAL MEAN, HIGHEST ANNUAL MEAN, LOWEST ANNUAL MEAN, HIGHEST DAILY MEAN, LOWEST DAILY MEAN, ANNUAL SEVEN-DAY MINIMUM, MAXIMUM PEAK FLOW, MAXIMUM PEAK STAGE, INSTANTANEOUS LOW FLOW, ANNUAL RUNOFF (AC-FT), 10 PERCENT EXCEEDS, 50 PERCENT EXCEEDS, 90 PERCENT EXCEEDS.

a--Estimated daily discharge, occurred during period of ice affected stage-discharge relation. b--Backwater from ice. c--Gage height, 2.73 ft. d--Gage height, 7.00 ft. e--Estimated.

## SMITH RIVER BASIN

06077200 SMITH RIVER BELOW EAGLE CREEK, NEAR FORT LOGAN, MT--Continued

## WATER-QUALITY RECORDS

PERIOD OF DAILY RECORD.--Water years 1997 to present. Data for water years 1997 to 2001 not published.

INSTRUMENTATION.--Water temperature recorder installed Nov. 4, 1997.

REMARKS.--Daily water temperature record good except for ice-affected days in March and April, which are fair. Several observations of water temperature and specific conductance were made during the water year.

EXTREMES FOR PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: Maximum, 27.5°C, July 14, 2002; minimum 0.0°C, many days during winter months.

EXTREMES FOR CURRENT YEAR.--

WATER TEMPERATURE: Maximum, 26.5°C, July 17-19, 21-22, Aug. 2, 14; minimum 0.0°C, many days October through March.

## WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	9.0	6.5	7.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	9.5	4.0	6.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	6.5	4.5	5.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	7.5	5.5	6.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	9.5	6.0	7.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	8.5	5.5	7.0	0.5	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.5
7	11.5	6.5	8.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	11.5	7.5	9.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	11.5	6.5	8.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	10.0	5.5	7.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	8.0	4.5	6.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12	6.5	2.0	4.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13	7.0	2.0	4.5	2.0	0.5	1.0	0.0	0.0	0.0	0.0	0.0	0.0
14	7.5	2.5	5.0	1.5	0.0	0.5	2.5	0.0	0.5	0.0	0.0	0.0
15	6.5	2.5	4.5	2.0	0.0	1.0	2.5	1.5	2.5	0.0	0.0	0.0
16	7.0	3.0	5.0	1.0	0.0	0.5	2.5	2.0	2.5	0.0	0.0	0.0
17	7.0	2.5	4.5	1.5	0.0	0.5	2.5	2.5	2.5	0.0	0.0	0.0
18	7.5	3.0	5.0	1.0	0.0	0.5	2.5	0.5	1.5	0.0	0.0	0.0
19	6.5	2.5	4.5	2.0	0.0	1.0	0.5	0.0	0.0	0.0	0.0	0.0
20	8.0	4.0	6.0	4.0	1.0	2.5	0.0	0.0	0.0	1.0	0.0	0.5
21	7.5	4.0	6.0	3.5	1.5	2.5	0.0	0.0	0.0	1.5	0.0	1.0
22	5.5	3.0	4.0	2.5	1.5	2.0	0.0	0.0	0.0	0.0	0.0	0.0
23	3.0	1.5	2.5	2.5	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0
24	4.0	1.5	2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
25	3.5	0.5	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
26	2.5	0.5	1.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0
27	3.0	0.5	1.5	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.5	0.5
28	2.5	1.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.5
29	1.0	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30	0.5	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0
31	0.5	0.0	0.5	---	---	---	0.0	0.0	0.0	0.5	0.0	0.5
MONTH	11.5	0.0	4.5	4.0	0.0	0.5	2.5	0.0	0.5	1.5	0.0	0.0

SMITH RIVER BASIN

06077200 SMITH RIVER BELOW EAGLE CREEK, NEAR FORT LOGAN, MT--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003--Continued

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	FEBRUARY			MARCH			APRIL			MAY		
1	0.5	0.5	0.5	0.0	0.0	0.0	5.5	3.5	4.5	8.5	4.5	6.5
2	0.5	0.5	0.5	0.0	0.0	0.0	6.0	2.5	4.5	9.5	6.0	7.5
3	0.5	0.0	0.5	0.0	0.0	0.0	5.0	2.0	3.0	8.0	5.0	7.0
4	0.5	0.0	0.5	0.0	0.0	0.0	6.0	2.0	4.0	8.0	6.0	7.0
5	0.5	0.0	0.5	0.0	0.0	0.0	8.0	3.0	5.0	7.0	4.5	6.0
6	0.5	0.0	0.0	0.0	0.0	0.0	7.5	3.0	5.0	8.0	3.5	5.5
7	0.0	0.0	0.0	0.0	0.0	0.0	8.0	2.5	5.0	9.5	5.0	7.0
8	0.0	0.0	0.0	0.0	0.0	0.0	10.0	3.5	6.0	8.0	5.0	6.5
9	0.5	0.0	0.0	0.0	0.0	0.0	11.5	4.0	7.5	9.0	5.0	7.0
10	0.5	0.0	0.0	0.0	0.0	0.0	12.0	5.0	8.0	7.5	5.5	6.5
11	0.5	0.0	0.0	0.5	0.0	0.0	11.5	5.5	8.0	10.5	4.5	7.5
12	0.0	0.0	0.0	0.0	0.0	0.0	9.5	4.0	7.0	10.0	8.0	9.0
13	0.0	0.0	0.0	0.0	0.0	0.0	8.5	4.5	6.5	11.0	7.0	9.0
14	0.0	0.0	0.0	0.5	0.0	0.0	7.5	5.0	6.0	13.5	7.0	10.0
15	0.0	0.0	0.0	2.5	0.0	1.0	6.0	4.0	5.0	12.5	9.0	11.0
16	1.0	0.0	0.0	2.5	1.0	1.5	7.0	2.5	5.0	11.0	8.0	9.5
17	2.5	0.5	1.0	3.0	0.0	1.5	7.0	3.5	5.5	10.5	6.5	8.5
18	1.5	0.5	1.0	2.5	0.5	1.5	7.5	5.0	6.0	9.0	6.0	6.5
19	0.5	0.5	0.5	6.5	1.0	3.0	10.5	4.5	7.0	10.0	4.0	7.0
20	0.5	0.5	0.5	5.5	2.0	4.0	10.5	5.0	8.0	10.5	5.5	8.0
21	0.5	0.5	0.5	5.5	3.5	4.5	11.0	5.5	8.0	11.5	8.5	10.0
22	0.5	0.0	0.5	6.0	3.5	5.0	10.5	6.0	8.5	13.5	9.0	11.0
23	0.0	0.0	0.0	6.0	3.5	4.5	9.5	7.0	8.5	14.5	10.0	12.5
24	0.0	0.0	0.0	4.5	2.0	3.5	9.0	5.0	7.0	16.0	10.0	13.0
25	0.0	0.0	0.0	4.0	3.0	3.5	8.5	6.0	7.5	16.0	11.5	14.0
26	0.0	0.0	0.0	5.0	3.0	4.0	7.5	5.0	6.0	14.5	11.5	13.0
27	0.0	0.0	0.0	6.0	2.5	4.0	7.0	3.0	5.0	15.0	10.5	12.5
28	0.0	0.0	0.0	6.0	2.5	4.0	6.5	4.0	5.0	16.0	10.5	13.5
29	---	---	---	7.0	2.5	4.5	6.5	4.0	5.0	17.0	12.5	15.0
30	---	---	---	9.5	4.0	6.5	7.0	5.0	6.0	15.5	12.5	13.5
31	---	---	---	9.0	3.5	5.5	---	---	---	14.0	11.0	12.5
MONTH	2.5	0.0	0.0	9.5	0.0	2.0	12.0	2.0	6.0	17.0	3.5	9.5
	JUNE			JULY			AUGUST			SEPTEMBER		
1	14.5	11.5	13.0	24.0	16.5	20.0	25.5	16.5	21.0	21.0	12.0	16.5
2	13.5	11.0	12.0	23.0	16.5	19.5	26.5	17.5	22.0	21.5	13.0	16.5
3	13.0	9.0	11.0	19.5	15.5	17.5	23.5	18.0	21.0	21.0	12.5	16.5
4	12.0	9.0	10.5	21.5	13.5	17.5	24.0	18.0	20.5	20.5	12.5	16.0
5	13.5	9.0	11.0	21.5	13.5	17.5	24.0	15.0	19.5	19.0	13.0	16.0
6	12.0	9.5	10.5	21.5	14.5	18.0	24.0	16.5	20.0	18.0	13.5	16.0
7	14.5	8.0	11.0	23.0	15.0	19.0	25.0	15.5	20.0	19.0	14.0	16.5
8	16.0	10.5	13.0	20.0	17.0	18.5	24.5	16.5	20.5	17.5	14.0	15.5
9	15.0	12.5	13.5	22.5	13.5	18.0	25.5	16.5	21.0	18.0	11.0	14.0
10	17.0	12.5	14.5	24.0	15.5	19.5	26.0	16.5	21.0	16.5	10.5	13.0
11	15.5	12.5	14.0	25.0	16.5	20.5	24.0	17.0	20.5	14.5	10.5	12.5
12	17.5	11.0	14.0	26.0	17.5	21.5	22.0	16.0	19.0	13.5	11.0	12.0
13	17.0	12.5	15.0	25.0	18.0	21.0	24.5	15.5	19.5	14.0	9.5	11.5
14	17.5	12.5	15.0	24.0	15.5	19.5	26.5	17.0	21.0	14.0	7.5	11.0
15	18.5	13.5	16.0	25.0	16.0	20.5	25.5	17.0	21.0	13.5	10.5	11.5
16	20.5	14.0	17.0	26.0	17.5	21.5	25.0	18.0	21.0	12.5	8.5	10.5
17	20.0	15.5	18.0	26.5	18.0	22.0	23.0	16.5	19.5	9.5	6.5	8.0
18	22.0	15.5	18.5	26.5	18.5	22.5	24.0	15.0	19.0	12.0	5.5	8.5
19	20.0	16.0	18.0	26.5	18.5	22.5	24.0	15.5	19.5	11.0	7.0	8.5
20	17.0	14.0	16.0	25.5	17.5	21.5	24.5	17.0	20.5	13.5	8.0	10.0
21	15.0	12.5	14.0	26.5	17.5	21.5	23.5	15.0	19.0	11.0	7.5	9.0
22	13.5	10.0	12.0	26.5	17.5	22.0	23.0	16.0	19.0	13.5	7.0	10.0
23	16.0	9.0	12.5	26.0	17.0	21.5	22.0	17.0	19.0	14.5	9.0	11.0
24	13.5	11.5	12.5	23.5	18.0	20.5	23.5	15.0	19.0	15.0	9.5	11.5
25	15.0	9.0	12.0	22.5	18.5	20.0	24.0	15.0	19.0	16.5	10.5	13.0
26	16.5	10.5	13.5	23.5	18.0	20.5	23.0	14.5	18.5	16.0	11.0	13.0
27	19.5	12.5	15.5	25.0	17.5	21.0	20.5	16.5	18.0	15.0	9.0	11.5
28	21.0	13.5	17.5	25.5	16.5	21.0	20.5	13.5	16.5	14.5	8.5	11.0
29	23.0	15.0	19.0	25.5	16.5	21.0	20.5	13.0	16.5	13.5	9.5	11.0
30	24.0	16.5	20.0	26.0	16.5	21.0	21.5	12.0	16.5	13.0	7.0	10.0
31	---	---	---	25.0	17.0	21.0	21.5	12.5	16.5	---	---	---
MONTH	24.0	8.0	14.5	26.5	13.5	20.5	26.5	12.0	19.5	21.5	5.5	12.5

MISSOURI RIVER MAIN STEM

06078200 MISSOURI RIVER NEAR ULM, MT

LOCATION (REVISED).--Lat 47°26'09", long 111°23'12" (NAD 27), in NE<sup>1</sup>/<sub>4</sub>NW<sup>1</sup>/<sub>4</sub>NW<sup>1</sup>/<sub>4</sub> sec.5, T.19 N., R.3 E., Cascade County, Hydrologic Unit 10030102, on left bank 5.6 mi east of Ulm, 9.1 mi downstream from Smith River, and at river mile 2,140.4.

DRAINAGE AREA.--20,941 mi<sup>2</sup>.

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

GAGE.--Water-stage recorder. Elevation of gage is 3,313.27 ft (NGVD 29).

REMARKS.--Records good except those for estimated daily discharges, which are fair. Flow regulated by 10 smaller irrigation reservoirs and power plants, Clark Canyon Reservoir (station number 06015300), and Canyon Ferry Lake (station number 06058500). Diversions for irrigation of about 630,400 acres upstream from station. U.S. Army Corps of Engineers satellite telemeter at station. Several observations of water temperature and specific conductance were made during the year.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in June 1953 reached a stage of about 17 ft; discharge, 35,000 ft<sup>3</sup>/s. Flood in June 1948 reached a stage of about 16 ft; discharge, 32,000 ft<sup>3</sup>/s, from information by local residents.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3160	3210	3670	e3900	e3800	e3900	4120	5290	9470	5770	3630	2980
2	3170	3200	3660	e3900	3940	e3900	4440	5430	9370	5740	3630	2960
3	3190	3190	3750	e3900	3980	e4000	4540	5320	9780	5590	3630	2910
4	3200	3180	3780	e3850	3990	e4000	4450	5340	10600	5240	3640	2890
5	3110	3170	3750	3850	3980	e3900	4340	5440	11100	4870	3630	2900
6	3100	3140	3790	3820	3980	e3900	4280	5520	10300	4640	3650	2900
7	3120	3170	3840	3770	e3950	e3900	4260	5510	8820	4510	3670	2920
8	3140	3370	3860	3770	e3900	e3900	4210	5500	7460	4320	3670	2970
9	3150	3500	3760	3820	e3900	e3900	4190	5590	6670	4220	3610	3010
10	3120	3820	3700	3580	3900	e3900	4190	5860	6560	4270	3320	3000
11	3100	3940	3610	e3700	3870	e3900	4400	6000	6780	4340	3240	3060
12	3130	3870	3630	e3800	3850	e3900	4590	5990	6810	4370	3250	2970
13	3190	3720	3730	e3800	3920	e4000	4760	6020	6680	4420	3160	3030
14	3160	3650	3850	e3800	3890	e4500	5050	6120	6480	4360	3050	3120
15	3160	3620	3920	e3800	3840	8880	5300	6450	6340	4210	2950	3100
16	3170	3650	3900	e3800	3850	6830	5440	7240	6240	4210	2840	3070
17	3180	3750	3800	e3800	3920	6010	5240	7660	6170	4250	2830	3110
18	3180	3820	3690	e3800	3890	5560	5040	7830	6120	4140	2890	3130
19	3200	3900	3660	e3800	3870	5070	5000	7450	6100	3860	3000	3120
20	3210	3810	3740	e3900	3720	4490	4940	7320	6130	3670	3120	3120
21	3230	3780	e3800	e3900	3720	4230	4850	7270	6150	3580	3260	3120
22	3220	3770	e3800	e3900	e3750	4050	4790	7140	6100	3570	3290	3140
23	3180	3760	e3800	e3900	e3800	4030	4800	6920	6070	3560	3320	3110
24	3170	3800	e3800	e4000	e3800	4150	4940	6880	6100	3550	3280	3110
25	3200	3810	e3800	e3900	e3800	4270	5460	7100	6160	3530	3280	3070
26	3260	3810	e3800	e3800	e3800	4210	5660	7500	6200	3590	3270	3000
27	3300	3820	e3750	e3700	e3800	4200	5600	7890	6200	3590	3280	3030
28	3240	3820	e3700	e3700	e3800	4160	5450	8270	6150	3510	3290	3040
29	3260	3770	e3700	e3700	---	4130	5340	8910	6040	3510	3250	3080
30	3290	3730	e3700	e3700	---	4090	5210	9510	5930	3530	3100	3100
31	3240	---	e3800	e3700	---	4050	---	9770	---	3550	3000	---
TOTAL	98730	108550	116540	118060	108210	137910	144880	210040	215080	130070	102030	91070
MEAN	3185	3618	3759	3808	3865	4449	4829	6775	7169	4196	3291	3036
MAX	3300	3940	3920	4000	3990	8880	5660	9770	11100	5770	3670	3140
MIN	3100	3140	3610	3580	3720	3900	4120	5290	5930	3510	2830	2890
AC-FT	195800	215300	231200	234200	214600	273500	287400	416600	426600	258000	202400	180600

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1957 - 2003, BY WATER YEAR (WY)

	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
MEAN	4931	5303	5529	5638	5756	5886	6532	8957	10870	7375	4853	4608																																			
MAX	11230	9497	10690	7213	9501	9652	12070	19800	24260	19480	8741	9990																																			
(WY)	1966	1966	1960	1984	1996	1968	1976	1976	1981	1975	1993	1984																																			
MIN	2977	3090	3095	3129	3096	3152	3070	3501	2965	2868	2990	2283																																			
(WY)	2002	2002	2002	2002	2002	2002	1961	1961	1961	1985	2000	1959																																			

SUMMARY STATISTICS FOR 2002 CALENDAR YEAR FOR 2003 WATER YEAR WATER YEARS 1957 - 2003

ANNUAL TOTAL	1312610	1581170				
ANNUAL MEAN	3596	4332				
HIGHEST ANNUAL MEAN		6353				
LOWEST ANNUAL MEAN		9653				
HIGHEST DAILY MEAN	9790	Jun 12	11100	Jun 5	28200	May 24 1981
LOWEST DAILY MEAN	2850	Sep 20	2830	Aug 17	1700	Jun 17 1961
ANNUAL SEVEN-DAY MINIMUM	2890	Sep 18	2920	Sep 2	2150	Sep 4 1959
MAXIMUM PEAK FLOW			11100	Jun 5	a28500	May 24 1981
MAXIMUM PEAK STAGE			7.86	Jun 5	15.20	Jun 17 1997
ANNUAL RUNOFF (AC-FT)	2604000	3136000				
10 PERCENT EXCEEDS	4550	6200				
50 PERCENT EXCEEDS	3260	3820				
90 PERCENT EXCEEDS	3090	3120				

a--Gage height, 14.99 ft.  
e--Estimated.



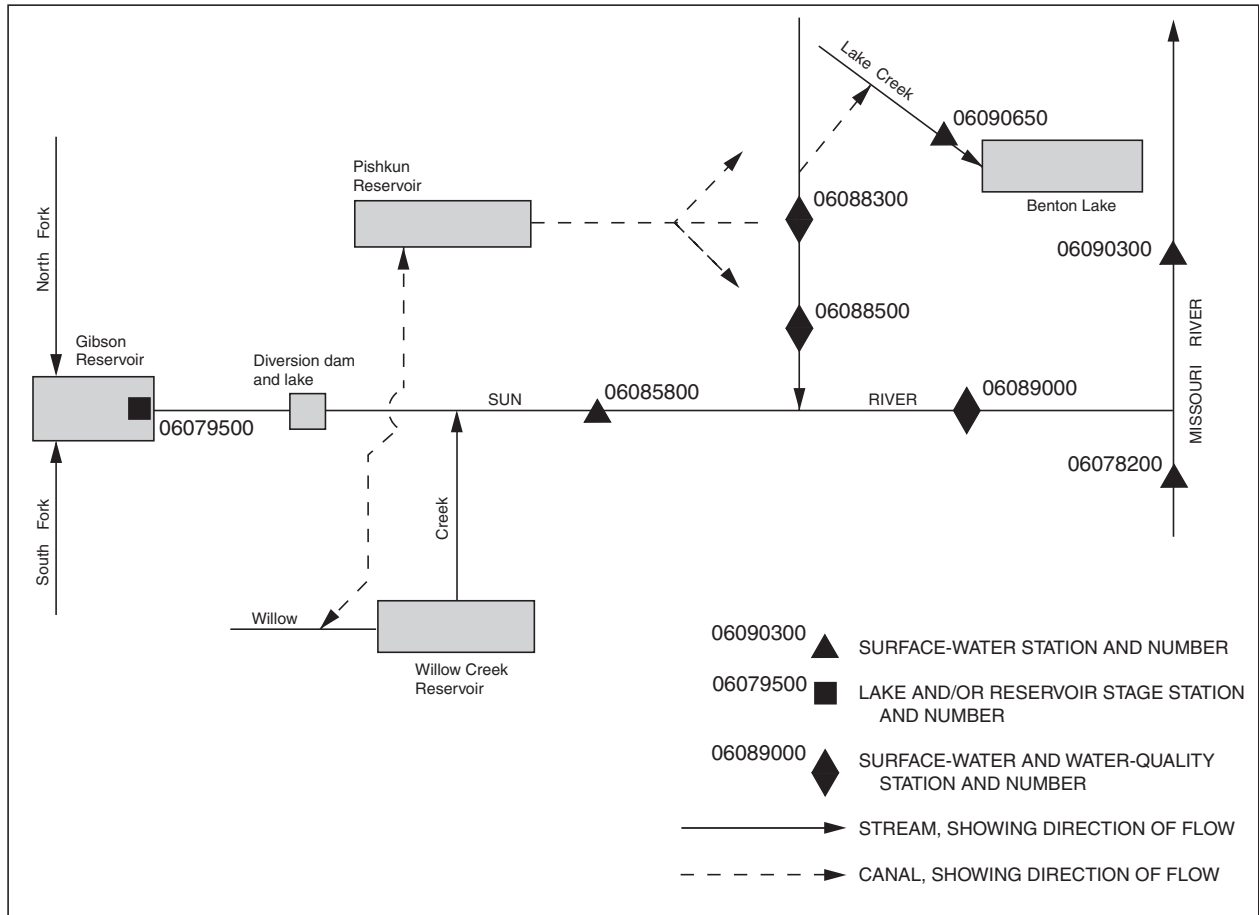


Figure 10. Schematic diagram showing diversions and storage in Sun River Basin.

SUN RIVER BASIN

06085800 SUN RIVER AT SIMMS, MT

LOCATION.--Lat 47°30'06", long 111°55'56" (NAD 27), in NW<sup>1</sup>/<sub>4</sub>NW<sup>1</sup>/<sub>4</sub>SE<sup>1</sup>/<sub>4</sub> sec. 12, T. 20 N., R.3 W., Cascade County, Hydrologic Unit 10030104, on left bank 5 ft downstream from bridge on Montana Secondary Highway 565, 0.7 mi downstream from Simms Creek, 0.7 mi north of Simms, and at river mile 45.0.

DRAINAGE AREA.--1,320 mi<sup>2</sup>.

PERIOD OF RECORD.--May to June 1953 (in WSP 1320-B), May to June 1964 (in WSP 1840-B), April 1966 to September 1979, April 1997 to current year.

REVISED RECORDS.--WDR MT-75-1: 1964 (M).

GAGE.--Water-stage recorder. Elevation of gage is 3,570 ft (NGVD 29). May 1941 to October 1965, nonrecording gage at different elevation. April 1966 to September 1979, water-stage recorder at site about 500 ft downstream at different elevation.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Flow regulated by Gibson, Pishkun, Willow Creek, and Nilan Reservoirs. Diversions for irrigation of about 105,000 acres upstream from station. Bureau of Reclamation satellite telemeter at station. Several observations of water temperature and specific conductance were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	123	e160	e170	e150	e160	e130	164	317	1850	56	55	35
2	126	e170	e170	e160	e150	e140	186	245	1480	55	63	43
3	128	e180	e150	e170	e140	e130	190	239	1710	47	69	51
4	137	e190	e140	e170	e150	e120	179	309	1440	43	52	45
5	149	e200	e150	e170	e150	e130	173	356	e600	42	45	39
6	147	206	e160	e170	e150	e120	172	294	e300	41	50	35
7	134	201	e160	e160	e150	e110	170	311	e400	38	68	33
8	124	191	e160	e160	e140	e110	167	313	e500	37	117	34
9	124	182	e170	e150	e140	e120	164	236	e600	37	103	56
10	111	176	e170	e140	e140	e140	165	247	648	29	103	63
11	88	176	e160	e140	e150	e140	168	230	679	27	87	69
12	101	178	e160	e150	e160	e160	174	201	668	26	80	76
13	111	176	e170	e150	e150	e200	184	195	548	27	69	83
14	115	177	e180	e140	e130	e450	202	181	440	51	70	110
15	163	174	e170	e150	e140	398	207	172	353	68	72	113
16	173	174	e170	e150	e160	288	201	165	335	58	75	148
17	175	172	e160	e150	e160	237	196	172	265	65	75	155
18	174	171	e150	e150	e150	215	196	151	234	52	51	124
19	175	171	e140	e170	e150	197	203	132	202	44	39	118
20	175	171	e130	e160	e140	187	221	112	279	37	34	118
21	177	175	e130	e140	e130	179	222	92	244	38	33	117
22	184	174	e130	e130	e120	178	220	88	205	41	33	122
23	181	e170	e130	e140	e100	175	177	77	202	38	34	118
24	180	e150	e130	e150	e110	175	192	70	194	37	33	106
25	182	e160	e140	e130	e120	173	197	113	193	40	30	103
26	181	e160	e150	e140	e130	176	277	2820	167	40	35	99
27	183	e180	e160	e160	e120	182	740	3340	143	42	39	107
28	183	e190	e160	e160	e130	178	897	3010	122	47	37	110
29	175	e170	e160	e150	---	174	811	2950	103	56	38	116
30	e160	e170	e150	e160	---	175	570	3520	77	58	36	117
31	e150	---	e150	e170	---	171	---	3290	---	55	30	---
TOTAL	4689	5295	4780	4740	3920	5658	7985	23948	15181	1372	1755	2663
MEAN	151	176	154	153	140	183	266	773	506	44.3	56.6	88.8
MAX	184	206	180	170	160	450	897	3520	1850	68	117	155
MIN	88	150	130	130	100	110	164	70	77	26	30	33
AC-FT	9300	10500	9480	9400	7780	11220	15840	47500	30110	2720	3480	5280

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1966 - 2003, BY WATER YEAR (WY)\*

MEAN	207	222	197	195	192	221	324	1161	2230	400	163	148
MAX	519	596	456	314	291	473	1125	4123	8558	2165	383	422
(WY)	1972	1976	1976	1976	1976	1969	1969	1976	1975	1975	1972	1972
MIN	89.0	120	101	122	96.3	104	80.9	72.1	109	44.3	48.8	49.3
(WY)	1978	1978	1974	2001	1977	1977	1977	2001	1977	2003	2000	1977

SUMMARY STATISTICS FOR 2002 CALENDAR YEAR FOR 2003 WATER YEAR WATER YEARS 1966 - 2003\*

ANNUAL TOTAL	129947	81986	
ANNUAL MEAN	356	225	465
HIGHEST ANNUAL MEAN			1177
LOWEST ANNUAL MEAN			123
HIGHEST DAILY MEAN	4070	3520	35000
LOWEST DAILY MEAN	26	26	19
ANNUAL SEVEN-DAY MINIMUM	41	32	26
MAXIMUM PEAK FLOW		4400	50000
MAXIMUM PEAK STAGE		5.88	b13.70
INSTANTANEOUS LOW FLOW		a24	Jul 12
ANNUAL RUNOFF (AC-FT)	257700	162600	336700
10 PERCENT EXCEEDS	287	278	869
50 PERCENT EXCEEDS	130	150	181
90 PERCENT EXCEEDS	83	43	83

\*--During periods of operation (April 1966 to September 1979, April 1997 to current year).  
a--Gage height, 0.58 ft.  
b--About, from floodmark.  
e--Estimated.

SUN RIVER BASIN

06088300 MUDDY CREEK NEAR VAUGHN, MT

LOCATION.--Lat 47°37'30", long 111°38'05" (NAD 27), in NE 1/4 NE 1/4 NW 1/4 sec. 32, T. 22 N., R. 1 E., Cascade County, Hydrologic Unit 10030104, on left bank 200 ft downstream from bridge on county road 6.2 mi northwest of Vaughn and at mile 14.6 DRAINAGE AREA.--282 mi<sup>2</sup>.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--July 1968 to September 1987, March 1996 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 3,441.79 ft (NGVD 29) (levels by U.S. Army Corps of Engineers).

REMARKS.--Water-discharge records good except those for estimated daily discharges, which are poor. Natural flow increased by wastage from Greenfield Irrigation Project. Diversions for irrigation of about 400 acres upstream from station and pumped diversions from Muddy Creek upstream from station in SW 1/4 sec. 2, T. 22 N., R. 1 W, to supplement water supply for Benton Lake Wildlife Refuge. Bureau of Reclamation satellite telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003 DAILY MEAN VALUES

Table with 13 columns (DAY, OCT, NOV, DEC, JAN, FEB, MAR, APR, MAY, JUN, JUL, AUG, SEP) and 31 rows of daily mean discharge data. Includes summary rows for TOTAL, MEAN, MAX, MIN, and AC-FT.

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1968 - 2003, BY WATER YEAR (WY)\*

Table with 13 columns (MEAN, MAX, (WY), MIN, (WY)) and 13 rows of monthly mean data statistics for water years 1968 through 2003.

SUMMARY STATISTICS FOR 2002 CALENDAR YEAR FOR 2003 WATER YEAR WATER YEARS 1968 - 2003\*

Table with 4 columns (Statistic, 2002 Calendar Year, 2003 Water Year, 1968-2003\*) and 13 rows of summary statistics including annual total, mean, highest/lowest annual/daily means, and exceedance percentages.

\*--During periods of operation (July 1968 to September 1987, March 1996 to current year). a--From floodmark. e--Estimated.

## SUN RIVER BASIN

## 06088300 MUDDY CREEK NEAR VAUGHN, MT--Continued

PERIOD OF RECORD.--Water years 1968 to September 1982, March 1996 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: July 1968 to September 1982.

SUSPENDED-SEDIMENT DISCHARGE: July 1968 to September 1982.

REMARKS.--Unpublished records of instantaneous water temperature and specific conductance are available in files of the District office.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: Maximum daily, 6,400 microsiemens per centimeter ( $\mu\text{S}/\text{cm}$ ) Apr. 29, 1976; minimum daily, 365  $\mu\text{S}/\text{cm}$  Feb. 20, 1969.

SEDIMENT CONCENTRATION: Maximum daily mean, 13,000 mg/L, Mar. 18, 1978; minimum daily mean observed, 11 mg/L, Oct. 19, 1968, Oct. 19, 1972, Oct. 30, 1973.

SEDIMENT LOAD: Maximum daily, 63,900 tons, May 22, 1981; minimum daily, 0.84 ton, Jan. 8, 1973.

## WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

Date	Time	Instantaneous discharge, cfs (00061)	pH, water, unfltrd field, std units (00400)	Specific conductance, wat unfltrd uS/cm 25 degC (00095)	Temperature, air, deg C (00020)	Temperature, water, deg C (00010)	Ammonia + org-N, water, unfltrd mg/L as N (00625)	Ammonia water, fltrd, mg/L as N (00608)	Nitrite + nitrate water, fltrd, mg/L as N (00631)	Nitrite water, fltrd, mg/L as N (00613)
NOV 2002										
14...	1500	54	8.5	917	11.0	4.0	.23	E.011	3.29	.015
JAN 2003										
15...	0930	34	8.2	962	0.0	0.0	.27	.022	4.01	.014
MAR										
12...	1150	26	8.0	960	11.0	0.0	.21	.028	.796	.004
APR										
10...	0820	21	8.6	1180	3.0	7.0	.49	.019	2.28	.020
MAY										
28...	1830	59	8.5	547	29.0	22.0	.93	.055	.583	.014
JUN										
18...	0800	219	8.5	507	21.0	16.0	1.0	.021	.973	.011
JUL										
15...	1540	241	8.8	587	35.0	21.0	.79	<.015	1.14	.011
AUG										
20...	0815	73	8.4	815	18.0	17.0	.39	<.015	1.48	.013
SEP										
09...	1100	38	8.4	895	14.0	13.0	.35	E.011	1.42	.008

Date	Ortho-phosphate, water, fltrd, mg/L as P (00671)	Phosphorus, water, unfltrd mg/L (00665)	Selenium, water, unfltrd ug/L (01147)	Suspnd. sediment, sieve diametr <.063mm (70331)	Suspended sediment concentration mg/L (80154)	Suspended sediment load, tons/d (80155)
NOV 2002						
14...	<.007	.013	2.7	82	40	5.8
JAN 2003						
15...	E.004	.017	2.9	85	16	1.5
MAR						
12...	<.007	.010	.8	74	15	1.1
APR						
10...	<.007	.029	3.4	83	30	1.7
MAY						
28...	.010	.168	1.6	96	154	25
JUN						
18...	.033	.340	1.1	75	319	189
JUL						
15...	.062	.183	1.5	70	107	70
AUG						
20...	<.007	.015	2.2	75	8	1.6
SEP						
09...	<.007	.012	2.0	58	15	1.5

E--Estimated.

SUN RIVER BASIN

06088500 MUDDY CREEK AT VAUGHN, MT

LOCATION.--Lat 47°33'40", long 111°32'15" (NAD 27), in SW<sup>1</sup>/<sub>4</sub>SE<sup>1</sup>/<sub>4</sub>NE<sup>1</sup>/<sub>4</sub> sec.24, T.21 N., R.1 E., Cascade County, Hydrologic Unit 10030104, on left bank at Vaughn, and at river mile 1.1.

DRAINAGE AREA.--314 mi<sup>2</sup>.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--June 1925 to January 1926, April 1934 to September 1968, July 1971 to current year.

REVISED RECORDS.--WSP 856: 1937. WSP 1509: 1934-35, 1941(M). WSP 1559: 1956. WSP 1629: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 3,330 ft (NGVD 29). May 21, 1925 to Feb. 8, 1926, nonrecording gage at site 500 ft downstream at different elevation. Apr. 19, 1925 to Sept. 30, 1955, at previous site at elevation. May 18, 1955 to Apr. 25, 1960 and Sept. 24, 1962 to Sept. 30, 1968, auxiliary crest-stage gage. Oct. 1, 1955 to Sept. 30, 1968, nonrecording gage at bridge 670 ft upstream at previous elevation. July 1, 1971 to May 9, 1996, 700 ft upstream at previous elevation.

REMARKS.--Water-discharge records good except those for estimated daily discharges, which are poor. Natural flow increased by wastage from Sun River Canal and by return flow from irrigation. Diversions for irrigation of about 700 acres upstream from station. Bureau of Reclamation satellite telemeter at station.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in June 1908 reached a stage of about 24 ft, previous elevation (discharge not determined); flood in June 1932 reached a stage of about 19 ft, previous elevation (discharge not determined); from information by local residents.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	105	e52	55	e40	e38	e28	28	37	187	190	302	94
2	118	e55	55	e42	e35	e32	30	31	257	218	271	89
3	115	e60	e45	e45	e30	e25	34	28	234	221	244	95
4	113	e65	e38	e42	e27	e27	33	37	222	252	288	92
5	106	e70	e42	e40	e25	e30	30	38	232	267	258	87
6	100	75	e45	e40	e25	e25	30	33	199	235	285	88
7	100	77	e48	e38	e27	e20	27	31	246	271	295	86
8	95	74	e52	e35	e25	e20	26	30	233	275	258	89
9	95	69	e55	e30	e25	e23	25	31	313	283	210	90
10	96	66	55	e25	e25	e30	24	33	301	254	182	89
11	95	64	54	e30	e25	e40	25	31	266	287	169	87
12	93	63	53	e37	e27	e80	27	62	255	248	169	86
13	92	63	59	e35	e30	e150	29	137	228	243	155	93
14	90	62	58	e33	e27	e120	39	149	278	275	148	98
15	93	62	57	e35	e28	67	40	140	242	259	138	97
16	72	60	e52	e33	e30	50	36	140	259	240	140	115
17	65	59	e45	e32	e32	47	31	147	202	242	141	138
18	63	58	e35	e32	e30	41	29	181	227	235	138	115
19	61	58	e32	e35	e28	44	29	195	209	251	127	109
20	60	58	e30	e30	e25	63	27	141	325	251	121	104
21	58	58	e30	e25	e20	34	26	134	419	271	109	102
22	57	58	e30	e22	e18	32	26	115	354	249	111	103
23	57	57	e30	e25	e17	32	26	129	382	253	109	101
24	57	55	e32	e22	e20	28	26	106	351	270	104	100
25	58	46	e35	e25	e23	28	27	84	372	293	100	99
26	76	e55	e37	e30	e25	28	26	137	339	284	94	94
27	74	66	e40	e35	e22	29	27	129	298	314	94	95
28	73	62	e42	e32	e25	29	27	143	266	300	101	95
29	68	58	e40	e30	---	28	31	104	235	267	100	93
30	e55	55	e38	e35	---	28	38	120	249	269	96	87
31	e50	---	e38	e40	---	28	---	181	---	290	95	---
TOTAL	2510	1840	1357	1030	734	1286	879	3034	8180	8057	5152	2910
MEAN	81.0	61.3	43.8	33.2	26.2	41.5	29.3	97.9	273	260	166	97.0
MAX	118	77	59	45	38	150	40	195	419	314	302	138
MIN	50	46	30	22	17	20	24	28	187	190	94	86
AC-FT	4980	3650	2690	2040	1460	2550	1740	6020	16230	15980	10220	5770

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1925 - 2003, BY WATER YEAR (WY) \*

	1925	1926	1926	1936	1936	1988	1968	1935	1936	1925	1925	1925
MEAN	99.7	60.0	44.2	34.4	37.2	54.7	41.6	137	238	275	283	174
MAX	200	113	131	68.5	96.9	283	182	305	480	416	488	270
(WY)	1963	1964	1957	1997	1952	1978	1975	1953	1953	1966	1975	1972
MIN	26.3	30.7	16.8	17.3	10.0	22.4	18.3	52.6	86.0	52.1	44.0	40.2
(WY)	1926	1926	1926	1936	1936	1988	1968	1935	1936	1925	1925	1925

## SUN RIVER BASIN

## 06088500 MUDDY CREEK AT VAUGHN, MT--Continued

SUMMARY STATISTICS	FOR 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1925 - 2003*	
ANNUAL TOTAL	47346		36969			
ANNUAL MEAN	130		101		125	
HIGHEST ANNUAL MEAN					185 1975	
LOWEST ANNUAL MEAN					61.2 1936	
HIGHEST DAILY MEAN	1150	Jun 11	419	Jun 21	3500	Jun 4 1953
LOWEST DAILY MEAN	17	Jan 28	17	Feb 23	4.8	Mar 29 1977
ANNUAL SEVEN-DAY MINIMUM	20	Mar 4	21	Feb 21	7.0	Jan 24 1936
MAXIMUM PEAK FLOW			438	Jun 21	a7600	Jun 4 1953
MAXIMUM PEAK STAGE			5.42	Jun 21	b17.70	Jun 4 1953
INSTANTANEOUS LOW FLOW					c2.0	Mar 16 1972
ANNUAL RUNOFF (AC-FT)	93910		73330		90260	
10 PERCENT EXCEEDS	309		258		293	
50 PERCENT EXCEEDS	62		62		70	
90 PERCENT EXCEEDS	24		27		26	

\*--During periods of operation (June 1925 to January 1926, April 1934 to September 1968, July 1971 to current year).

a--From rating curve extended above 3,000 ft<sup>3</sup>/s on basis of slope-area measurement of peak flow.

b--From floodmark, site and datum then in use.

c--Gage height, 1.20 ft, result of freezeup.

e--Estimated.

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1968, 1971-82, October 1991 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: October 1967 to September 1968, July 1972 to September 1982.

WATER TEMPERATURE: October 1967 to September 1968, July 1971 to September 1979.

SUSPENDED-SEDIMENT DISCHARGE: July 1971 to September 1982.

REMARKS.--Unpublished records of instantaneous water temperature and specific conductance are available in files of the District office.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: Maximum daily, 5,400 microsiemens per centimeter ( $\mu\text{S}/\text{cm}$ ) at 25.0°C, Apr. 30, 1976; minimum daily, 470  $\mu\text{S}/\text{cm}$  at 25.0°C, June 8, 1974.

WATER TEMPERATURE : Maximum daily, 25.5°C, June 18, 1974, June 28, 1979; minimum daily, 0.0°C, on many days during winters.

SEDIMENT CONCENTRATION: Maximum daily, 21,100 mg/L, May 22, 1981; minimum daily, 10 mg/L, Feb. 10, 1973.

SEDIMENT LOAD: Maximum daily, 127,000 tons, May 22, 1981; minimum daily, 0.68 ton, Feb. 10, 1973.

## WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

Date	Time	Instantaneous discharge, cfs (00061)	pH, water, unfltrd field, std units (00400)	Specific conductance, wat unfltrd uS/cm 25 degC (00095)	Temperature, air, deg C (00020)	Temperature, water, deg C (00010)	Ammonia + org-N, water, unfltrd mg/L as N (00625)	Ammonia + nitrate, water, fltrd, mg/L as N (00608)	Nitrite + nitrate, water, fltrd, mg/L as N (00631)	Nitrite-water, fltrd, mg/L as N (00613)
NOV 2002										
15...	1000	61	8.5	952	11.0	5.0	.23	.023	3.08	.013
JAN 2003										
15...	1215	35	8.3	1010	10.0	0.0	.27	E.010	3.95	.014
MAR										
19...	1450	47	8.4	1050	15.0	0.0	.72	.060	2.42	.015
APR										
10...	1000	24	8.7	1240	11.5	8.5	.44	.015	1.86	.020
MAY										
21...	1600	134	8.5	608	16.0	15.0	.72	E.014	.537	.009
JUN										
18...	1000	238	8.5	584	26.0	19.0	.99	E.009	1.04	.012
JUL										
15...	1230	250	8.5	594	30.0	19.0	1.0	<.015	1.03	.007
AUG										
19...	1645	134	8.4	734	30.0	23.0	.37	<.015	.856	.008
SEP										
10...	1430	88	8.6	798	21.0	16.0	.34	<.015	.779	.005

E--Estimated.

SUN RIVER BASIN

06088500 MUDDY CREEK AT VAUGHN, MT--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003--Continued

Date	Ortho-phosphate, water, fltrd, mg/L as P (00671)	Phosphorus, water, unfltrd mg/L (00665)	Selenium, water, unfltrd ug/L (01147)	Suspnd. sediment, sieve diameter percent <.063mm (70331)	Suspended sediment concentration mg/L (80154)	Suspended sediment load, tons/d (80155)
NOV 2002						
15...	<.007	.015	2.4	61	61	10
JAN 2003						
15...	<.007	.015	3.0	67	31	2.9
MAR						
19...	E.006	.119	3.5	92	118	15
APR						
10...	<.007	.027	3.6	93	44	2.9
MAY						
21...	<.007	.170	1.3	94	168	61
JUN						
18...	.043	.200	1.6	84	387	249
JUL						
15...	.038	.220	1.3	69	205	138
AUG						
19...	<.007	.030	1.7	83	43	16
SEP						
10...	<.007	.028	1.3	82	60	14

E--Estimated.

## SUN RIVER BASIN

## 06089000 SUN RIVER NEAR VAUGHN, MT

LOCATION (REVISED).--Lat 47°31'33", long 111°30'43" (NAD 27), in SE<sup>1</sup>/<sub>4</sub>SW<sup>1</sup>/<sub>4</sub>SW<sup>1</sup>/<sub>4</sub> sec.32, T.21 N., R.2 E., Cascade County, Hydrologic Unit 10030104, on right bank 2.3 mi downstream from Muddy Creek, 2.8 mi southeast of Vaughn, and at river mile 15.0.

DRAINAGE AREA.--1,849 mi<sup>2</sup>, revised.

## WATER-DISCHARGE RECORDS

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.

REVISED RECORDS.--WSP 786: 1934. WSP 1729: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 3,340 ft (NGVD 29). July 11 to Oct. 30, 1897, nonrecording gage at site 0.6 mi downstream at different elevation. Apr. 19 to Aug. 3, 1934, non-recording gage at 1.4 mi downstream at different elevation. Aug. 4, 1934 to Oct. 15, 2002, water-stage recorder 1.4 mi downstream at different elevation.

REMARKS.--Water-discharge records good except those for estimated daily discharges, which are poor. Flow regulated by Gibson, Pishkun, Willow Creek, and Nilan Reservoirs. Diversion for irrigation of about 110,000 acres upstream from station. U.S. Army Corps of Engineers satellite telemeter at station.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 1964 exceeded the stage of the June 1908 flood by about 3 ft and is the highest since 1908, from information by local residents.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	374	e300	300	e280	e250	e240	195	589	2480	320	461	210
2	381	e320	298	e280	e240	e250	217	379	1920	293	413	202
3	383	e340	294	e290	e240	e230	246	337	1790	306	403	212
4	379	e350	e300	e290	e240	e220	235	403	1900	332	476	205
5	392	e360	e280	e290	e230	e230	225	499	1190	397	434	188
6	371	372	e290	e300	e230	e210	220	503	531	387	449	182
7	370	376	e300	e300	e230	e200	214	422	686	466	503	173
8	345	352	e300	e290	e220	e200	212	477	949	477	512	173
9	327	336	e310	e270	e220	e210	207	394	1140	514	570	181
10	314	322	e310	e250	e220	e230	206	382	1190	486	515	192
11	296	313	e300	e230	e230	e240	215	375	1150	426	487	193
12	285	308	e300	e240	e230	e250	224	345	1130	406	376	189
13	290	306	e310	e250	e240	e300	236	399	1020	367	339	209
14	299	306	335	e240	e220	e400	262	417	967	395	318	219
15	314	305	317	e250	e230	e500	286	391	856	402	296	241
16	338	299	308	e250	e230	418	276	337	788	420	278	275
17	333	291	303	e250	e230	323	264	348	647	382	281	364
18	326	286	290	e260	e220	277	258	412	610	374	272	318
19	317	288	e280	e270	e210	256	259	438	573	376	235	300
20	314	291	e260	e250	e210	235	268	315	829	369	221	293
21	312	289	e250	e230	e200	226	278	262	1000	389	202	276
22	315	295	e250	e230	e190	218	279	212	755	381	203	274
23	318	288	e240	e240	e180	213	275	232	772	386	196	269
24	317	296	e240	e250	e180	212	260	205	670	412	202	259
25	318	262	e250	e220	e200	203	296	179	714	427	197	251
26	338	e270	e270	e240	e230	192	322	1190	673	426	189	238
27	336	339	e280	e250	e220	197	586	3180	585	482	183	238
28	336	336	e280	e240	e230	203	993	2860	524	465	194	239
29	326	315	e270	e240	---	196	1010	2770	425	413	204	235
30	e300	302	e270	e240	---	192	865	3220	508	451	211	233
31	e280	---	e270	e250	---	193	---	3510	---	493	211	---
TOTAL	10244	9413	8855	7960	6200	7664	9889	25982	28972	12620	10031	7031
MEAN	330	314	286	257	221	247	330	838	966	407	324	234
MAX	392	376	335	300	250	500	1010	3510	2480	514	570	364
MIN	280	262	240	220	180	192	195	179	425	293	183	173
AC-FT	20320	18670	17560	15790	12300	15200	19610	51540	57470	25030	19900	13950

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1934 - 2003, BY WATER YEAR (WY)

MEAN	381	339	301	256	265	325	499	1570	2538	782	562	441
MAX	779	908	896	656	601	868	3000	4333	8014	2508	1025	1040
(WY)	1952	1990	1996	1986	1986	1969	1934	1976	1964	1975	1975	1993
MIN	143	149	114	66.5	82.4	133	93.3	87.1	280	265	250	164
(WY)	1937	1937	1936	1937	1936	1941	1941	1941	1941	1939	1940	1936



SUN RIVER BASIN

06089000 SUN RIVER NEAR VAUGHN, MT--Continued

SUMMARY STATISTICS	FOR 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1934 - 2003	
ANNUAL TOTAL	207200		144861			
ANNUAL MEAN	568		397		683	
HIGHEST ANNUAL MEAN					1307 1943	
LOWEST ANNUAL MEAN					210 1941	
HIGHEST DAILY MEAN	5360	Jun 11	3510	May 31	37000	Jun 10 1964
LOWEST DAILY MEAN	69	May 5	173	Sep 7	23	May 26 1941
ANNUAL SEVEN-DAY MINIMUM	89	Apr 30	183	Sep 5	38	May 21 1941
MAXIMUM PEAK FLOW			3620	May 27	b53500	Jun 9 1964
MAXIMUM PEAK STAGE			4.21	May 27	c23.40	Jun 9 1964
INSTANTANEOUS LOW FLOW			a160	May 26	d20	Apr 24 1944
ANNUAL RUNOFF (AC-FT)	411000		287300		494600	
10 PERCENT EXCEEDS	829		578		1380	
50 PERCENT EXCEEDS	304		293		360	
90 PERCENT EXCEEDS	160		206		179	

a--Gage height, 1.94 ft.  
 b--42,200 ft<sup>3</sup>/s in main channel, plus 11,300 ft<sup>3</sup>/s in bypass channel.  
 c--From floodmark.  
 d--Gage height, 0.52 ft, result of irrigation.  
 e--Estimated.

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1969 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: October 1968 to September 2003 (discontinued).

WATER TEMPERATURE: October 1968 to September 1979, August 1999 to current year.

INSTRUMENTATION.--Temperature recorder installed Aug. 24, 1999. Specific conductance probe installed Sept. 18, 2001, discontinued September 30, 2003.

REMARKS.--Daily water temperature record good. Daily specific conductance record fair. Missing specific conductance data for March 27 to April 10, May 31 to June 17, and Sept. 12-14 are due to equipment problems. Unpublished records of instantaneous water temperature and specific conductance are available in files of District office.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: Maximum daily, 2,610 microsiemens per centimeter (µS/cm), Apr. 8, 1977; minimum daily, 214 µS/cm, June 8, 1970.

WATER TEMPERATURE: Maximum daily, 29.5°C, July 14, 18, 2002; minimum daily, 0.0°C on many days during winter.

EXTREMES FOR CURRENT YEAR.--

SPECIFIC CONDUCTANCE: Maximum daily, 873 microsiemens per centimeter (µS/cm), Dec. 24; minimum daily, 287 µS/cm, May 19.

WATER TEMPERATURE: Maximum daily, 25.0°C, July 17-19, 22; minimum daily, 0.0°C on many days October through March.

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

Date	Time	Instantaneous discharge, cfs (00061)	pH, water, unfltrd field, std units (00400)	Specific conductance, wat unfltrd uS/cm 25 degC (00095)	Temperature, air, deg C (00020)	Temperature, water, deg C (00010)	Ammonia + org-N, water, unfltrd mg/L as N (00625)	Ammonia + nitrate, water, fltrd, mg/L as N (00608)	Nitrite + nitrate, water, fltrd, mg/L as N (00631)	Nitrite, water, fltrd, mg/L as N (00613)
NOV 2002										
15...	1300	304	8.6	732	11.0	4.0	.12	E.014	1.12	.005
JAN 2003										
15...	1440	E250	8.3	693	5.0	0.0	.15	E.010	1.05	.005
MAR										
12...	1530	E250	7.9	672	10.5	0.0	.41	.020	3.80	.014
APR										
10...	1240	204	8.5	690	16.0	12.5	.29	.024	.244	.003
MAY										
29...	1330	2720	8.3	317	30.0	17.0	.39	E.010	.034	E.002
JUN										
17...	1730	582	8.4	498	28.0	22.0	.44	<.015	.303	.005
JUL										
17...	0815	369	8.6	648	28.0	22.5	.55	.016	.661	.007
AUG										
19...	1315	228	8.4	727	27.0	23.0	.42	.018	.440	.005
SEP										
10...	1230	192	8.6	805	21.0	16.0	.43	.016	.342	.004

E--Estimated.

## SUN RIVER BASIN

06089000 SUN RIVER NEAR VAUGHN, MT--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003--Continued

Date	Ortho-phosphate, water, fltrd, mg/L as P (00671)	Phosphorus, water, unfltrd mg/L (00665)	Selenium, water, unfltrd ug/L (01147)	Suspnd. sediment, sieve diametr percent <.063mm (70331)	Suspended sediment concentration mg/L (80154)	Suspended sediment load, tons/d (80155)
NOV 2002						
15...	<.007	.007	1.0	66	41	34
JAN 2003						
15...	<.007	.007	1.0	83	9	E6.1
MAR						
12...	<.007	.022	3.0	65	8	E5.4
APR						
10...	<.007	.027	.8	91	29	16
MAY						
29...	<.007	.158	E.4	61	282	2070
JUN						
17...	.007	.080	.7	99	54	85
JUL						
17...	.024	.093	1.4	96	51	51
AUG						
19...	<.007	.045	1.3	95	59	36
SEP						
10...	E.004	.034	1.0	82	49	25

Date	Time	Hardness, water, unfltrd mg/L as CaCO3 (00900)	Calcium water, fltrd, mg/L (00915)	Magnesium, water, fltrd, mg/L (00925)	Potassium, water, fltrd, mg/L (00935)	Sodium adsorption ratio (00931)	Sodium, water, fltrd, mg/L (00930)	Alkalinity, wat flt fxd end lab, mg/L as CaCO3 (29801)	Chloride, water, fltrd, mg/L (00940)	Fluoride, water, fltrd, mg/L (00950)	Silica, water, fltrd, mg/L (00955)
APR 2003											
10...	1240	310	63.7	37.6	1.76	.9	34.8	211	3.01	.40	2.70
JUN											
17...	1730	220	48.5	24.9	1.70	.6	19.7	180	2.70	.36	4.75

Date	Sulfate water, fltrd, mg/L (00945)	Residue water, sum of constituents mg/L (70301)	Residue water, fltrd, tons/ acre-ft (70303)	Residue water, fltrd, tons/d (70302)	Arsenic water, unfltrd ug/L (01002)	Cadmium water, unfltrd ug/L (01027)	Chromium, unfltrd recover -able, ug/L (01034)	Copper, water, unfltrd recover -able, ug/L (01042)	Lead, water, unfltrd recover -able, ug/L (01051)	Nickel, water, unfltrd recover -able, ug/L (01067)	Zinc, water, unfltrd recover -able, ug/L (01092)
APR 2003											
10...	159	431	.59	237	E2	<.2	<.8	3.0	.37	3.22	3
JUN											
17...	77.3	289	.39	454	2	<.2	<.8	2.7	.95	3.08	6

E--Estimated.

SUN RIVER BASIN

06089000 SUN RIVER NEAR VAUGHN, MT--Continued

SPECIFIC CONDUCTANCE, µS/CM, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	738	831	706	686	577	664	---	346	---	584	639	789
2	745	821	706	690	570	664	---	398	---	627	636	795
3	743	781	707	675	572	665	---	424	---	630	644	794
4	735	731	708	674	575	666	---	397	---	629	646	787
5	722	712	709	667	578	668	---	409	---	611	631	794
6	723	698	712	668	580	668	---	401	---	631	635	804
7	714	705	739	669	582	669	---	372	---	644	634	820
8	718	744	725	672	585	669	---	370	---	623	650	822
9	714	767	723	673	587	670	---	335	---	621	654	821
10	719	760	727	672	599	671	---	342	---	640	647	811
11	741	753	721	684	605	672	661	340	---	621	643	779
12	742	744	722	725	607	672	637	352	---	627	663	---
13	762	739	718	765	609	666	626	365	---	654	672	---
14	784	740	697	735	607	655	622	354	---	640	690	---
15	782	741	694	705	608	566	618	332	---	631	716	810
16	741	741	699	704	607	507	653	321	---	640	726	784
17	723	742	704	710	605	476	648	316	---	645	735	772
18	731	745	709	718	607	489	623	311	515	646	734	777
19	733	745	725	712	609	495	595	287	524	638	724	782
20	728	747	741	677	610	466	602	297	549	651	731	786
21	726	752	765	657	615	442	573	337	602	648	749	769
22	725	751	789	657	623	366	543	352	576	652	773	756
23	727	749	830	659	635	384	532	364	588	658	796	742
24	734	751	873	663	643	452	531	364	590	652	806	731
25	745	731	846	665	649	436	486	374	550	646	810	727
26	758	709	830	668	652	433	463	390	550	657	803	724
27	771	707	831	671	656	---	446	323	558	651	794	729
28	766	706	794	638	662	---	338	307	572	642	799	722
29	758	705	694	622	---	---	309	318	586	659	797	715
30	745	706	681	623	---	---	316	312	595	674	785	719
31	779	---	684	621	---	---	---	---	---	654	777	---
MEAN	741	742	739	678	608	---	---	---	---	640	714	---
MAX	784	831	873	765	662	---	---	---	---	674	810	---
MIN	714	698	681	621	570	---	---	---	---	584	631	---

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
1	13.5	13.5	10.0	0.0	0.0	0.0	2.5	2.5	2.0	0.0	0.0	0.0
2	12.5	12.5	8.5	0.0	0.0	0.0	2.5	2.5	2.0	0.0	0.0	0.0
3	9.0	9.0	8.0	0.0	0.0	0.0	2.0	2.0	0.5	0.0	0.0	0.0
4	10.5	10.5	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	10.5	10.5	7.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	12.0	12.0	8.5	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	14.0	14.0	10.0	3.0	3.0	1.5	0.0	0.0	0.0	0.0	0.0	0.0
8	14.0	14.0	10.5	3.0	3.0	2.5	0.0	0.0	0.0	0.0	0.0	0.0
9	14.0	14.0	10.5	3.0	3.0	2.5	0.0	0.0	0.0	0.0	0.0	0.0
10	14.0	14.0	9.5	2.5	2.5	2.0	0.0	0.0	0.0	0.0	0.0	0.0
11	10.5	10.5	7.5	2.5	2.5	2.0	0.0	0.0	0.0	0.0	0.0	0.0
12	10.5	10.5	6.0	2.5	2.5	2.0	0.0	0.0	0.0	0.0	0.0	0.0
13	11.5	11.5	6.5	4.0	4.0	3.5	0.0	0.0	0.0	0.0	0.0	0.0
14	11.5	11.5	6.5	4.0	4.0	3.5	1.5	1.5	0.5	0.0	0.0	0.0
15	11.5	11.5	6.5	4.0	4.0	3.5	2.5	2.5	2.0	0.0	0.0	0.0
16	9.0	9.0	7.0	3.5	3.5	3.0	2.0	2.0	1.5	0.0	0.0	0.0
17	8.0	8.0	7.5	3.5	3.5	3.0	1.5	1.5	1.0	0.0	0.0	0.0
18	9.0	9.0	8.0	2.5	2.5	2.0	0.0	0.0	0.0	0.0	0.0	0.0
19	8.5	8.5	8.0	3.5	3.5	2.5	0.0	0.0	0.0	0.0	0.0	0.0
20	9.0	9.0	8.5	5.5	5.5	4.5	0.0	0.0	0.0	0.0	0.0	0.0
21	9.5	9.5	9.0	6.0	6.0	5.5	0.0	0.0	0.0	0.0	0.0	0.0
22	8.0	8.0	6.5	6.0	6.0	6.0	0.0	0.0	0.0	0.0	0.0	0.0
23	5.0	5.0	4.0	5.5	5.5	5.0	0.0	0.0	0.0	0.0	0.0	0.0
24	3.5	3.5	3.0	3.5	3.5	2.0	0.0	0.0	0.0	0.0	0.0	0.0
25	3.5	3.5	3.0	0.5	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0
26	3.0	3.0	3.0	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
27	3.5	3.5	3.0	2.0	2.0	1.5	0.0	0.0	0.0	0.0	0.0	0.0
28	3.5	3.5	3.0	3.0	3.0	2.5	0.0	0.0	0.0	0.0	0.0	0.0
29	2.0	2.0	0.5	3.5	3.5	3.5	0.0	0.0	0.0	0.0	0.0	0.0
30	0.0	0.0	0.0	3.0	3.0	2.5	0.0	0.0	0.0	0.0	0.0	0.0
31	0.0	0.0	0.0	---	---	---	0.0	0.0	0.0	0.0	0.0	0.0
MONTH	14.0	0.0	6.5	6.0	0.0	2.0	2.5	0.0	0.5	0.0	0.0	0.0

## SUN RIVER BASIN

## 06089000 SUN RIVER NEAR VAUGHN, MT--Continued

## WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003--Continued

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	FEBRUARY			MARCH			APRIL			MAY		
1	0.0	0.0	0.0	0.0	0.0	0.0	11.0	11.0	9.5	11.0	11.0	9.0
2	0.0	0.0	0.0	0.0	0.0	0.0	8.5	8.5	7.5	13.0	13.0	11.5
3	0.0	0.0	0.0	0.0	0.0	0.0	6.5	6.5	5.0	13.0	13.0	12.0
4	0.0	0.0	0.0	0.0	0.0	0.0	7.0	7.0	5.5	12.0	12.0	9.5
5	0.0	0.0	0.0	0.0	0.0	0.0	8.5	8.5	6.5	9.0	9.0	8.0
6	0.0	0.0	0.0	0.0	0.0	0.0	9.5	9.5	7.5	11.0	11.0	9.5
7	0.0	0.0	0.0	0.0	0.0	0.0	9.0	9.0	7.5	12.0	12.0	11.0
8	0.0	0.0	0.0	0.0	0.0	0.0	10.5	10.5	8.5	11.5	11.5	10.0
9	0.0	0.0	0.0	0.0	0.0	0.0	13.0	13.0	11.0	8.5	8.5	8.0
10	0.0	0.0	0.0	0.0	0.0	0.0	14.0	14.0	11.5	9.5	9.5	8.5
11	0.0	0.0	0.0	0.0	0.0	0.0	15.5	15.5	13.0	12.0	12.0	10.0
12	0.0	0.0	0.0	0.0	0.0	0.0	15.5	15.5	13.0	14.5	14.5	13.0
13	0.0	0.0	0.0	0.0	0.0	0.0	15.5	15.5	13.5	14.5	14.5	13.5
14	0.0	0.0	0.0	0.0	0.0	0.0	14.5	14.5	13.0	16.0	16.0	14.5
15	0.0	0.0	0.0	2.0	2.0	0.5	12.5	12.5	12.0	16.5	16.5	15.5
16	0.0	0.0	0.0	4.0	4.0	3.5	12.0	12.0	11.0	15.5	15.5	13.5
17	0.0	0.0	0.0	5.5	5.5	4.5	12.5	12.5	11.0	13.5	13.5	11.5
18	0.5	0.5	0.0	5.5	5.5	4.5	11.0	11.0	11.0	11.0	11.0	9.0
19	0.5	0.5	0.0	6.5	6.5	4.5	13.5	13.5	11.5	11.0	11.0	9.0
20	0.5	0.5	0.0	7.0	7.0	5.5	14.5	14.5	13.0	14.0	14.0	12.0
21	0.0	0.0	0.0	6.5	6.5	5.5	15.5	15.5	14.0	16.0	16.0	14.0
22	0.0	0.0	0.0	8.5	8.5	6.5	16.5	16.5	15.0	16.5	16.5	15.0
23	0.0	0.0	0.0	9.0	9.0	7.0	18.5	18.5	16.5	17.0	17.0	16.0
24	0.0	0.0	0.0	6.0	6.0	5.0	17.5	17.5	16.0	20.0	20.0	17.5
25	0.0	0.0	0.0	6.0	6.0	4.5	16.5	16.5	15.5	22.5	22.5	20.0
26	0.0	0.0	0.0	7.5	7.5	5.5	14.0	14.0	12.5	20.5	20.5	18.5
27	0.0	0.0	0.0	6.5	6.5	5.5	12.0	12.0	11.0	14.5	14.5	13.0
28	0.0	0.0	0.0	7.0	7.0	5.0	10.5	10.5	9.0	15.0	15.0	14.0
29	---	---	---	8.0	8.0	6.0	7.5	7.5	7.0	16.0	16.0	15.0
30	---	---	---	10.0	10.0	7.5	8.5	8.5	7.0	15.5	15.5	14.0
31	---	---	---	12.0	12.0	10.0	---	---	---	13.5	13.5	12.5
MONTH	0.5	0.0	0.0	12.0	0.0	3.0	18.5	6.5	11.0	22.5	8.5	12.5
	JUNE			JULY			AUGUST			SEPTEMBER		
1	13.5	13.5	12.5	24.5	24.5	22.5	22.5	22.5	21.0	20.5	20.5	18.5
2	13.5	13.5	13.5	23.0	23.0	21.5	23.5	23.5	21.5	20.0	20.0	18.5
3	14.0	14.0	13.0	21.0	21.0	19.5	23.0	23.0	22.0	20.5	20.5	19.0
4	13.5	13.5	12.5	20.5	20.5	19.0	21.5	21.5	20.5	21.0	21.0	19.0
5	13.0	13.0	12.0	20.5	20.5	19.0	21.0	21.0	20.0	21.0	21.0	19.5
6	14.0	14.0	13.0	21.0	21.0	19.0	21.5	21.5	20.0	20.5	20.5	19.5
7	15.0	15.0	13.5	21.5	21.5	19.5	21.5	21.5	20.0	20.5	20.5	19.5
8	16.0	16.0	15.0	20.5	20.5	19.0	22.5	22.5	21.0	19.5	19.5	18.5
9	15.5	15.5	15.0	21.0	21.0	19.0	23.0	23.0	21.5	17.0	17.0	15.5
10	16.0	16.0	15.0	22.5	22.5	20.5	23.5	23.5	22.5	16.5	16.5	15.0
11	16.5	16.5	15.5	23.0	23.0	21.5	23.0	23.0	22.0	15.5	15.5	14.5
12	17.5	17.5	16.5	24.0	24.0	22.5	21.5	21.5	20.5	14.5	14.5	13.0
13	17.5	17.5	17.0	24.0	24.0	22.0	23.0	23.0	21.0	14.5	14.5	13.0
14	17.5	17.5	17.0	21.5	21.5	20.0	24.0	24.0	22.5	15.0	15.0	13.0
15	19.5	19.5	18.0	23.0	23.0	21.0	24.0	24.0	22.5	13.5	13.5	13.0
16	20.0	20.0	19.5	24.5	24.5	22.0	22.5	22.5	21.5	12.5	12.5	11.0
17	22.0	22.0	20.5	25.0	25.0	23.0	22.0	22.0	20.5	9.5	9.5	9.0
18	22.5	22.5	21.5	25.0	25.0	23.5	22.5	22.5	21.0	9.5	9.5	9.0
19	23.0	23.0	21.5	25.0	25.0	23.0	23.5	23.5	22.0	11.5	11.5	10.0
20	20.5	20.5	19.5	24.5	24.5	22.5	23.0	23.0	22.0	13.5	13.5	12.0
21	18.0	18.0	16.5	24.5	24.5	22.5	23.0	23.0	21.5	13.0	13.0	12.0
22	16.0	16.0	15.0	25.0	25.0	23.0	22.0	22.0	21.0	13.5	13.5	12.0
23	15.5	15.5	15.0	24.5	24.5	23.0	21.0	21.0	20.0	12.5	12.5	12.0
24	16.0	16.0	15.5	22.5	22.5	21.5	21.0	21.0	19.5	13.0	13.0	11.5
25	16.5	16.5	15.0	20.0	20.0	19.0	22.0	22.0	20.0	13.5	13.5	12.5
26	19.0	19.0	17.5	21.5	21.5	19.5	21.5	21.5	20.5	16.0	16.0	14.0
27	20.0	20.0	19.0	23.5	23.5	21.5	21.0	21.0	20.0	15.5	15.5	14.0
28	21.5	21.5	20.0	23.5	23.5	22.0	20.0	20.0	18.5	14.5	14.5	13.5
29	22.5	22.5	21.0	23.5	23.5	22.0	19.0	19.0	17.5	13.5	13.5	13.0
30	23.5	23.5	22.0	23.5	23.5	22.0	19.5	19.5	18.0	13.0	13.0	12.0
31	---	---	---	22.5	22.5	21.5	20.0	20.0	18.0	---	---	---
MONTH	23.5	13.0	16.5	25.0	20.0	21.0	24.0	19.0	20.5	21.0	9.5	14.0

MISSOURI RIVER MAIN STEM

06090300 MISSOURI RIVER NEAR GREAT FALLS, MT

LOCATION.--Lat 47°35'04", long 111°03'35" (NAD 27), in SW 1/4 SE 1/4 SW 1/4 sec.11, T.21 N., R.5 E., Cascade County, Hydrologic Unit 10030102, on left bank 700 ft downstream from Morony Dam, 12.6 mi northeast of Great Falls, and at river mile 2,105.4.

DRAINAGE AREA.--23,292 mi<sup>2</sup>.

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

GAGE.--Water-stage recorder. Elevation of gage is 2,807.21 ft (NGVD 29). Prior to July 27, 1977, nonrecording gage at same site at elevation 2.00 ft higher. July 27, 1977 to May 26, 1987, at site 600 ft upstream at elevation 2.00 ft higher. October 1971 to July 27, 1977, discharges were obtained from the Montana Power Company at Rainbow Dam 7.05 mi upstream. Prior to October 1971, Foxboro meters were used for determining discharge through powerplant. Water-stage recorder on Morony Reservoir was used for determining head on taintor gates with elevation of gage at sea level (level by Montana Power Company).

REMARKS.--Records good. Flow regulated by 18 smaller irrigation reservoirs and powerplants upstream, Clark Canyon Reservoir (station number 06015300), and Canyon Ferry Lake (station number 06058500). Diversion for irrigation of about 750,400 acres upstream from station. U.S. Geological Survey satellite telemeter at station. Several observations of water temperature and specific conductance were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003 DAILY MEAN VALUES

Table with 13 columns (DAY, OCT, NOV, DEC, JAN, FEB, MAR, APR, MAY, JUN, JUL, AUG, SEP) and 31 rows of daily mean discharge data, plus summary rows for TOTAL, MEAN, MAX, MIN, and AC-FT.

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1957 - 2003, BY WATER YEAR (WY)

Table with 13 columns (MEAN, MAX, MIN, WY) and 13 rows of monthly mean discharge statistics for water years 1957 through 2003.

SUMMARY STATISTICS FOR 2002 CALENDAR YEAR FOR 2003 WATER YEAR WATER YEARS 1957 - 2003

Summary statistics table with 4 columns: 2002 Calendar Year, 2003 Water Year, and Water Years 1957-2003. Rows include Annual Total, Annual Mean, Highest/Lowest Annual Mean, Highest/Lowest Daily Mean, Annual Seven-Day Minimum, Maximum Peak Flow, Maximum Peak Stage, Instantaneous Low Flow, Annual Runoff (AC-FT), and 10/50/90 Percent Exceeds.

a--From hydrographic comparison with nearby stations.
b--Site and datum then in use.
c--About, powerplant shutdown.

MISSOURI RIVER BASIN

06090650 LAKE CREEK NEAR POWER, MT

LOCATION.--Lat 47°41'55", long 111°23'23" (NAD 27), in SE<sup>1</sup>/<sub>4</sub>SE<sup>1</sup>/<sub>4</sub>SE<sup>1</sup>/<sub>4</sub> sec.31, T.23 N., R.3 E., Chouteau County, Hydrologic Unit 10030102, on left bank 1.9 mi downstream from county bridge, 1.5 mi upstream from Benton Lake, and 14 mi east of Power.

DRAINAGE AREA.--83.8 mi<sup>2</sup>, of which 11.4 mi<sup>2</sup> is noncontributing.

PERIOD OF RECORD.--July 1990 to current year (seasonal records only).

GAGE.--Water-stage recorder. Parshall flume since Apr. 1, 1997. Prior to Apr. 1, 1997 water-stage recorder located at site 1.9 mi upstream. Elevation of gage is 3,620 ft (NGVD 29).

REMARKS.--Seasonal records fair. Seasonal flows from Muddy Creek diverted into Lake Creek, most years. U. S. Geological Survey satellite telemeter at station. Several observations of water temperature and specific conductance were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 2003  
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1				0.00	0.00	33	0.04	0.00	9.3	9.6		
2				0.00	0.00	32	0.00	7.8	11	9.4		
3				0.00	0.00	26	0.00	23	7.9	9.5		
4				0.00	0.00	24	0.00	26	10	9.7		
5				0.00	0.04	33	0.00	28	16	9.5		
6				0.00	0.06	32	0.00	30	11	9.7		
7				0.00	0.01	31	0.00	31	9.6	10		
8				0.00	0.00	31	0.00	32	10	11		
9				0.00	0.00	30	0.00	32	10	11		
10				0.00	0.00	26	0.00	32	10	11		
11				0.00	0.00	21	0.00	33	11	12		
12				0.00	0.00	26	0.00	33	12	12		
13				0.01	0.00	25	0.00	34	12	12		
14				0.06	0.00	3.7	0.00	27	13	12		
15				0.06	0.00	0.18	0.00	26	13	12		
16				0.06	0.00	0.02	0.00	26	15	13		
17				0.06	0.00	0.00	0.00	26	15	13		
18				0.04	0.00	0.00	0.00	26	13	13		
19				0.01	0.00	0.00	0.00	26	13	14		
20				0.00	0.00	0.00	0.00	26	11	14		
21				0.00	0.00	0.50	0.00	26	12	14		
22				0.00	2.2	0.39	0.00	26	13	14		
23				0.00	8.8	0.21	0.00	23	12	14		
24				0.00	31	0.12	0.00	22	11	14		
25				0.00	31	0.10	0.00	22	11	14		
26				0.00	13	0.08	0.00	18	10	14		
27				0.00	12	0.09	0.00	9.6	10	14		
28				0.00	19	0.11	0.00	13	9.3	2.8		
29				0.00	29	0.11	0.00	10	9.1	0.24		
30				0.00	19	0.07	0.00	9.4	9.4	0.03		
31				---	32	---	0.00	8.9	---	0.05		
TOTAL				0.30	197.11	375.68	0.04	712.70	339.6	328.52		
MEAN				0.010	6.36	12.5	0.001	23.0	11.3	10.6		
MAX				0.06	32	33	0.04	34	16	14		
MIN				0.00	0.00	0.00	0.00	0.00	7.9	0.03		
AC-FT				0.6	391	745	0.08	1410	674	652		

STATISTICS OF MONTHLY MEAN DATA FOR SEASONS 1990 - 2003

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
MEAN	3.64	3.27	13.6	13.4	1.38	12.0	25.4	16.46						
MAX	24.8	8.56	30.9	29.8	9.51	35.5	38.1	30.1						
(WY)	1993	1993	1992	1991	1993	1990	1990	2000						
MIN	0.055	0.010	0.49	1.05	0.000	0.35	11.3	0.03						
(WY)	2000	2003	1993	1999	1992	2002	2003	2003						

SUMMARY STATISTICS

FOR 2003 SEASON

SEASONS 1990 - 2003

HIGHEST DAILY MEAN	34	Aug 13	300	Mar 6 1993
LOWEST DAILY MEAN	.00	many days	0.00	Jul 1 1990
MAXIMUM PEAK FLOW	35	Aug 13	a300	Mar 6 1993
MAXIMUM PEAK STAGE	1.85	Aug 13	b7.30	Mar 6 1993

a--Estimated daily discharge during period of ice effect.  
b--From floodmarks, site and datum then in use.

MISSOURI RIVER MAIN STEM

06090800 MISSOURI RIVER AT FORT BENTON, MT

LOCATION.--Lat 47°49'03", long 110°39'59" (NAD 27), in NW 1/4 SE 1/4 sec.23, T.24 N., R.8 E., Chouteau County, Hydrologic Unit 10030102, on left bank at downstream side of Old Fort Benton Bridge at Fort Benton, 3.8 mi upstream from Shonkin Creek, and at river mile 2,073.2.

DRAINAGE AREA.--24,749 mi<sup>2</sup>.

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.

REVISED RECORDS.--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.

GAGE.--Water-stage recorder. Elevation of gage is 2,614.05 ft (NGVD 1929). Prior to Oct. 11, 1920, nonrecording gages, and Oct. 11, 1920, to Apr. 25, 1924, water-stage recorder, all at present site at elevation 1.00 ft higher.

REMARKS.--Records good except those for estimated daily discharges, which are fair. Flow regulated by 18 smaller irrigation reservoirs and powerplants, Clark Canyon Reservoir (station number 06015300), and Canyon Ferry Lake (station number 06058500). Diversions for irrigation of about 751,000 acres upstream from station. Extreme diurnal fluctuation caused by powerplant at Morony Dam. Bureau of Reclamation satellite telemeter at station. Several observations of water temperature and specific conductance were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003 DAILY MEAN VALUES

Table with 13 columns: DAY, OCT, NOV, DEC, JAN, FEB, MAR, APR, MAY, JUN, JUL, AUG, SEP. Rows 1-31 show daily mean discharge values. Summary rows include TOTAL, MEAN, MAX, MIN, and AC-FT.

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1891 - 2003, BY WATER YEAR (WY)

Table with 13 columns: MEAN, MAX, (WY), MIN, (WY). Rows show monthly mean data for water years 1891 through 1934.

Table with 4 columns: SUMMARY STATISTICS, FOR 2002 CALENDAR YEAR, FOR 2003 WATER YEAR, WATER YEARS 1891 - 2003. Rows include ANNUAL TOTAL, ANNUAL MEAN, HIGHEST ANNUAL MEAN, LOWEST ANNUAL MEAN, HIGHEST DAILY MEAN, LOWEST DAILY MEAN, ANNUAL SEVEN-DAY MINIMUM, MAXIMUM PEAK FLOW, MAXIMUM PEAK STAGE, INSTANTANEOUS LOW FLOW, ANNUAL RUNOFF (AC-FT), 10 PERCENT EXCEEDS, 50 PERCENT EXCEEDS, 90 PERCENT EXCEEDS.

a--Gage height, 4.72 ft.

b--Backwater from ice.

c--About, observed, from rating table extended above 63,000 ft<sup>3</sup>/s.

d--Present datum.

e--Estimated.

f--Gage height, -0.05 ft.

MARIAS RIVER BASIN

06091700 TWO MEDICINE RIVER BELOW SOUTH FORK, NEAR BROWNING, MT

LOCATION.--Lat 48°25'36", long 112°59'20" (NAD 27), in SE<sup>1</sup>/<sub>4</sub>SE<sup>1</sup>/<sub>4</sub>SE<sup>1</sup>/<sub>4</sub> sec. 23, T.31 N., R.11 W., Glacier County, Hydrologic Unit 10030201, Blackfoot Indian Reservation, on left bank 15 ft downstream from bridge on Blackfoot Secondary Highway No. 1, 9.7 mi south of Browning, and 12.3 mi northwest of Heart Butte.

DRAINAGE AREA.--250 mi<sup>2</sup>.

PERIOD OF RECORD.--May 1977 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 4,180 ft (NGVD 29). May 1977 to September 1997 at elevation 1.00 ft higher.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Flow regulated by Lower Two Medicine Lake (station number 06090900). Diversions for irrigation of about 64 acres upstream from station. Bureau of Reclamation satellite telemeter at station. Several observations of water discharge and specific conductance were made during the year.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum discharge, 100,000 ft<sup>3</sup>/s, June 8, 1964, as determined at Two Medicine River near Browning (station number 06092000) located about 10 mi downstream.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	71	e33	e40	e40	e45	e32	893	844	1630	330	209	94
2	68	e35	e35	e43	e43	e35	576	843	1540	322	206	91
3	68	e35	e30	e45	e40	e32	412	876	1300	292	206	87
4	68	e35	e25	e45	e40	e30	330	861	1170	291	203	75
5	71	e37	e28	e45	e37	e30	273	771	1080	256	203	72
6	78	e40	e30	e48	e35	e27	235	691	940	238	201	61
7	81	e42	e30	e50	e37	e25	212	645	895	246	197	58
8	84	e45	e30	e45	e38	e25	229	596	886	240	191	59
9	78	e48	e32	e40	e40	e30	349	515	942	235	187	60
10	75	50	e35	e35	e40	e35	468	507	850	237	180	53
11	76	52	e35	e37	e42	e40	570	505	791	276	177	43
12	75	49	e35	e40	e43	e100	645	521	840	269	176	50
13	74	56	e37	e38	e45	e500	828	556	846	259	170	49
14	75	53	e40	e35	e40	e1200	796	641	808	256	154	38
15	73	48	e40	e35	e45	487	789	794	772	253	140	36
16	72	45	e38	e35	e45	369	763	762	725	250	139	39
17	71	47	e35	e37	e45	269	818	630	675	244	137	44
18	71	42	e30	e40	e45	205	796	587	661	240	135	39
19	69	46	e27	e45	e45	162	780	537	697	239	133	38
20	69	50	e25	e40	e40	150	777	512	726	244	131	42
21	69	56	e25	e30	e30	149	818	520	677	242	129	42
22	70	58	e25	e25	e25	165	901	536	610	239	126	37
23	62	60	e25	e28	e20	283	1000	636	506	232	123	35
24	55	e30	e25	e30	e22	195	1070	839	448	227	122	35
25	51	e28	e27	e25	e25	153	1160	1110	401	229	120	33
26	51	e30	e30	e30	e30	133	1010	1570	379	228	118	32
27	51	e35	e30	e40	e33	122	877	1280	317	223	113	31
28	49	e40	e32	e45	e35	109	775	1190	220	219	114	33
29	38	e45	e35	e43	---	104	777	1230	307	217	111	31
30	e32	e43	e35	e42	---	141	812	1500	336	214	98	32
31	e30	---	e37	e45	---	870	---	1760	---	212	95	---
TOTAL	2025	1313	983	1201	1050	6207	20739	25365	22975	7699	4744	1469
MEAN	65.3	43.8	31.7	38.7	37.5	200	691	818	766	248	153	49.0
MAX	84	60	40	50	45	1200	1160	1760	1630	330	209	94
MIN	30	28	25	25	20	25	212	505	220	212	95	31
AC-FT	4020	2600	1950	2380	2080	12310	41140	50310	45570	15270	9410	2910
*	0	0	0	0	0	0	0	0	3160	9580	7740	2210

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1977 - 2003, BY WATER YEAR (WY)

	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	
MEAN	95.4	128	78.1	60.8	90.5	146	501	1171	1056	362	161	102																
MAX	533	558	394	180	394	474	923	2040	2922	656	265	240																
(WY)	1986	1996	1996	1981	1996	1986	1990	1991	2002	2002	2002	1985																
MIN	25.0	18.8	19.7	17.9	26.4	40.5	140	439	282	173	41.2	24.4																
(WY)	1980	1980	1999	1982	1980	1980	2001	1977	1977	1994	1994	1988																

SUMMARY STATISTICS FOR 2002 CALENDAR YEAR FOR 2003 WATER YEAR WATER YEARS 1977 - 2003

ANNUAL TOTAL	187907	95770																											
ANNUAL MEAN	515	262								335																			
HIGHEST ANNUAL MEAN										542																			1991
LOWEST ANNUAL MEAN										199																			2001
HIGHEST DAILY MEAN		4430			Jun 16		1760	May 31		8600																			Jun 7 1995
LOWEST DAILY MEAN		20			Jan 28		20	Feb 23		10																			Jan 29 1980
ANNUAL SEVEN-DAY MINIMUM		26			Dec 19		26	Dec 19		13																			Feb 3 1982
MAXIMUM PEAK FLOW							2020	May 31		a11700																			May 19 1991
MAXIMUM PEAK STAGE							4.62	May 31		b8.25																			Jun 7 1995
ANNUAL RUNOFF (AC-FT)		372700					190000			242700																			
10 PERCENT EXCEEDS		2140					814			969																			
50 PERCENT EXCEEDS		90					75			120																			
90 PERCENT EXCEEDS		35					30			32																			

\*--Flows, in acre-ft, in Two Medicine Canal.  
a--Gage height, 7.78 ft, previous datum; from rating curve extended above 5,500 ft<sup>3</sup>/s.  
b--Previous datum.  
e--Estimated.



MARIAS RIVER BASIN

06093200 BADGER CREEK BELOW FOUR HORNS CANAL, NEAR BROWNING, MT

LOCATION.--Lat 48°22'12", long 112°48'07" (NAD 27), in NW¼SW¼SE¼ sec.8, T.30 N., R.9 W., Glacier County, Hydrologic Unit 10030201, Blackfeet Indian Reservation, on left bank, 3.4 mi downstream from point of diversion to Four Horns Canal, 15.5 mi southeast of Browning, and at river mile 11.6.

DRAINAGE AREA.--152 mi².

PERIOD OF RECORD.--October 1973 to current year. Records equivalent to those published as Badger Creek near Browning (station number 06092500) if diversion to Four Horns Canal is added to flow past station.

GAGE.--Water-stage recorder. Elevation of gage is 4,140 ft (NGVD 29). May 1951 to September 1973, water-stage recorder at site 3.4 mi upstream (station number 06092500) at different elevation.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Four Horns Canal diverts water from right bank in NE¼ sec.24, T.30 N., R.10 W., at diversion dam 3.4 mi upstream for irrigation of about 6,000 acres downstream from station. Recorded diversions by Four Horns Canal are listed in daily table below. Several observations of water temperature and specific conductance were made during the year. Bureau of Reclamation satellite telemeter at station.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum discharge, 49,700 ft³/s, June 8, 1964, gage height, 10.37 ft, from rating curve extended above 2,000 ft³/s on basis of slope-area measurement of peak flow, as determined at Badger Creek near Browning site (station number 06092500) 3.4 mi upstream.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003 DAILY MEAN VALUES

Table with 13 columns (DAY, OCT, NOV, DEC, JAN, FEB, MAR, APR, MAY, JUN, JUL, AUG, SEP) and 31 rows of daily mean discharge data. Includes summary rows for TOTAL, MEAN, MAX, MIN, and AC-FT.

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1974 - 2003, BY WATER YEAR (WY)

Table with 13 columns (MEAN, MAX, MIN, WY) and 4 rows of monthly mean discharge statistics for water years 1974 through 1977.

## MARIAS RIVER BASIN

## 06093200 BADGER CREEK BELOW FOUR HORNS CANAL, NEAR BROWNING, MT--Continued

SUMMARY STATISTICS	FOR 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1974 - 2003	
ANNUAL TOTAL	88033		51091			
ANNUAL MEAN	241		140*			
HIGHEST ANNUAL MEAN					177**	
LOWEST ANNUAL MEAN					350	1975
HIGHEST DAILY MEAN	2420	Jun 18	1260	May 26	68.1	1977
LOWEST DAILY MEAN	45	Jan 27	37	Sep 19	14000	Jun 19 1975
ANNUAL SEVEN-DAY MINIMUM	51	Jan 23	38	Sep 1	6.5	Sep 17 1984
MAXIMUM PEAK FLOW			1630	May 26	7.7	Oct 25 1977
MAXIMUM PEAK STAGE			7.39	May 26	a20700	Jun 19 1975
ANNUAL RUNOFF (AC-FT)	174600		101300		13.58	Jun 19 1975
10 PERCENT EXCEEDS	751		277		128400	
50 PERCENT EXCEEDS	100		99		397	
90 PERCENT EXCEEDS	60		45		97	
					42	

+--Diversion, in acre-feet, by Four Horns Canal.

\*--170 ft<sup>3</sup>/s, adjusted flow Four Horns Canal.

\*\*--217 ft<sup>3</sup>/s, adjusted flow Four Horns Canal.

a--From rating curve extended above 7,700 ft<sup>3</sup>/s, based on comparison with previous site 3.4 miles upstream.  
(station number 06092500).

e--Estimated.

MARIAS RIVER BASIN

06098500 CUT BANK CREEK NEAR BROWNING, MT

LOCATION--Lat 48°37'00", long 113°02'06" (NAD 27), in NE 1/4NW 1/4SW 1/4 sec. 15, T.33 N., R.11 W., Glacier County, Hydrologic Unit 10030202, Blackfeet Indian Reservation, on right bank 20 ft downstream from bridge on Montana Secondary Highway 464, 4.0 mile north of Browning, and at river mile 73.3.

DRAINAGE AREA--123 mi<sup>2</sup>.

PERIOD OF RECORD--April 1918 to October 1925 (seasonal records only), April 1991 to current year.

REVISED RECORDS--WDR MT-93-1: 1992(M).

GAGE--Water-stage recorder. Elevation of gage is 4,380 ft (NGVD 29). April 1918 to October 1925, water-stage recorder at site about 120 ft upstream at different elevation. April 1991 to September 1995 at elevation 1.00 ft higher.

REMARKS--Records good except those for estimated daily discharges, which are poor. Diversions for irrigation of about 1,200 acres upstream from station. Several observations of water temperature and specific conductance were made during the year. Bureau of Reclamation satellite telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003 DAILY MEAN VALUES

Table with columns: DAY, OCT, NOV, DEC, JAN, FEB, MAR, APR, MAY, JUN, JUL, AUG, SEP. Rows 1-31 showing daily discharge values and summary statistics (TOTAL, MEAN, MAX, MIN, AC-FT).

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1918 - 2003, BY WATER YEAR (WY)\*

Table with columns: MEAN, MAX (WY), MIN (WY) and rows for months OCT, NOV, DEC, JAN, FEB, MAR, APR, MAY, JUN, JUL, AUG, SEP.

SUMMARY STATISTICS FOR 2002 CALENDAR YEAR FOR 2003 WATER YEAR WATER YEARS 1918 - 2003\*

Table with columns: ANNUAL TOTAL, ANNUAL MEAN, HIGHEST ANNUAL MEAN, LOWEST ANNUAL MEAN, HIGHEST DAILY MEAN, LOWEST DAILY MEAN, ANNUAL SEVEN-DAY MINIMUM, MAXIMUM PEAK FLOW, MAXIMUM PEAK STAGE, INSTANTANEOUS LOW FLOW, ANNUAL RUNOFF (AC-FT), 10 PERCENT EXCEEDS, 50 PERCENT EXCEEDS, 90 PERCENT EXCEEDS.

\*--During periods of operation (April 1918 to October 1925, seasonal records only; April 1991 to current year). a--From rating curve extended above 2,500 ft<sup>3</sup>/s. b--Previous datum. c--Gage height, 0.60 ft, result of freezeup. e--Estimated.

MARIAS RIVER BASIN

06099000 CUT BANK CREEK AT CUT BANK, MT

LOCATION.--Lat 48°38'00", long 112°20'46" (NAD 27), in SW<sup>1</sup>/<sub>4</sub>SE<sup>1</sup>/<sub>4</sub>NE<sup>1</sup>/<sub>4</sub> sec.11, T.33 N., R.6 W., Glacier County, Hydrologic Unit 10030202, Blackfoot Indian Reservation, on right bank, 0.1 mi downstream from bridge on U.S. Highway 2, 0.7 mi west of Cut Bank, 0.8 mi downstream from Old Maids Coulee, and at river mile 17.7.

DRAINAGE AREA.--1,041 mi<sup>2</sup>.

PERIOD OF RECORD.--August 1905 to October 1919, May to July 1920, May 1922 to October 1924, May 1951 to September 1973, October 1981 to current year. Monthly discharge only for some periods, published in WSP 1309.

REVISED RECORDS.--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.

GAGE.--Water-stage recorder. Elevation of gage is 3,561.42 ft (NGVD 29). Prior to May 12, 1922, nonrecording gage at several sites 0.5 mi upstream at various elevations. May 12, 1922 to Nov. 1, 1924, nonrecording gage at present site and different elevation.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Few minor diversions for irrigation and municipal water supply for city of Cut Bank upstream from station. Natural flow of stream may be affected by return flow from Two Medicine Canal which irrigates lands upstream from station. U.S. Geological Survey satellite telemeter at station. Several observations of water temperature and specific conductance were made during the year.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 20, 1975 reached a discharge of 5,200 ft<sup>3</sup>/s, gage height, 8.2 ft, from floodmarks.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	72	e50	e60	e35	e50	e45	241	291	594	124	12	15
2	69	e60	e60	e35	e45	e45	366	251	497	124	12	13
3	69	e70	e50	e40	e45	e40	278	224	507	120	12	12
4	70	e80	e30	e40	e45	e35	224	253	457	108	12	14
5	74	84	e40	e40	e45	e30	201	275	391	95	15	13
6	73	89	e50	e40	e40	e30	191	279	355	89	16	9.9
7	71	90	e45	e40	e40	e25	177	271	333	87	16	8.7
8	73	90	e45	e40	e45	e20	163	248	304	81	17	8.7
9	76	91	e45	e30	e45	e20	152	231	318	74	17	10
10	78	e75	e45	e25	e50	e30	149	224	404	67	14	12
11	80	e70	e50	e25	e55	e40	171	212	521	65	14	14
12	81	e80	e50	e25	e55	e50	189	195	429	59	18	15
13	81	84	e55	e25	e50	e100	275	174	380	51	15	15
14	82	e85	e60	e25	e45	e500	453	159	353	46	13	16
15	82	e85	e60	e30	e50	e1000	431	156	326	44	13	17
16	83	81	e55	e30	e50	e900	351	183	342	41	15	19
17	83	85	e45	e30	e50	711	285	274	321	40	17	21
18	82	93	e35	e30	e50	436	248	290	297	37	17	23
19	79	70	e30	e35	e50	290	226	274	299	34	15	23
20	79	71	e25	e30	e40	217	208	237	387	34	14	23
21	78	74	e20	e25	e30	183	193	207	369	30	14	22
22	77	73	e20	e20	e20	174	190	186	308	28	12	22
23	e70	74	e22	e20	e15	161	207	178	260	27	16	22
24	e65	53	e22	e20	e20	169	256	194	232	24	16	21
25	e70	35	e25	e20	e30	153	317	316	199	22	16	21
26	72	e50	e30	e30	e35	135	393	537	168	20	16	20
27	75	e80	e35	e40	e40	119	405	839	136	21	17	20
28	e70	76	e40	e35	e40	114	473	828	127	21	17	20
29	e55	e70	e35	e35	---	107	400	692	132	17	17	20
30	e45	e60	e30	e40	---	103	335	703	129	16	16	21
31	e40	---	e35	e50	---	115	---	771	---	14	16	---
TOTAL	2254	2228	1249	985	1175	6097	8148	10152	9875	1660	467	511.3
MEAN	72.7	74.3	40.3	31.8	42.0	197	272	327	329	53.5	15.1	17.0
MAX	83	93	60	50	55	1000	473	839	594	124	18	23
MIN	40	35	20	20	15	20	149	156	127	14	12	8.7
AC-FT	4470	4420	2480	1950	2330	12090	16160	20140	19590	3290	926	1010

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1905 - 2003, BY WATER YEAR (WY)\*

	1905	1906	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
MEAN	84.2	76.5	47.0	34.7	57.2	150	242	483	631	241	89.1	74.9																																																																																							
MAX	268	271	185	115	414	1053	664	894	1781	605	233	298																																																																																							
(WY)	1952	1990	1996	1990	1986	1972	1952	1954	2002	1951	1972	1911																																																																																							
MIN	11.2	19.1	15.0	1.61	11.1	6.90	79.4	198	174	17.0	5.56	5.92																																																																																							
(WY)	2002	2002	1984	1982	1985	1907	1984	1984	1992	1988	1988	1988																																																																																							

MARIAS RIVER BASIN

06099000 CUT BANK CREEK AT CUT BANK, MT--Continued

SUMMARY STATISTICS	FOR 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1905 - 2003*	
ANNUAL TOTAL	98223		44801.3			
ANNUAL MEAN	269		123		183	
HIGHEST ANNUAL MEAN					317	1972
LOWEST ANNUAL MEAN					73.9	1988
HIGHEST DAILY MEAN	7750	Jun 11	1000	Mar 15	11200	Jun 9 1964
LOWEST DAILY MEAN	10	Jan 29	8.7	Sep 7	1.0	Jan 22 1982
ANNUAL SEVEN-DAY MINIMUM	13	Jan 27	11	Sep 3	1.1	Jan 20 1982
MAXIMUM PEAK FLOW			a1250	Mar 14	c16600	Jun 9 1964
MAXIMUM PEAK STAGE			b7.11	Mar 14	13.93	Jun 9 1964
INSTANTANEOUS LOW FLOW					d0.92	Sep 10 1988
ANNUAL RUNOFF (AC-FT)	194800		88860		132400	
10 PERCENT EXCEEDS	787		323		485	
50 PERCENT EXCEEDS	78		55		80	
90 PERCENT EXCEEDS	20		16		24	

\*--During periods of operation (August 1905 to October 1919, May to July 1920, May 1922 to October 1924, May 1951 to September 1973, October 1981 to current year).

a--About.

b--Backwater from ice.

c--From rating curve extended above 12,000 ft<sup>3</sup>/s on basis of slope-area measurement of peak flow.

d--Gage height, 0.59 ft.

e--Estimated.

## MARIAS RIVER BASIN

## 06099500 MARIAS RIVER NEAR SHELBY, MT

LOCATION.--Lat 48°25'38", long 111°53'20" (NAD 27), in SE<sup>1</sup>/<sub>4</sub>NW<sup>1</sup>/<sub>4</sub>SE<sup>1</sup>/<sub>4</sub> sec.20, T.31 N., R.2 W., Toole County, Hydrologic Unit 10030203, on left bank 20 ft downstream from bridge on old U.S. Highway 91, 5.1 mi south of Shelby, 24 mi downstream from Cut Bank Creek, and at river mile 140.6.

DRAINAGE AREA.--3,242 mi<sup>2</sup>, of which 518 mi<sup>2</sup> 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.

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

GAGE.--Water-stage recorder. Elevation of gage is 3,087.72 ft (NGVD 29). Prior to Dec. 23, 1947, nonrecording gage or water-stage recorder at several sites within 1,000 ft of present site at approximately the same elevation. Dec. 23, 1947, to Apr. 6, 1976, water-stage recorder at site 150 ft downstream at same elevation.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Some regulation by Lower Two Medicine Lake (station number 06090900), Four Horns Reservoir (station number 06093000) Swift Reservoir (station number 06094000), and Lake Frances (station number 06095500), having a combined capacity of 172,630 acre-ft. Diversions for irrigation of about 50,000 acres upstream from station and about 15,000 acres downstream from station. Bureau of Reclamation satellite telemeter at station. Several observations of water temperature and specific conductance were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	282	e300	350	e270	e400	e260	957	1610	2900	507	109	87
2	281	e330	348	e260	e390	e270	1490	1510	2520	475	99	78
3	278	388	e320	e270	e380	e270	1260	1450	2340	449	94	74
4	279	412	e250	e290	e370	e260	981	1570	2130	437	91	70
5	284	433	e180	e290	e360	e260	861	1640	1940	407	96	73
6	297	451	e200	e300	e350	e250	782	1550	1770	384	105	70
7	299	439	e220	e300	e340	e230	723	1390	1640	362	117	71
8	304	433	e250	e290	e330	e220	668	1270	1530	342	118	70
9	306	418	e270	e250	e320	e220	637	1200	1530	323	125	72
10	305	377	e290	e200	e310	e240	653	1150	1870	307	128	75
11	311	429	e300	e170	e300	e250	808	1140	2060	289	125	77
12	322	399	e300	e180	e300	e300	947	1100	1760	267	124	80
13	327	382	e310	e170	e300	e1000	1160	1070	1600	262	135	81
14	326	364	e320	e170	e290	e2000	1660	1050	1510	248	135	81
15	326	371	e340	e180	e280	3090	1800	1090	1380	233	124	89
16	322	365	e350	e200	e280	2580	1650	1290	1310	221	117	94
17	348	353	e330	e200	e290	1830	1490	1400	1240	211	118	103
18	354	334	e280	e210	e290	1270	1480	1370	1210	197	121	122
19	348	334	e200	e230	e290	1020	1430	1300	1330	187	127	130
20	348	326	e170	e250	e280	821	1360	1190	1540	184	126	128
21	343	328	e150	e220	e250	736	1330	1100	1490	177	125	128
22	344	335	e150	e180	e220	689	1360	1040	1270	166	115	130
23	351	348	e160	e150	e200	666	1480	1030	1140	147	99	124
24	345	364	e180	e170	e200	715	1640	1130	1040	143	88	124
25	334	289	e200	e180	e210	692	1880	1430	949	136	106	148
26	343	279	e220	e150	e230	619	2090	2220	832	143	118	133
27	339	405	e250	e200	e240	544	2000	3110	735	147	114	125
28	337	383	e270	e250	e250	517	1820	2950	672	143	93	126
29	e310	360	e280	e230	---	482	1760	2710	553	135	87	127
30	e280	361	e260	e220	---	463	1650	2770	537	137	87	131
31	e250	---	e250	e250	---	467	---	3000	---	118	91	---
TOTAL	9823	11090	7948	6880	8250	23231	39807	48830	44328	7884	3457	3021
MEAN	317	370	256	222	295	749	1327	1575	1478	254	112	101
MAX	354	451	350	300	400	3090	2090	3110	2900	507	135	148
MIN	250	279	150	150	200	220	637	1030	537	118	87	70
AC-FT	19480	22000	15760	13650	16360	46080	78960	96850	87920	15640	6860	5990

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1902 - 2003, BY WATER YEAR (WY)\*

	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911	1912	1913
MEAN	404	394	304	254	318	580	1137	2705	3074	1050	386	355
MAX	1448	1485	1135	700	1173	2300	3149	5300	10190	3982	1100	1853
(WY)	1952	1990	1996	1918	1986	1947	1934	1927	1948	1902	1927	1911
MIN	73.8	116	103	41.9	58.7	139	280	711	409	147	67.1	66.4
(WY)	2002	2002	1937	1937	1936	2002	1931	1977	1977	1940	1988	1988

MARIAS RIVER BASIN

06099500 MARIAS RIVER NEAR SHELBY, MT--Continued

SUMMARY STATISTICS	FOR 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1902 - 2003*	
ANNUAL TOTAL	408971		214549			
ANNUAL MEAN	1120		588		903	
HIGHEST ANNUAL MEAN					1929	1927
LOWEST ANNUAL MEAN					302	1977
HIGHEST DAILY MEAN	19300	Jun 11	3110	May 27	109000	Jun 9 1964
LOWEST DAILY MEAN	80	Mar 9	70	Sep 4	10	Aug 20 1919
ANNUAL SEVEN-DAY MINIMUM	100	Mar 17	71	Sep 3	21	Jan 25 1937
MAXIMUM PEAK FLOW			4180	Mar 15	b241000	Jun 9 1964
MAXIMUM PEAK STAGE			6.85	Mar 15	c23.64	Jun 9 1964
INSTANTANEOUS LOW FLOW			a66	Sep 06	d10	Aug 20 1919
ANNUAL RUNOFF (AC-FT)	811200		425600		653900	
10 PERCENT EXCEEDS	3840		1530		2320	
50 PERCENT EXCEEDS	340		310		400	
90 PERCENT EXCEEDS	140		118		157	

\*--During periods of operation (1903-04, 1906, 1912 to current year).

a--Gage height, 2.61 ft.

b--Largely due to the failure of Swift Dam, from slope-area measurement of peak flow. Maximum unaffected by dam failure, 75,000 ft<sup>3</sup>/s, June 20, 1975, gage height, 18.21 ft.

c--From floodmark.

d--Observed, site and datum in use.

e--Estimated.

## MARIAS RIVER BASIN

## 06101500 MARIAS RIVER NEAR CHESTER, MT

LOCATION.--Lat 48°18'23", long 111°04'47" (NAD 27), in SW<sup>1</sup>/<sub>4</sub>SW<sup>1</sup>/<sub>4</sub>SW<sup>1</sup>/<sub>4</sub> sec.34, T.30 N., R.5 E., Liberty County, Hydrologic Unit 10030203, on left bank 2.0 mi downstream from Tiber Dam, 4.4 mi upstream from Pondera Coulee, 15 mi southwest of Chester, and at river mile 78.3.

DRAINAGE AREA.--4,927 mi<sup>2</sup>, of which 518 mi<sup>2</sup> is probably noncontributing.

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.

REVISED RECORDS.--WSP 1629: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 2,814.03 ft (NGVD) (Bureau of Reclamation bench mark). Prior to Oct. 1, 1921, nonrecording gage at bridge 2.5 mi downstream at different elevation. Oct. 4, 1945, to Sept. 30, 1946, nonrecording gage at site 3 mi downstream at different elevation.

REMARKS.--Records good. Flow completely regulated by Lake Elwell since Oct. 28, 1955 (see preceding page). Bureau of Reclamation satellite telemeter at station. Several observations of water temperature and specific conductance were made during the year.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 1948 reached a stage of 16 ft, present elevation.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1010	508	503	507	503	497	481	487	625	638	498	497
2	1010	508	503	506	503	495	482	487	626	637	498	502
3	925	509	503	504	503	487	483	486	627	638	500	514
4	874	432	503	504	503	487	484	486	627	638	499	511
5	873	457	503	503	501	487	483	489	628	639	495	507
6	873	505	503	503	503	487	481	487	629	640	492	508
7	873	506	503	503	502	487	479	489	631	642	497	508
8	874	508	503	502	503	487	476	488	630	643	500	507
9	873	507	503	504	502	487	476	487	631	641	490	504
10	871	508	508	504	502	487	477	489	634	642	492	500
11	872	507	508	504	503	487	476	492	632	643	491	504
12	874	507	508	503	500	487	475	497	634	642	489	508
13	872	507	508	503	497	487	477	565	635	637	489	506
14	872	507	509	503	497	487	479	614	635	635	487	508
15	872	508	508	502	497	492	479	614	641	637	493	508
16	884	506	509	508	496	492	479	613	643	636	494	510
17	895	504	508	507	496	492	478	614	643	589	497	508
18	896	503	508	506	495	492	481	616	648	550	497	508
19	895	503	508	505	495	492	480	618	647	550	494	508
20	896	505	508	506	494	489	481	618	649	551	493	508
21	896	508	508	507	497	487	482	618	643	551	496	508
22	902	505	508	508	497	487	481	618	644	553	496	508
23	894	505	508	508	497	487	481	618	643	551	495	505
24	834	507	508	508	497	487	482	619	643	553	497	507
25	809	503	508	508	497	487	487	619	643	551	496	503
26	811	503	508	508	497	487	486	618	643	551	499	503
27	812	503	508	508	497	487	487	611	643	547	497	503
28	722	503	508	508	497	487	487	617	643	546	487	503
29	577	503	508	508	---	485	488	620	646	525	498	503
30	509	503	508	506	---	481	487	618	639	498	498	503
31	508	---	508	505	---	481	---	619	---	492	498	---
TOTAL	26158	15048	15705	15669	13971	15128	14435	17531	19125	18386	15342	15180
MEAN	844	502	507	505	499	488	481	566	638	593	495	506
MAX	1010	509	509	508	503	497	488	620	649	643	500	514
MIN	508	432	503	502	494	481	475	486	625	492	487	497
AC-FT	51880	29850	31150	31080	27710	30010	28630	34770	37930	36470	30430	30110

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1921 - 2003, BY WATER YEAR (WY)\*

	734	589	443	404	440	602	810	1221	1701	1233	924	850
MEAN	734	589	443	404	440	602	810	1221	1701	1233	924	850
MAX	2758	1733	1050	1079	1068	2400	2343	3541	6254	5325	2909	3063
(WY)	1966	1986	1990	1990	1990	1947	1996	1947	1964	1975	1964	1965
MIN	208	0.40	15.7	35.0	35.0	47.7	46.1	51.0	58.9	57.5	82.5	173
(WY)	1983	1956	1956	1956	1956	1956	1956	1956	1956	1956	1956	1921

SUMMARY STATISTICS

FOR 2002 CALENDAR YEAR

FOR 2003 WATER YEAR

WATER YEARS 1921 - 2003\*

ANNUAL TOTAL	352892	201678	
ANNUAL MEAN	967	553	829
HIGHEST ANNUAL MEAN			1488
LOWEST ANNUAL MEAN			97.5
HIGHEST DAILY MEAN	5280	Jun 22	10100
LOWEST DAILY MEAN	225	Apr 1	0.20
ANNUAL SEVEN-DAY MINIMUM	227	Mar 26	0.20
MAXIMUM PEAK FLOW			10100
MAXIMUM PEAK STAGE		4.17	10.63
INSTANTANEOUS LOW FLOW			b0.20
ANNUAL RUNOFF (AC-FT)	700000	400000	600400
10 PERCENT EXCEEDS	1960	643	1660
50 PERCENT EXCEEDS	508	505	563
90 PERCENT EXCEEDS	231	487	220

\*--During period of operation (April to September 1921, October 1945 to September 1947, October 1955 to current year).

a--Since dam completion. Maximum discharge not determined; occurred about March 20, 1947.

b--Probably less than; during Tiber Dam shutdown.



MARIAS RIVER BASIN

06102050 MARIAS RIVER NEAR LOMA, MT

LOCATION.--Lat 47°55'59", long 111°31'02" (NAD 27) , in SW<sup>1</sup>/<sub>4</sub>NE<sup>1</sup>/<sub>4</sub>SE<sup>1</sup>/<sub>4</sub> sec.12, T.25 N., R.9 E., Choteau County, Hydrologic Unit 10030203, on left bank 600 ft upstream from Teton River, 800 ft upstream from highway bridge, 0.2 mi southwest of Loma, and at river mile 2.5.

DRAINAGE AREA.--7,137 mi<sup>2</sup>, of which 518 mi<sup>2</sup> is probably noncontributing.

PERIOD OF RECORD.--October 1959 to September 1972, June 2001 to current year (seasonal records only).

GAGE.--Water-stage recorder. Elevation of gage is 2,570 ft (NGVD 29). Prior to June 2001, water-stage recorder at site 4.5 mi upstream at different elevation.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Flow completely regulated by Lake Elwell. Numerous diversions for irrigation upstream from station. Several observations of water temperature and specific conductance were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 2003  
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1				e490	490	610	595	455	488	477		
2				e492	490	602	592	442	484	480		
3				e495	484	599	582	453	479	481		
4				e495	490	601	586	458	479	473		
5				e495	538	619	594	467	485	467		
6				e495	575	613	595	466	490	474		
7				e495	520	606	593	464	491	477		
8				e492	520	609	597	464	493	461		
9				e490	528	609	606	476	492	461		
10				e490	519	621	575	476	486	455		
11				e490	503	626	585	469	483	461		
12				e490	504	611	579	476	488	469		
13				e490	499	588	569	493	497	469		
14				e510	499	592	561	498	495	470		
15				e560	588	601	566	485	500	475		
16				532	607	605	562	470	504	487		
17				492	599	610	570	486	502	478		
18				521	601	602	564	482	484	474		
19				597	631	588	499	476	470	472		
20				507	615	809	503	470	472	476		
21				489	614	661	510	469	464	473		
22				488	607	649	507	480	470	369		
23				494	608	652	479	484	452	353		
24				491	610	655	468	482	449	445		
25				491	596	641	487	480	457	454		
26				484	600	647	497	478	445	461		
27				475	608	627	502	479	467	465		
28				476	600	609	507	477	462	e470		
29				489	589	589	514	475	454	e470		
30				489	587	592	512	482	466	e475		
31				---	589	---	458	484	---	e475		
TOTAL				14984	17408	18643	16914	14696	14348	14347		
MEAN				499	562	621	546	474	478	463		
MAX				597	631	809	606	498	504	487		
MIN				475	484	588	458	442	445	353		
AC-FT				29720	34530	36980	33550	29150	28460	28460		

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1960 - 1972, AND 2001-2003 SEASONS

	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	2001	2002	2003
MEAN	298	434	568	852	1273	2151	1345	1154	1072	1345	1154	1072				
MAX	517	910	1290	2184	2175	6018	2990	3040	3258	2990	3040	3258				
(WY)	1968	1968	1967	1972	1972	1964	2002	1965	1965	2002	1965	1965				
MIN	105	110	117	180	441	621	250	137	296	250	137	296				
(WY)	1964	1964	1964	1961	2002	2003	1962	1961	2001	1962	1961	2001				

SUMMARY STATISTICS FOR 2003 SEASON WATER YEARS 1960 - 1972 SEASONS 2001 - 2003

ANNUAL MEAN						977										
HIGHEST ANNUAL MEAN						1330			1967							
LOWEST ANNUAL MEAN						522			1963							
HIGHEST DAILY MEAN				809	Jun 20	10300		Jun 16	1964	5250	Jun 23	2002				
LOWEST DAILY MEAN				353	Oct 23	45		Dec 11	1962	220	Apr 1	2002				
ANNUAL SEVEN-DAY MINIMUM						49		Dec 5	1962							
MAXIMUM PEAK FLOW				972	Jun 20	10800		Jun 16	1964	5250	Jun 23	2002				
MAXIMUM PEAK STAGE				1.92	Jun 20	a8.72		Jun 16	1964	b5.29	Jun 24	2002				
ANNUAL RUNOFF (AC-FT)						707900										
10 PERCENT EXCEEDS						1940										
50 PERCENT EXCEEDS						800										
90 PERCENT EXCEEDS						180										

a--Site and datum then in use.  
b--From high-water mark.  
e--Estimated.

MARIAS RIVER BASIN

06102500 TETON RIVER BELOW SOUTH FORK, NEAR CHOTEAU, MT

LOCATION.--Lat 47°52'59", long 112°36'40" (NAD 27), in NE<sup>1</sup>/<sub>4</sub>NE<sup>1</sup>/<sub>4</sub>NE<sup>1</sup>/<sub>4</sub> sec.34, T.25 N., R.8 W., Teton County, Hydrologic Unit 10030205, on right bank at county road bridge, 1.1 mi downstream from South Fork, 7.6 mi southwest of Bynum Reservoir, 20 mi northwest of Choteau, and at river mile 194.7.

WATER-DISCHARGE RECORDS

DRAINAGE AREA.--105 mi<sup>2</sup>.

PERIOD OF RECORD.--June 1947 to October 1954 (published as "near Farmington"), June 1998 to current year, seasonal records only.

GAGE.--Water-stage recorder. Elevation of gage is 4,770 ft (NGVD 29). June 1947 to October 1954, water-stage recorder 300 ft downstream at different elevation.

REMARKS.--Seasonal water-discharge records good. Negligible diversion for irrigation upstream from station.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 8, 1964 reached a discharge of 54,600 ft<sup>3</sup>/s, from slope-area measurement of peak flow.

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 2003  
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1				70	140	389	129	72	58	57		
2				64	138	362	125	72	58	57		
3				59	143	317	121	71	58	57		
4				56	145	292	116	70	57	56		
5				55	138	263	113	70	57	56		
6				53	133	268	112	71	56	56		
7				52	e127	243	108	69	56	55		
8				51	e125	245	108	69	58	55		
9				55	e120	279	103	70	58	56		
10				59	114	271	100	67	58	56		
11				62	110	284	98	67	57	56		
12				69	110	264	95	66	67	56		
13				80	107	252	94	65	61	55		
14				92	115	247	93	64	59	56		
15				91	142	236	92	64	59	57		
16				85	171	224	90	64	67	57		
17				84	163	220	87	64	65	55		
18				83	156	224	85	62	61	56		
19				79	145	232	83	61	59	55		
20				80	141	261	83	61	62	55		
21				83	141	223	82	61	61	54		
22				92	142	199	81	61	59	55		
23				109	164	185	79	61	59	55		
24				142	215	174	78	60	59	55		
25				179	348	160	78	60	56	55		
26				186	506	149	78	60	57	53		
27				176	467	147	76	59	58	52		
28				168	467	143	74	60	58	56		
29				155	527	137	73	60	57	69		
30				147	535	132	73	59	57	e61		
31				---	432	---	73	59	---	e55		
TOTAL				2816	6627	7022	2880	1999	1772	1739		
MEAN				93.9	214	234	92.9	64.5	59.1	56.1		
MAX				186	535	389	129	72	67	69		
MIN				51	107	132	73	59	56	52		
AC-FT				5590	13140	13930	5710	3970	3510	3450		

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1947 - 1954 AND SEASONS 1998 - 2003\*

	1947	1948	1949	1950	1951	1952	1953	1954	1998	1999	2000	2001	2002	2003
MEAN	47.9	46.3	45.1	80.3	324	513	239	114	86.4	77.5	68.6	56.9		
MAX	59.0	59.0	48.9	142	516	1178	468	182	134	133	89.8	68.2		
(WY)	1952	1952	1952	1952	1951	1953	1951	1951	1951	1952	1952	1951		
MIN	24.9	25.1	36.5	45.0	195	230	92.9	61.8	57.3	54.6	44.0	40.7		
(WY)	1950	1949	1950	2001	2001	2000	1949	1949	1949	1950	1950	1950		

SUMMARY STATISTICS

	FOR 2003 SEASON		WATER YEARS 1947 - 1954*		SEASONS 1998 - 2003*	
ANNUAL MEAN			166			
HIGHEST ANNUAL MEAN			225		1953	
LOWEST ANNUAL MEAN			92.9		1949	
HIGHEST DAILY MEAN	535	May 30	2380	Jun 5 1948	1160	Jun 17 2002
LOWEST DAILY MEAN	51	Apr 8	20	Jan 24 1949	36	Apr 13 2001
ANNUAL SEVEN-DAY MINIMUM			22	Jan 24 1949		
MAXIMUM PEAK FLOW	608	May 30	b2780	Jun 3 1948	1280	Jun 17 2002
MAXIMUM PEAK STAGE	5.21	May 30	c7.34	Jan 6 1950	5.78	Jun 17 2002
INSTANTANEOUS LOW FLOW	a48	Apr 9	d12	Mar 28 1951	f35	Apr 15 2001
ANNUAL RUNOFF (AC-FT)			119900			
10 PERCENT EXCEEDS			418			
50 PERCENT EXCEEDS			80			
90 PERCENT EXCEEDS			43			

\*--During periods of operation (June 1947 to October 1955, June 1998 to current year; seasonal records beginning 1998).  
a--Gage height, 3.62 ft.  
b--From rating curve extended above 1,100 ft<sup>3</sup>/s, gage height, 5.32 ft. previous site and datum.  
c--Backwater from ice, previous site and datum.  
d--Gage height, 2.82 ft, previous site and datum.  
e--Estimated.  
f--Gage height, 3.71 ft.

MARIAS RIVER BASIN

06102500 TETON RIVER BELOW SOUTH FORK, NEAR CHOTEAU, MT--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--May 1998 to current year.

REMARKS.--Unpublished records of instantaneous water temperature and specific conductance are available in files of the District office.

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

Date	Time	Instantaneous discharge, cfs (00061)	pH, water, unfltrd field, std units (00400)	Specific conductance, wat unfltrd uS/cm 25 degC (00095)	Temperature, air, deg C (00020)	Temperature, water, deg C (00010)	Ammonia + org-N, water, unfltrd mg/L as N (00625)	Ammonia water, fltrd, mg/L as N (00608)	Nitrite + nitrate water, fltrd, mg/L as N (00631)	Nitrite water, fltrd, mg/L as N (00613)
NOV 2002										
04...	1510	68	8.3	390	7.0	4.0	<.10	<.015	.043	<.002
JAN 2003										
14...	1500	49	8.4	388	.5	2.5	<.10	<.015	.050	<.002
MAR										
11...	1000	48	7.8	382	-9.0	.0	<.10	<.015	.061	<.002
APR										
08...	1745	50	8.2	387	15.5	11.5	E.06	E.009	.054	<.002
MAY										
21...	0930	144	8.3	339	10.0	8.0	<.10	<.015	.036	<.002
JUN										
16...	1520	212	8.5	312	23.0	15.0	E.07	<.015	E.020	<.002
JUL										
15...	2000	89	8.5	367	28.0	15.0	<.10	<.015	E.019	<.002
AUG										
20...	1745	59	8.4	383	24.0	16.0	<.10	<.015	<.022	<.002
SEP										
09...	1745	58	8.6	385	12.0	13.0	<.10	<.015	E.012	<.002

Date	Ortho-phosphate, water, fltrd, mg/L as P (00671)	Phosphorus, water, unfltrd mg/L (00665)	Selenium, water, unfltrd ug/L (01147)	Suspnd. sedi-ment, sieve diametr <.063mm percent (70331)	Suspended sedi-ment concentration mg/L (80154)	Suspended sedi-ment load, tons/d (80155)
NOV 2002						
04...	<.007	<.004	E.5	83	13	2.4
JAN 2003						
14...	<.007	E.003	.8	70	2	.26
MAR						
11...	<.007	E.002	E.5	47	12	1.6
APR						
08...	<.007	E.002	.8	61	5	.68
MAY						
21...	<.007	<.004	.7	63	3	1.2
JUN						
16...	<.007	E.003	E.4	80	3	1.7
JUL						
15...	<.007	E.002	.7	79	9	2.2
AUG						
20...	<.007	<.004	.6	60	10	1.6
SEP						
09...	<.007	<.004	.6	58	7	1.1

E--Estimated.

MARIAS RIVER BASIN

06108000 TETON RIVER NEAR DUTTON, MT

LOCATION.--Lat 47°55'49", long 111°33'07" (NAD 27), in SE<sup>1</sup>/<sub>4</sub>SW<sup>1</sup>/<sub>4</sub>SW<sup>1</sup>/<sub>4</sub> sec.12, T.25 N., R.1 E., Teton County, Hydrologic Unit 10030205, on right bank 150 ft upstream from Kerr Bridge, 0.9 mi downstream from Hunt Coulee, 9.5 mi northeast of Dutton, and at river mile 100.9.

DRAINAGE AREA.--1,307 mi<sup>2</sup>. Area at site used prior to July 17, 1965, 1,308 mi<sup>2</sup>.

WATER-DISCHARGE RECORDS

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

GAGE.--Water-stage recorder. Elevation of gage is 3,235 ft (NGVD 29). Prior to July 17, 1965, water-stage recorder at site 1,800 ft downstream at elevation 1.97 ft lower.

REMARKS.--Water-discharge records good except those for estimated daily discharges, 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 upstream from station. U.S. Geological Survey satellite telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	38	e30	e45	e35	e40	e35	99	98	62	52	0.00	3.8
2	36	e35	e40	e40	e40	e35	107	107	59	41	0.00	4.6
3	36	e38	e30	e40	e35	e30	117	104	55	30	0.00	4.8
4	37	e40	e25	e40	e35	e35	123	103	49	19	0.00	4.7
5	39	e42	e27	e40	e32	e35	124	103	45	16	0.00	4.8
6	37	e45	e30	e40	e35	e25	126	134	47	12	0.00	4.9
7	38	e47	e35	e40	e35	e15	125	147	43	11	0.00	4.5
8	38	e45	e35	e35	e38	e15	114	129	53	12	0.00	5.0
9	38	e45	e40	e25	e40	e20	106	115	58	12	0.00	6.0
10	34	e45	e45	e25	e40	e35	96	105	61	11	0.00	6.4
11	35	e48	e40	e30	e40	e40	91	101	74	9.9	0.00	7.4
12	37	e50	e40	e35	e40	e50	87	101	70	6.5	0.00	9.2
13	36	e50	e45	e33	e40	e70	87	101	75	6.8	0.00	9.9
14	38	47	e50	e30	e35	e100	96	83	86	6.3	0.00	11
15	42	46	e45	e30	e40	e300	119	72	71	6.3	0.00	14
16	43	44	e45	e30	e45	504	163	69	58	5.2	1.5	22
17	47	44	e40	e30	e45	400	149	63	48	3.9	2.8	39
18	43	42	e32	e33	e45	275	131	67	42	3.4	1.8	41
19	38	41	e27	e35	e40	212	118	67	41	3.2	1.2	33
20	37	39	e25	e30	e35	179	111	64	48	2.7	1.1	26
21	38	38	e25	e25	e30	161	102	64	169	2.3	1.3	21
22	39	38	e25	e20	e20	147	92	61	228	1.8	1.2	17
23	38	38	e25	e22	e15	132	84	60	171	1.3	1.8	15
24	39	e37	e27	e25	e15	120	80	57	116	0.53	1.7	14
25	42	e37	e30	e20	e20	116	78	53	104	0.13	1.9	13
26	44	e40	e35	e25	e30	110	79	48	96	0.00	1.7	12
27	44	e40	e35	e35	e25	107	85	45	86	0.00	1.9	11
28	e40	e45	e35	e35	e30	107	94	50	81	0.00	2.3	11
29	e30	e45	e30	e35	---	104	95	57	74	0.00	2.2	10
30	e20	e40	e30	e40	---	103	93	53	64	0.00	2.4	10
31	e25	---	e35	e45	---	98	---	57	---	0.00	2.9	---
TOTAL	1166	1261	1073	1003	960	3715	3171	2538	2334	276.26	29.70	396.0
MEAN	37.6	42.0	34.6	32.4	34.3	120	106	81.9	77.8	8.91	0.96	13.2
MAX	47	50	50	45	45	504	163	147	228	52	2.9	41
MIN	20	30	25	20	15	15	78	45	41	0.00	0.00	3.8
AC-FT	2310	2500	2130	1990	1900	7370	6290	5030	4630	548	59	785

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1954 - 2003, BY WATER YEAR (WY)

MEAN	69.8	70.6	64.1	55.2	85.5	183	158	245	385	157	72.7	64.9
MAX	223	176	209	167	388	819	495	957	2727	551	263	211
(WY)	1966	1976	1960	1976	1986	1969	1965	1976	1964	1958	1972	1993
MIN	15.4	18.5	14.8	13.2	15.2	28.8	46.6	20.1	16.9	1.30	0.000	7.39
(WY)	2002	2002	2001	1985	1985	2002	2000	2000	1988	1985	1988	2001

SUMMARY STATISTICS FOR 2002 CALENDAR YEAR FOR 2003 WATER YEAR WATER YEARS 1954 - 2003

ANNUAL TOTAL	20999	17922.96	
ANNUAL MEAN	57.5	49.1	134
HIGHEST ANNUAL MEAN			350
LOWEST ANNUAL MEAN			26.9
HIGHEST DAILY MEAN	1900	Jun 12	504
LOWEST DAILY MEAN	10	Jan 26	0.00
ANNUAL SEVEN-DAY MINIMUM	11	Jan 24	0.00
MAXIMUM PEAK FLOW			a607
MAXIMUM PEAK STAGE			b5.96
INSTANTANEOUS LOW FLOW			0.00
ANNUAL RUNOFF (AC-FT)	41650	35550	97210
10 PERCENT EXCEEDS	66	106	267
50 PERCENT EXCEEDS	35	38	70
90 PERCENT EXCEEDS	15	2.1	22

a--Gage height, 3.83 ft.

b--Backwater from ice.

c--From slope-area measurement of peak flow.

d--From floodmark.

e--Estimated.

f--No flow at times on many years.

MARIAS RIVER BASIN

06108000 TETON RIVER NEAR DUTTON, MT--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--May 1998 to current year.

REMARKS.--Unpublished records of instantaneous water temperature and specific conductance are available in files of the District office.

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

Date	Time	Instantaneous discharge, cfs (00061)	pH, water, unfltrd field, std units (00400)	Specific conductance, wat unfltrd uS/cm 25 degC (00095)	Temperature, air, deg C (00020)	Temperature, water, deg C (00010)	Ammonia + org-N, water, unfltrd mg/L as N (00625)	Ammonia water, fltrd, mg/L as N (00608)	Nitrite + nitrate water, fltrd, mg/L as N (00631)	Nitrite water, fltrd, mg/L as N (00613)
NOV 2002										
06...	1240	45	8.3	822	14.0	0.0	.21	.053	.684	.006
JAN 2003										
14...	1015	29	8.4	1010	-5.0	0.0	.18	E.014	1.07	.007
MAR										
11...	1540	38	7.4	849	-4.0	0.0	.20	E.012	.856	.004
19...	1030	204	--	700	14.0	1.5	--	--	--	--
APR										
08...	1445	114	8.5	1010	26.5	10.0	.65	.015	.072	E.002
MAY										
20...	1410	64	8.6	807	17.0	14.0	.34	E.011	<.022	<.002
JUN										
16...	1815	55	8.6	1020	27.0	26.0	.76	E.009	.056	.009
JUL										
16...	0930	5.8	8.5	1110	26.0	21.0	.45	E.008	<.022	<.002
AUG										
20...	1345	1.3	8.5	1310	25.0	23.5	.55	<.015	<.022	<.002
SEP										
09...	1400	5.8	8.5	925	17.0	17.0	.32	<.015	<.022	<.002

Date	Ortho-phosphate, water, fltrd, mg/L as P (00671)	Phosphorus, water, unfltrd mg/L (00665)	Selenium, water, unfltrd ug/L (01147)	Suspnd. sedi-ment, sieve diametr <.063mm (70331)	Suspended sedi-ment concentration mg/L (80154)	Suspended sedi-ment load, tons/d (80155)
NOV 2002						
06...	<.007	.009	.8	77	52	6.3
JAN 2003						
14...	<.007	.011	1.0	30	80	6.3
MAR						
11...	<.007	.010	.7	80	42	4.3
19...	--	--	--	98	560	308
APR						
08...	<.007	.053	1.1	96	69	21
MAY						
20...	<.007	.026	1.0	96	42	7.3
JUN						
16...	<.007	.055	1.0	96	76	11
JUL						
16...	<.007	.039	.8	99	58	.91
AUG						
20...	<.007	.041	1.0	99	24	.08
SEP						
09...	<.007	.027	.8	99	26	.41

E--Estimated.

## MARIAS RIVER BASIN

06108800 TETON RIVER AT LOMA, MT

LOCATION.--Lat 47°55'57", long 110°30'49" (NAD 27), in NW<sup>1</sup>/<sub>4</sub>SW<sup>1</sup>/<sub>4</sub>SE<sup>1</sup>/<sub>4</sub> sec.12, T.25 N., R.9 E., Choteau County, Hydrologic Unit 10030205, on left bank 25 ft downstream from county bridge, 0.5 mi southwest of Loma, and at river mile 0.3.

DRAINAGE AREA.--2,010 mi<sup>2</sup>.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--June 1998 to current year. Prior to October 1, 1999, seasonal records only.

GAGE.--Water-stage recorder. Elevation of gage is 2,560 ft (NGVD 29).

REMARKS.--Water-discharge records good except those for estimated daily discharges, which are poor. U. S. Geological Survey satellite telemeter at station. Numerous diversions upstream from station for irrigation.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	24	e27	55	e25	e38	e31	99	92	31	38	0.00	0.00
2	26	e31	55	e25	e32	e30	102	89	31	26	0.00	0.00
3	26	e36	e46	e26	e28	e28	107	89	37	18	0.00	0.00
4	26	e39	e21	e27	e25	e27	107	92	39	13	0.00	0.00
5	27	e41	e26	e29	e24	e26	112	93	39	9.2	0.00	0.00
6	27	e45	e33	e32	e26	e25	116	91	38	6.5	0.00	0.00
7	27	e47	e36	e37	e28	e24	119	89	31	3.6	0.00	0.00
8	30	52	e40	e38	e30	e23	122	99	31	1.5	0.00	0.00
9	29	57	e43	e40	e30	e22	124	102	32	3.4	0.00	0.00
10	28	51	e47	e32	e28	e21	118	97	35	0.06	0.00	0.00
11	31	41	e52	e27	e28	e21	113	89	61	0.00	0.00	0.00
12	34	38	e55	e24	e26	e20	109	87	67	0.00	0.00	0.00
13	31	46	e56	e21	e25	e24	108	83	64	0.00	0.00	0.00
14	29	61	e58	e19	e26	e34	108	77	64	0.00	0.00	0.00
15	30	62	e54	e18	e24	e56	108	75	62	0.00	0.00	0.00
16	29	53	e47	e17	e27	e100	107	72	61	0.00	0.00	0.00
17	32	49	e36	e19	e29	e430	119	64	59	0.00	0.00	0.00
18	34	45	e30	e27	e30	357	147	63	49	0.00	0.00	0.00
19	36	43	e26	e33	e32	290	132	62	37	0.00	0.00	0.00
20	39	43	e22	e25	e33	249	115	58	122	0.00	0.00	0.00
21	37	42	e21	e20	e28	215	110	55	50	0.00	0.00	0.00
22	35	42	e20	e16	e21	190	107	51	45	0.00	0.00	0.00
23	32	40	e23	e18	e18	171	102	51	92	0.00	0.00	0.00
24	33	e25	e25	e17	e17	153	98	49	124	0.00	0.00	0.00
25	36	e20	e30	e19	e18	137	96	46	102	0.00	0.00	0.00
26	36	e28	e33	e23	e21	127	92	50	82	0.00	0.00	0.00
27	36	42	e30	e27	e26	122	90	50	72	0.00	0.00	0.00
28	38	52	e27	e22	e29	115	88	38	65	0.00	0.00	0.00
29	e27	64	e25	e28	---	108	91	29	57	0.00	0.00	0.00
30	e20	59	e24	e37	---	103	92	24	47	0.00	0.00	0.00
31	e24	---	e24	e40	---	97	---	28	---	0.00	0.00	---
TOTAL	949	1321	1120	808	747	3376	3258	2134	1726	119.26	0.00	0.00
MEAN	30.6	44.0	36.1	26.1	26.7	109	109	68.8	57.5	3.85	0.000	0.000
MAX	39	64	58	40	38	430	147	102	124	38	0.00	0.00
MIN	20	20	20	16	17	20	88	24	31	0.00	0.00	0.00
AC-FT	1880	2620	2220	1600	1480	6700	6460	4230	3420	237	0.00	0.00

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1998 - 2003, BY WATER YEAR (WY)

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
MEAN	17.8	23.0	20.1	17.4	23.4	69.4	72.7	41.7	126	38.2	13.7	9.77
MAX	30.6	44.0	39.5	35.0	31.6	109	109	74.8	304	151	62.6	24.8
(WY)	2003	2003	2000	2000	2000	2003	2003	1999	2002	1998	1998	1999
MIN	0.000	0.000	0.82	3.59	14.8	20.2	43.4	10.2	4.98	2.48	0.000	0.000
(WY)	2002	2002	2002	2002	2001	2002	2000	2000	2001	2000	2000	2000

## SUMMARY STATISTICS FOR 2002 CALENDAR YEAR FOR 2003 WATER YEAR WATER YEARS 1998 - 2003

	2002 CALENDAR YEAR	2003 WATER YEAR	1998 - 2003
ANNUAL TOTAL	18257.65	15558.26	
ANNUAL MEAN	50.0	42.6	32.3
HIGHEST ANNUAL MEAN			42.6
LOWEST ANNUAL MEAN			16.6
HIGHEST DAILY MEAN	1740	430	1740
LOWEST DAILY MEAN	0.00	0.00	0.00
ANNUAL SEVEN-DAY MINIMUM	0.07	0.00	0.00
MAXIMUM PEAK FLOW		a500	c2000
MAXIMUM PEAK STAGE		b6.98	b6.98
ANNUAL RUNOFF (AC-FT)	36210	30860	23400
10 PERCENT EXCEEDS	67	102	73
50 PERCENT EXCEEDS	27	30	19
90 PERCENT EXCEEDS	4.9	0.00	0.00

a--About, backwater from ice.

b--Backwater from ice, from floodmarks.

c--Gage height, 5.87 ft.

e--Estimated.

MARIAS RIVER BASIN

06108800 TETON RIVER AT LOMA, MT--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water year 1965, May 1998 to current year.

PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: October 1999 to current year.

INSTRUMENTATION.--Temperature recorder installed Oct. 20, 1999.

REMARKS.--No samples collected during July through September due to no flow. Daily temperature record good for period of flow. Missing maximum daily water temperature for Mar. 31 due to equipment problems. No daily water temperature data from July 10 through September 30 due to no flow. Unpublished records of instantaneous water temperature and specific conductance are available in files of the District office.

EXTREMES FOR PERIOD OF DAILY RECORD.--

WATER TEMPERATURE (October 1999 to current year): Maximum, 35.5°C, July 13, 2002; minimum, 0.0°C on many days during winter months.

EXTREMES FOR CURRENT YEAR.--

WATER TEMPERATURE: Maximum, 30.5°C, July 1; minimum, 0.0°C, many days October through March.

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

Date	Time	Instantaneous discharge, cfs (00061)	pH, water, unfltrd field, std units (00400)	Specific conductance, wat unfltrd uS/cm 25 degC (00095)	Temperature, air, deg C (00020)	Temperature, water, deg C (00010)	Ammonia + org-N, water, unfltrd mg/L as N (00625)	Ammonia water, fltrd, mg/L as N (00608)	Nitrite + nitrate water, fltrd, mg/L as N (00631)	Nitrite water, fltrd, mg/L as N (00613)
NOV 2002										
06...	1615	45	8.4	915	13.0	.0	.34	E.008	.217	.004
JAN 2003										
13...	1430	21	7.9	1100	-2.0	.0	.22	E.009	.904	.008
MAR										
12...	0840	E20	7.9	992	-5.5	.0	.15	.015	.596	E.002
APR										
09...	0905	129	8.5	961	22.0	10.5	.54	<.015	<.022	<.002
MAY										
22...	1100	52	8.6	1020	17.0	17.0	.29	<.015	<.022	<.002
JUN										
17...	1440	59	8.6	1100	29.0	28.0	.63	<.015	<.022	<.002

Date	Ortho-phosphate, water, fltrd, mg/L as P (00671)	Phosphorus, water, unfltrd mg/L (00665)	Selenium, water, unfltrd ug/L (01147)	Suspended sediment, sieve diametr percent <.063mm (70331)	Suspended sediment concentration mg/L (80154)	Suspended sediment load, tons/d (80155)
NOV 2002						
06...	<.007	.098	1.1	97	177	22
JAN 2003						
13...	<.007	.019	1.1	90	51	2.9
MAR						
12...	<.007	.010	.7	78	46	E2.5
APR						
09...	<.007	.081	1.2	96	101	35
MAY						
22...	<.007	.015	1.1	96	26	3.7
JUN						
17...	<.007	.095	.9	99	130	21

Date	Time	Hardness, water, unfltrd mg/L as CaCO3 (00900)	Calcium water, fltrd, mg/L (00915)	Magnesium, water, fltrd, mg/L (00925)	Potassium, water, fltrd, mg/L (00935)	Sodium adsorption ratio (00931)	Sodium, water, fltrd, mg/L (00930)	Alkalinity, wat flt lab, mg/L as CaCO3 (29801)	Chloride, water, fltrd, mg/L (00940)	Fluoride, water, fltrd, mg/L (00950)	Silica, water, fltrd, mg/L (00955)
APR 2003											
09...	0905	410	68.2	57.7	2.90	1	67.3	249	8.75	.44	1.42
JUN											
17...	1440	420	60.5	65.6	3.64	2	91.1	225	11.3	.4	1.37

E--Estimated.

## MARIAS RIVER BASIN

06108800 TETON RIVER AT LOMA, MT--Continued

## WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003--Continued

Date	Sulfate water, fltrd, mg/L (00945)	Residue water, fltrd, sum of consti- tuents mg/L (70301)	Residue water, fltrd, tons/ acre-ft (70303)	Residue water, fltrd, tons/d (70302)	Arsenic water unfltrd ug/L (01002)	Cadmium water, unfltrd ug/L (01027)	Chrom- ium, water, unfltrd recover -able, ug/L (01034)	Copper, water, unfltrd recover -able, ug/L (01042)	Lead, water, unfltrd recover -able, ug/L (01051)	Nickel, water, unfltrd recover -able, ug/L (01067)	Zinc, water, unfltrd recover -able, ug/L (01092)
APR 2003 09...	259	615	.84	214	E2	<.2	.9	6.2	1.24	5.50	10
JUN 17...	342	711	.97	113	2	<.2	E.7	4.9	1.58	5.53	10

E--Estimated.

## WATER TEMPERATURE, DEGREES CELSIUS, OCTOBER 2002 TO SEPTEMBER 2003

DAY	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
1	15.0	7.5	10.5	0.0	0.0	0.0	3.5	0.0	1.5	0.0	0.0	0.0
2	14.0	5.5	9.5	0.0	0.0	0.0	2.5	1.5	2.0	0.0	0.0	0.0
3	10.0	8.0	9.0	0.5	0.0	0.0	1.5	0.0	0.0	0.0	0.0	0.0
4	9.5	7.5	8.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	8.5	6.0	7.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	13.0	5.0	8.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	14.0	10.0	11.0	2.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0
8	16.0	8.5	11.5	2.5	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0
9	15.5	8.5	12.0	2.0	0.5	1.5	0.0	0.0	0.0	0.0	0.0	0.0
10	14.5	8.0	10.5	2.5	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0
11	10.0	6.0	8.5	3.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0
12	10.5	3.5	6.5	4.5	0.0	2.5	0.0	0.0	0.0	0.0	0.0	0.0
13	11.5	3.5	7.0	5.5	3.0	4.5	0.0	0.0	0.0	0.0	0.0	0.0
14	11.5	4.5	7.5	5.0	3.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0
15	11.0	4.0	7.5	6.5	3.5	4.5	0.0	0.0	0.0	0.0	0.0	0.0
16	11.5	6.5	8.5	4.0	2.5	3.0	0.0	0.0	0.0	0.0	0.0	0.0
17	12.5	5.0	8.5	5.5	2.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0
18	12.0	6.5	9.0	4.5	1.5	2.5	0.0	0.0	0.0	0.0	0.0	0.0
19	11.5	4.5	8.0	6.0	2.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0
20	12.0	6.5	9.0	7.5	4.0	5.5	0.0	0.0	0.0	0.0	0.0	0.0
21	11.0	6.5	8.5	6.0	2.0	4.5	0.0	0.0	0.0	0.0	0.0	0.0
22	7.0	2.0	5.0	5.5	3.5	5.0	0.0	0.0	0.0	0.0	0.0	0.0
23	4.0	0.0	1.5	4.5	0.0	2.5	0.0	0.0	0.0	0.0	0.0	0.0
24	4.0	0.0	1.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
25	5.5	0.0	2.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
26	5.0	0.0	2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
27	5.5	1.5	3.5	2.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0
28	3.5	0.5	2.5	5.5	0.5	3.0	0.0	0.0	0.0	0.0	0.0	0.0
29	0.5	0.0	0.0	4.5	1.5	3.0	0.0	0.0	0.0	0.0	0.0	0.0
30	0.0	0.0	0.0	3.5	0.5	1.5	0.0	0.0	0.0	0.0	0.0	0.0
31	0.0	0.0	0.0	---	---	---	0.0	0.0	0.0	0.0	0.0	0.0
MONTH	16.0	0.0	6.5	7.5	0.0	2.0	3.5	0.0	0.0	0.0	0.0	0.0





## MISSOURI RIVER MAIN STEM

## 06109500 MISSOURI RIVER AT VIRGELLE, MT

LOCATION.--Lat 48°00'18", long 110°15'25" (NAD 27), in SW<sup>1</sup>/<sub>4</sub>SW<sup>1</sup>/<sub>4</sub>SE<sup>1</sup>/<sub>4</sub> sec.13, T.26 N., R.11 E., Chouteau County, Hydrologic Unit 10040101, on left bank 0.2 mi upstream from Virgelle ferry, 0.6 mi southwest of Virgelle, 1.8 mi downstream from Spring Coulee, and at river mile 2,034.2.

DRAINAGE AREA.--34,379 mi<sup>2</sup>.

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

REVISED RECORDS.--WSP 1729: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 2,507.50 ft (NGVD 29). Prior to Sept. 30, 1953, water-stage recorder at Loma, 18 mi upstream, 2,543.40 ft.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Flow regulated by 23 smaller irrigation reservoirs and powerplants, Clark Canyon Reservoir (station number 06015300), Canyon Ferry Lake (station number 06058500), and Lake Elwell (station number 06101300). Diversions for irrigation of about 850,400 acres upstream from station. U.S. Army Corps of Engineers satellite telemeter at station. Several observations of water temperature and specific conductance were made during the year.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in June 1908 reached a stage about 2 ft higher than that of June 5, 1953, from information by local residents.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	4800	4550	5290	e5700	e6200	e5950	5630	7660	15100	7830	4860	4120
2	4590	4680	5280	e5350	e6100	e5950	5630	7500	13700	7760	4980	3990
3	4760	4690	5210	e5650	e5400	e5600	5930	7470	13200	7650	5040	4210
4	4840	4760	5170	e5750	e5500	e5900	6290	7490	12900	7080	5030	3900
5	4700	4830	5240	e5850	e5400	e5750	6210	7530	14000	6830	5140	3930
6	4600	4750	5170	e5550	e5400	e5400	5950	7570	13800	6710	5040	3860
7	4610	4790	5000	e5250	e5250	e5300	5930	7690	12500	6040	5090	3880
8	4650	4860	5430	e5250	e4800	e5100	5780	7640	11500	6210	5140	3840
9	4620	4780	5450	e5150	e5650	e4750	5770	7610	10800	5960	5120	3900
10	4600	4950	5360	e5300	e5900	e4550	5680	7830	9990	5500	5410	3960
11	4600	5140	5260	e4900	e5800	e4850	5630	7830	10100	5740	4930	3890
12	4630	5490	5200	e3900	5670	e5300	5820	8070	10300	5700	4830	4100
13	4420	5600	5200	e4150	5550	e6150	6140	8390	9650	5860	4470	4090
14	4530	5350	5180	e5050	5520	e7150	6500	8260	9870	5830	4620	4100
15	4640	5220	5400	e5350	5580	e13000	7060	8240	9440	5960	4280	4200
16	4590	5200	5580	e5650	5480	e10500	7060	8860	9290	5730	4220	4120
17	4590	5140	5570	e5350	5420	9080	7300	9310	9020	5670	4100	4360
18	4620	5150	5340	e5250	5430	8330	7400	10200	8700	5720	4260	4230
19	4640	5270	5140	e5050	5510	8060	7250	10600	8400	5600	4230	4270
20	4720	5340	e4950	e5300	5550	7730	6900	10200	9420	5210	4140	4110
21	4750	5420	e4700	e5600	5480	6610	6730	9960	8520	5040	4180	3990
22	4740	5330	e4200	e5300	e4850	5530	6610	9620	8800	5190	4300	4020
23	4690	5290	e4100	e4350	e4350	5420	6480	9380	8560	4970	4390	4140
24	4670	5270	e4750	e3250	e3650	5560	6530	9260	8540	4910	4210	4090
25	4630	5260	e4950	e3950	e3700	5630	6790	9240	8490	4900	4410	4040
26	4590	5280	e5100	e5200	e4150	5820	7330	9550	8620	4790	4540	4090
27	4580	5280	e4650	e5650	e5100	5920	7790	10900	8490	4950	4360	3940
28	4850	5410	e4500	e5650	e5550	5760	7930	13300	8420	5060	4350	3870
29	4840	5510	e5300	e5900	---	5740	8200	13100	8250	5160	4300	4370
30	4710	5430	e5900	e6250	---	5680	8140	13500	7960	4930	4250	4240
31	4610	---	e5950	e6350	---	5660	---	14400	---	4900	4170	---
TOTAL	144410	154020	159520	162200	147940	197730	198390	288160	306330	179390	142390	121850
MEAN	4658	5134	5146	5232	5284	6378	6613	9295	10210	5787	4593	4062
MAX	4850	5600	5950	6350	6200	13000	8200	14400	15100	7830	5410	4370
MIN	4420	4550	4100	3250	3650	4550	5630	7470	7960	4790	4100	3840
AC-FT	286400	305500	316400	321700	293400	392200	393500	571600	607600	355800	282400	241700

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1935 - 2003, BY WATER YEAR (WY)

MEAN	6160	6329	6254	6253	6579	7343	8672	13340	17860	9749	6142	5825
MAX	15340	12470	12220	8997	10240	14490	17720	28260	51960	29670	11950	11590
(WY)	1966	1966	1960	1976	1971	1978	1943	1976	1948	1975	1993	1965
MIN	3533	3207	3221	2716	2600	3784	4062	4819	4646	3704	2821	2818
(WY)	1938	1938	1937	1936	1937	1938	1961	1992	1977	1940	1937	1937

## SUMMARY STATISTICS FOR 2002 CALENDAR YEAR FOR 2003 WATER YEAR WATER YEARS 1935 - 2003

ANNUAL TOTAL	2047170	2202330	
ANNUAL MEAN	5609	6034	8403
HIGHEST ANNUAL MEAN			13660
LOWEST ANNUAL MEAN			4152
HIGHEST DAILY MEAN	18600	15100	119000
LOWEST DAILY MEAN	2670	3250	638
ANNUAL SEVEN-DAY MINIMUM	3490	3890	2020
MAXIMUM PEAK FLOW		a15200	c122000
MAXIMUM PEAK STAGE		b11.63	d23.40
ANNUAL RUNOFF (AC-FT)	4061000	4368000	6087000
10 PERCENT EXCEEDS	8800	8920	14600
50 PERCENT EXCEEDS	4750	5350	6750
90 PERCENT EXCEEDS	4030	4200	4230

a--Gage height, 6.29 ft.

b--Backwater from ice.

c--From rating curve for former site at Loma, extended above 66,000 ft<sup>3</sup>/s.

d--From floodmark.

e--Estimated.

MISSOURI RIVER BASIN

06114700 JUDITH RIVER NEAR MOUTH, NEAR WINIFRED, MT

LOCATION.--Lat 47°40'06", long 109°39'09" (NAD 27), in SW<sup>1</sup>/<sub>4</sub>NW<sup>1</sup>/<sub>4</sub>NE<sup>1</sup>/<sub>4</sub> sec.22, T.22 N., R.16 E., Fergus County, Hydrologic Unit 10040103, on right bank 0.2 mi downstream from private road bridge, 5.3 mi south of Judith Landing, 15 mi northwest of Winifred, and at river mile 7.7.  
DRAINAGE AREA.--2,731 mi<sup>2</sup>.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 2000 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 2,490 ft (NGVD 29).

REMARKS.--Water-discharge records good except those for estimated daily discharges, which are poor. Numerous diversions for irrigation upstream from station. U. S. Geological Survey satellite telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	214	e200	258	e250	e280	e250	324	412	868	263	108	136
2	214	e210	259	e250	e280	e240	358	402	808	223	119	126
3	214	e220	262	e250	e270	e240	369	387	736	202	133	128
4	224	e230	e250	e250	e260	e230	348	423	687	199	137	131
5	229	e230	e220	e250	e260	e230	330	627	666	194	131	130
6	240	241	e230	e260	e250	e220	326	717	673	169	139	138
7	241	247	e230	e260	e250	e220	311	627	706	156	167	147
8	236	251	e240	e260	e260	e210	301	601	682	150	150	141
9	238	255	e240	e260	e260	e200	294	572	622	139	148	175
10	235	253	e250	e250	e260	e200	287	548	597	139	147	178
11	236	251	e250	e230	e270	e220	288	571	634	127	137	178
12	237	249	e260	e230	e270	e250	289	573	587	111	140	198
13	e235	249	e260	e240	e270	e2000	289	545	553	98	157	233
14	e235	250	265	e240	e260	6860	309	524	506	71	157	211
15	e235	252	269	e250	e270	4870	395	509	496	62	148	206
16	e235	256	271	e250	e270	2670	519	495	492	63	145	212
17	235	255	267	e260	e280	1760	475	466	454	68	168	235
18	235	250	270	e260	e280	1070	427	557	420	77	172	221
19	236	249	e260	e260	e280	703	485	684	400	69	172	214
20	235	250	e230	e260	e280	523	507	637	381	62	171	213
21	236	250	e220	e250	e270	418	466	621	377	62	167	212
22	237	251	e210	e250	e240	354	419	606	361	61	159	226
23	237	249	e200	e240	e200	336	380	585	369	62	150	226
24	237	253	e200	e230	e170	417	357	557	358	58	147	224
25	236	259	e200	e220	e150	430	371	576	339	75	145	224
26	236	262	e210	e230	e180	338	465	664	344	81	132	219
27	238	263	e220	e240	e230	305	437	763	336	83	122	220
28	241	262	e230	e260	e250	262	432	806	308	84	111	220
29	249	259	e250	e250	---	278	422	831	286	85	111	220
30	e240	257	e260	e250	---	289	426	823	272	91	119	219
31	e220	---	e260	e260	---	292	---	850	---	96	127	---
TOTAL	7246	7413	7501	7700	7050	26885	11406	18559	15318	3480	4436	5761
MEAN	234	247	242	248	252	867	380	599	511	112	143	192
MAX	249	263	271	260	280	6860	519	850	868	263	172	235
MIN	214	200	200	220	150	200	287	387	272	58	108	126
AC-FT	14370	14700	14880	15270	13980	53330	22620	36810	30380	6900	8800	11430

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 2001 - 2003, BY WATER YEAR (WY)

	2001	2001	2003	2002	2002	2003	2003	2003	2003	2001	2001	2001
MEAN	248	258	230	260	258	493	323	332	386	177	180	201
MAX	272	268	242	278	287	867	380	599	511	226	236	217
(WY)	2001	2001	2003	2002	2002	2003	2003	2003	2003	2001	2002	2002
MIN	234	247	223	248	234	293	293	157	318	112	143	192
(WY)	2003	2003	2001	2003	2001	2002	2001	2001	2001	2003	2003	2003

SUMMARY STATISTICS FOR 2002 CALENDAR YEAR FOR 2003 WATER YEAR WATER YEARS 2001 - 2003

ANNUAL TOTAL	93816	122755	
ANNUAL MEAN	257	336	279
HIGHEST ANNUAL MEAN			336 2003
LOWEST ANNUAL MEAN			243 2001
HIGHEST DAILY MEAN	517	Jul 8 6860	Mar 14 6860
LOWEST DAILY MEAN	83	Aug 1 58	Jul 24 58
ANNUAL SEVEN-DAY MINIMUM	92	Jul 29 64	Jul 19 64
MAXIMUM PEAK FLOW		a7600	Mar 14 a7600
MAXIMUM PEAK STAGE		b11.00	Mar 13 b11.00
INSTANTANEOUS LOW FLOW		c54	Jul 24 c54
ANNUAL RUNOFF (AC-FT)	186100	243500	201900
10 PERCENT EXCEEDS	312	572	365
50 PERCENT EXCEEDS	253	250	250
90 PERCENT EXCEEDS	204	137	150

a--Gage height, 9.06 ft.  
b--From floodmarks, backwater from ice.  
c--Gage height, 2.26 ft.  
e--Estimated.

## MISSOURI RIVER BASIN

06114700 JUDITH RIVER NEAR MOUTH, NEAR WINIFRED, MT--Continued

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--May 2001 to current year.

PERIOD OF DAILY RECORD.--

WATER TEMPERATURE (seasonal records): April 2002 to current year.

INSTRUMENTATION.--Temperature recorder installed Sept. 9, 2000.

REMARKS.--Seasonal daily water temperature record good. Unpublished records of instantaneous water temperature and specific conductance are available in files of the District Office.

EXTREMES FOR PERIOD OF DAILY RECORD.--

WATER TEMPERATURE (seasonal records): Maximum, 32.0°C, July 13, 2002; minimum, 0.0°C Apr. 1-3, 2002.

EXTREMES FOR CURRENT YEAR.--

WATER TEMPERATURE: During period of seasonal operation, maximum 30.5°C, July 17, minimum, 2.5°C, Apr. 3.

## WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

Date	Time	Instantaneous discharge, cfs (00061)	pH, water, unfltrd field, std units (00400)	Specific conductance, wat unfltrd uS/cm 25 degC (00095)	Temperature, air, deg C (00020)	Temperature, water, deg C (00010)	Ammonia + org-N, water, unfltrd mg/L as N (00625)	Nitrite + nitrate, water, fltrd, mg/L as N (00631)	Nitrite, water, fltrd, mg/L as N (00613)			
APR 2003												
09...	1350	303	8.3	897	25.0	12.5	.18	.148	.003			
MAY												
22...	1630	616	8.4	903	22.0	18.0	.58	.095	.005			
JUN												
17...	0930	469	8.4	685	27.0	21.0	.54	.089	.003			
JUL												
16...	1500	62	8.4	899	36.0	26.0	.14	<.022	<.002			
Date			Ortho-phosphate, water, fltrd, mg/L as P (00671)	Phosphorus, water, unfltrd mg/L (00665)	Suspended sediment, sieve diameter percent <.063mm (70331)	Suspended sediment concentration, mg/L (80154)	Suspended sediment load, tons/d (80155)					
APR 2003												
09...			<.007	.022	84	38	31					
MAY												
22...			<.007	.183	86	227	378					
JUN												
17...			<.007	.180	89	241	305					
JUL												
16...			<.007	.006	88	18	3.0					
Date	Time	Hardness, water, unfltrd mg/L as CaCO3 (00900)	Calcium, water, fltrd, mg/L (00915)	Magnesium, water, fltrd, mg/L (00925)	Potassium, water, fltrd, mg/L (00935)	Sodium adsorption ratio (00931)	Sodium, water, fltrd, mg/L (00930)	Alkalinity, water, lab, mg/L as CaCO3 (29801)	Chloride, water, fltrd, mg/L (00940)	Fluoride, water, fltrd, mg/L (00950)	Silica, water, fltrd, mg/L (00955)	
MAY 2003												
22...	1630	430	101	43.4	2.86	.9	41.4	185	5.56	.6	4.76	
JUL												
16...	1500	410	93.0	42.1	3.06	.9	40.8	145	4.73	.9	6.10	
Date		Sulfate, water, fltrd, mg/L (00945)	Residue sum of constituents, mg/L (70301)	Residue water, fltrd, tons/d (70303)	Residue water, fltrd, tons/d (70302)	Arsenic, water, unfltrd ug/L (01002)	Cadmium, water, unfltrd ug/L (01027)	Chromium, water, unfltrd recoverable, ug/L (01034)	Copper, water, unfltrd recoverable, ug/L (01042)	Lead, water, unfltrd recoverable, ug/L (01051)	Nickel, water, unfltrd recoverable, ug/L (01067)	Zinc, water, unfltrd recoverable, ug/L (01092)
MAY 2003												
22...	295	605	.82	1010	3	<.2	1.8	7.5	3.08	7.90	20	
JUL												
16...	318	595	.81	99.6	<2	<.04	<.8	2.3	<.06	3.53	E2	

E--Estimated.

MISSOURI RIVER BASIN

06114700 JUDITH RIVER NEAR MOUTH, NEAR WINIFRED, MT--Continued

WATER TEMPERATURE, DEGREES CELSIUS, APRIL 2003 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	APRIL			MAY			JUNE			JULY		
1	9.5	8.0	9.0	13.5	8.0	11.0	20.0	17.0	18.0	27.0	20.5	24.0
2	8.0	4.0	6.5	15.5	10.0	12.5	17.5	15.5	16.5	26.5	20.5	23.0
3	7.5	2.5	5.0	14.5	10.5	13.0	18.5	14.5	16.5	22.5	19.0	21.0
4	7.5	4.0	6.0	13.5	8.0	10.5	16.5	13.5	15.0	23.5	17.0	20.0
5	8.5	4.0	6.5	8.0	5.5	7.0	16.5	13.0	14.5	24.0	17.5	20.5
6	9.5	6.0	7.5	11.5	6.5	9.0	15.5	14.0	14.5	24.0	17.0	20.5
7	10.5	4.5	7.5	13.0	9.0	10.5	17.0	12.0	14.5	25.0	18.0	21.5
8	12.5	6.5	9.5	11.5	9.0	10.0	19.0	14.0	16.5	21.5	18.0	19.5
9	15.0	9.0	12.0	10.5	8.5	9.5	18.0	16.0	17.0	24.5	17.0	20.5
10	15.0	9.0	12.0	11.0	8.5	10.0	20.0	15.5	17.5	26.0	18.0	22.0
11	16.5	10.5	13.5	15.0	8.0	11.5	19.5	16.5	17.5	27.0	19.5	23.0
12	17.5	12.0	14.5	17.0	11.5	14.5	21.5	16.0	18.5	28.5	20.0	24.5
13	16.0	12.5	14.5	17.5	13.0	15.0	23.5	17.5	20.5	28.0	22.0	24.5
14	15.0	12.0	13.5	19.0	12.0	15.5	23.5	18.5	21.0	26.0	18.5	22.5
15	13.5	9.0	11.0	19.0	14.5	17.0	24.5	19.5	22.0	27.0	18.0	22.5
16	12.0	8.0	10.0	17.0	14.0	15.5	26.0	20.0	23.0	28.0	20.5	23.5
17	13.5	8.5	11.0	16.5	11.5	14.0	26.0	21.0	23.5	30.5	21.0	25.5
18	12.0	9.0	10.5	14.0	8.0	11.0	27.0	20.5	23.5	29.5	22.0	26.0
19	13.0	7.5	10.0	13.5	7.0	10.0	27.0	21.0	23.5	28.5	21.5	25.0
20	15.5	9.0	12.0	15.5	9.0	12.0	24.5	20.5	22.0	29.0	20.5	24.5
21	16.5	11.0	13.5	17.0	13.0	14.5	22.0	18.0	20.0	28.5	21.0	24.5
22	17.5	11.5	14.5	18.5	13.5	16.0	20.5	15.5	18.0	29.5	20.5	25.0
23	19.0	13.0	16.0	19.0	15.5	17.0	20.0	14.0	17.0	29.5	21.5	25.5
24	18.5	14.5	16.5	22.0	15.0	18.0	19.5	15.0	17.0	26.5	22.5	24.5
25	16.5	13.5	15.0	22.5	17.5	20.0	20.0	14.5	17.0	24.0	20.0	22.0
26	15.0	12.5	13.5	22.0	18.5	20.5	22.0	16.0	19.0	25.0	20.0	22.0
27	15.0	10.5	12.5	22.0	18.0	20.0	23.0	18.0	20.5	27.5	20.0	23.5
28	13.0	9.5	11.5	22.5	17.5	20.0	25.0	18.5	21.5	28.0	20.5	24.0
29	11.5	10.0	10.5	23.0	19.5	21.0	26.0	18.5	22.5	27.5	20.5	24.0
30	12.0	9.0	10.0	21.5	18.5	20.0	27.5	20.5	24.0	28.0	20.5	24.0
31	---	---	---	19.0	17.0	18.0	---	---	---	26.5	21.0	23.5
MONTH	19.0	2.5	11.0	23.0	5.5	14.5	27.5	12.0	19.0	30.5	17.0	23.0
	AUGUST			SEPTEMBER								
1	26.5	20.0	23.5	21.5	16.0	19.0						
2	28.0	20.0	24.0	22.0	16.0	19.0						
3	25.5	22.5	24.0	22.5	16.0	19.0						
4	25.5	21.0	23.0	22.5	16.5	19.5						
5	26.5	19.5	23.0	21.5	17.0	19.5						
6	26.5	21.0	23.5	20.5	17.5	19.0						
7	26.5	20.0	22.5	24.0	18.0	21.0						
8	26.5	19.0	22.5	21.5	18.0	19.5						
9	27.5	20.5	24.0	18.5	15.0	17.0						
10	28.5	21.5	25.0	18.5	13.0	16.0						
11	27.0	21.5	24.5	17.0	13.5	15.5						
12	25.0	21.0	22.5	16.0	13.5	14.5						
13	27.0	20.5	24.0	15.5	12.0	13.5						
14	28.0	21.5	24.5	16.5	10.5	13.5						
15	26.5	20.5	23.5	16.0	13.0	14.5						
16	27.0	21.0	23.5	15.0	11.0	12.5						
17	23.5	21.0	22.0	11.0	9.0	10.0						
18	25.5	19.0	22.0	13.0	7.5	10.5						
19	25.5	19.5	22.5	14.5	9.5	12.0						
20	25.5	20.0	22.5	15.0	11.5	13.5						
21	24.5	18.5	21.5	13.5	11.5	12.0						
22	25.0	20.0	22.5	15.0	9.0	12.0						
23	24.5	20.5	22.5	14.0	11.5	13.0						
24	25.0	19.0	22.0	15.5	11.0	13.0						
25	25.0	19.0	22.0	16.5	11.0	13.5						
26	23.5	17.5	21.0	16.5	13.5	14.5						
27	21.5	18.5	19.5	16.0	11.0	13.5						
28	20.5	16.0	18.0	16.5	12.5	14.5						
29	21.5	14.5	18.0	16.0	12.0	14.0						
30	22.0	14.5	18.5	14.5	9.5	12.0						
31	22.5	16.0	19.5	---	---	---						
MONTH	28.5	14.5	22.5	24.0	7.5	15.0						



MISSOURI RIVER MAIN STEM

06115200 MISSOURI RIVER NEAR LANDUSKY, MT--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1972 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: March 1979 to September 1981.

WATER TEMPERATURE: March to September 1979.

SUSPENDED-SEDIMENT DISCHARGE: October 1971 to September 1991, October 1991 to current year (seasonal records only, March through November).

REMARKS.--Daily sediment records rated fair. Daily sediment data not available from Dec. 1 to Mar. 25 due to ice cover. Unpublished records of instantaneous water temperature and conductance are available in files of District office. Prior to July 1972, sampling and record computations were under supervision of Corps of Engineers, U.S. Army.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE (water years 1979-81): Maximum daily, 1,240 microsiemens per centimeter ( $\mu\text{S}/\text{cm}$ ), June 20, 1979; minimum daily, 410  $\mu\text{S}/\text{cm}$ , July 3, 1980.

WATER TEMPERATURE (water year 1979): Maximum, 24.0°C, on several days during June to August 1979; minimum, 0.5°C, on several days during March 1979.

SEDIMENT CONCENTRATION: Maximum daily mean, 27,400 mg/L, June 22, 1976; minimum daily mean, 2 mg/L, Dec. 21, 1983.

SEDIMENT LOAD: Maximum daily, 1,680,000 tons, June 22, 1976; minimum daily, 33 tons, Dec. 21, 1983.

EXTREMES FOR CURRENT YEAR.--

SEDIMENT CONCENTRATION: During period of collection, maximum daily mean, 16,600 mg/L, Apr. 16; minimum daily mean, 86 mg/L, Aug. 6.

SEDIMENT LOAD: During period of seasonal collection, maximum daily, 392,000 tons, Apr. 16; minimum daily, 986 tons, Sept. 9.

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

Date	Time	Instantaneous discharge, cfs (00061)	Specific conductance, wat unf uS/cm 25 degC (00095)	Temperature, air, deg C (00020)	Temperature, water, deg C (00010)	Suspnd. sedi- ment, sieve diametr percent <.063mm (70331)	Sus- pended sedi- ment concen- tration mg/L (80154)	Sus- pended sedi- ment load, tons/d (80155)	Bed sedi- ment, dry svd sve dia percent <.063mm (80164)	Bed sedi- ment, dry svd sve dia percent <.125mm (80165)	
OCT 2002	02...	1730	5460	479	11.5	11.5	30	258	3800	<1	1
APR 2003	15...	1300	6600	513	12.0	14.0	67	1410	25200	<1	<1
JUN	10...	1400	11700	372	--	15.0	44	584	18400	56	84
JUL	21...	1315	4700	389	32.5	26.0	17	285	3620	<1	9

Date	Bed sedi- ment, dry svd sve dia percent <.25mm (80166)	Bed sedi- ment, dry svd sve dia percent <.5 mm (80167)	Bed sedi- ment, dry svd sve dia percent <1 mm (80168)	Bed sedi- ment, dry svd sve dia percent <2 mm (80169)	Bed sedi- ment, dry svd sve dia percent <4 mm (80170)	Bed sedi- ment, dry svd sve dia percent <8 mm (80171)	Bed sedi- ment, dry svd sve dia percent <16 mm (80172)
OCT 2002	7	60	91	96	98	99	100
APR 2003	3	50	87	97	99	100	100
JUN	92	96	98	98	99	99	100
JUL	85	96	99	99	99	100	100

## MISSOURI RIVER MAIN STEM

06115200 MISSOURI RIVER NEAR LANDUSKY, MT--Continued

SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MEAN CONCENTRATION (MG/L)		MEAN LOAD (TONS/ DAY)		MEAN CONCENTRATION (MG/L)		MEAN LOAD (TONS/ DAY)		MEAN CONCENTRATION (MG/L)		MEAN LOAD (TONS/ DAY)	
	OCTOBER	NOVEMBER	DECEMBER	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER
1	255	3760	151	2160	---	---	---	---	---	---	---	---
2	262	3740	150	2110	---	---	---	---	---	---	---	---
3	255	3510	145	2040	---	---	---	---	---	---	---	---
4	237	3270	135	1900	---	---	---	---	---	---	---	---
5	225	3240	121	1630	---	---	---	---	---	---	---	---
6	219	3120	109	1470	---	---	---	---	---	---	---	---
7	217	2980	108	1460	---	---	---	---	---	---	---	---
8	211	2890	114	1540	---	---	---	---	---	---	---	---
9	208	2880	120	1660	---	---	---	---	---	---	---	---
10	206	2850	125	1710	---	---	---	---	---	---	---	---
11	205	2770	130	1780	---	---	---	---	---	---	---	---
12	203	2790	135	1890	---	---	---	---	---	---	---	---
13	200	2720	141	2070	---	---	---	---	---	---	---	---
14	198	2650	147	2290	---	---	---	---	---	---	---	---
15	193	2540	150	2260	---	---	---	---	---	---	---	---
16	188	2580	154	2220	---	---	---	---	---	---	---	---
17	184	2500	157	2220	---	---	---	---	---	---	---	---
18	180	2450	162	2280	---	---	---	---	---	---	---	---
19	175	2380	168	2330	---	---	---	---	---	---	---	---
20	169	2320	174	2450	---	---	---	---	---	---	---	---
21	162	2250	175	2540	---	---	---	---	---	---	---	---
22	158	2230	175	2580	---	---	---	---	---	---	---	---
23	162	2270	175	2580	---	---	---	---	---	---	---	---
24	178	2490	175	2520	---	---	---	---	---	---	---	---
25	183	2520	174	2500	---	---	---	---	---	---	---	---
26	178	2460	174	2590	---	---	---	---	---	---	802	13000
27	161	2230	175	2690	---	---	---	---	---	---	764	12800
28	152	2060	175	2600	---	---	---	---	---	---	672	11600
29	150	2100	175	2570	---	---	---	---	---	---	586	9810
30	150	2130	176	2650	---	---	---	---	---	---	646	10800
31	150	2050	---	---	---	---	---	---	---	---	652	10700
TOTAL	---	82730	---	65290	---	---	---	---	---	---	---	---
1	534	8790	910	20400	1150	46900	470	10300	116	1320	100	1060
2	506	8200	646	13900	1180	50000	409	8770	101	1150	100	1040
3	492	7970	600	12500	915	36300	360	7520	90	1030	100	1020
4	646	11000	572	11900	770	28900	353	7160	87	1040	165	1700
5	700	12700	2830	64200	680	25000	329	6490	88	1060	208	2130
6	625	11300	3810	89100	803	31700	265	4680	86	1070	102	1020
7	530	9160	1540	34500	690	27000	266	4800	260	3260	100	991
8	460	7950	690	15500	594	21700	237	3940	900	11800	100	999
9	430	6830	680	15000	559	18900	268	4210	330	4050	100	986
10	392	6210	570	12600	532	16900	307	4760	250	3190	100	996
11	380	5960	538	12000	473	14000	281	4160	275	3500	100	1010
12	415	6470	524	11800	760	22600	246	3400	344	4570	104	1070
13	419	6610	558	12900	1900	56900	240	3510	180	2130	181	1900
14	519	8930	699	16500	820	23700	230	3310	155	1800	165	1800
15	4400	85800	700	17000	819	23200	307	4560	155	1720	142	1530
16	16600	392000	608	13900	450	12400	306	4560	161	1740	140	1520
17	3000	62900	718	17700	495	13400	293	4320	144	1530	154	1730
18	1080	22400	800	20600	459	11800	284	4050	120	1220	159	1790
19	1050	22000	1120	31100	433	10900	275	3930	108	1110	226	2620
20	1280	27000	1220	35900	409	9920	262	3780	107	1120	197	2210
21	1100	21900	910	25800	1160	30500	235	3030	112	1160	165	1840
22	870	16900	930	25900	680	16500	172	2160	117	1180	120	1310
23	830	15600	810	22100	555	13500	128	1600	114	1140	114	1230
24	710	13400	670	18000	548	13200	124	1490	109	1120	114	1270
25	580	10800	590	15500	495	11700	112	1280	103	1090	115	1290
26	620	12000	700	18700	415	9800	103	1150	107	1120	115	1290
27	760	15200	985	27100	400	9500	96	1090	123	1350	115	1300
28	760	16300	799	24200	400	9440	96	1080	118	1280	115	1280
29	672	14700	1580	58400	456	10600	116	1410	107	1140	115	1240
30	920	20600	1220	44800	525	12000	125	1530	100	1060	115	1280
31	---	---	1050	40000	---	---	136	1630	100	1060	---	---
TOTAL	---	887580	---	799500	---	638860	---	119660	---	62110	---	42452



MISSOURI RIVER BASIN

06115270 ARMELLS CREEK NEAR LANDUSKY, MT

LOCATION.--Lat 47°36'38", long 108°41'41" (NAD 27), in NE<sup>1</sup>/<sub>4</sub>NW<sup>1</sup>/<sub>4</sub>SW<sup>1</sup>/<sub>4</sub> sec.6, T.21 N., R.24 E., Fergus County, Hydrologic Unit 10040104, on right bank at downstream side of bridge on U.S. Highway 191, 1.5 mi south of Fred Robinson Bridge, 22 mi south of Landusky, and at river mile 1.1.

DRAINAGE AREA.--397 mi<sup>2</sup>.

PERIOD OF RECORD.--February 2000 to current year.

REVISED RECORDS.--WSP 1729: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 2,280 ft (NGVD 29).

REMARKS.--Records good except those for estimated daily discharges, which are poor. U. S. Geological Survey satellite telemeter at station. Several observations of water temperature and specific conductance were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.00	0.00	0.00	e0.00	e0.00	e0.00	0.00	0.61	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	e0.00	e0.00	e0.00	0.00	0.34	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	e0.00	e0.00	e0.00	0.00	0.63	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	e0.00	e0.00	e0.00	0.00	0.88	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	e0.00	e0.00	e0.00	0.00	76	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	e0.00	e0.00	e0.00	0.00	148	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	e0.00	e0.00	0.00	0.00	45	0.00	0.00	0.10	0.00
8	0.00	0.00	0.00	e0.00	e0.00	0.00	0.00	12	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	e0.00	e0.00	0.00	0.00	11	9.8	0.00	0.00	0.00
10	0.00	0.00	0.00	e0.00	e0.00	0.00	0.00	11	6.5	0.00	0.00	0.00
11	0.00	0.00	e0.00	e0.00	e0.00	0.00	0.00	13	4.5	0.00	0.00	0.00
12	0.00	0.00	e0.10	e0.00	e0.00	0.00	0.00	18	4.6	0.00	0.00	0.00
13	0.00	0.00	e0.00	e0.00	e0.00	112	0.00	9.0	3.0	0.00	0.00	0.00
14	0.00	0.00	e0.00	e0.00	e0.00	1380	0.00	5.0	4.2	0.00	0.00	0.00
15	0.00	0.00	e0.00	0.00	e0.00	519	0.00	3.1	3.0	0.00	0.00	0.00
16	0.00	0.00	e0.00	0.00	e0.00	266	152	4.5	1.4	0.00	0.00	0.00
17	0.00	0.00	0.00	0.00	e0.00	85	35	7.7	0.57	0.00	0.00	0.00
18	0.00	0.00	0.00	0.00	e0.00	27	11	5.7	0.09	0.00	0.00	0.00
19	0.00	0.00	0.00	0.00	e0.00	11	6.6	129	0.00	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00	e0.00	4.2	5.4	68	0.00	0.00	0.00	0.00
21	0.00	0.00	e0.00	0.00	e0.00	1.6	3.7	26	0.00	0.00	0.00	0.00
22	0.00	0.00	e0.00	0.00	e0.00	0.34	1.7	12	0.00	0.00	0.00	0.00
23	0.00	0.00	e0.00	0.00	e0.00	0.04	0.76	6.8	0.89	0.00	0.00	0.00
24	0.00	0.00	e0.00	0.00	e0.00	0.00	0.29	4.3	0.45	0.00	0.00	0.00
25	0.00	0.00	e0.00	0.00	e0.00	0.00	0.13	2.8	0.10	0.00	0.00	0.00
26	0.00	0.00	e0.00	0.00	e0.00	0.00	0.28	1.9	0.00	0.00	0.00	0.00
27	0.00	0.00	e0.00	0.00	e0.00	0.00	0.59	1.2	0.00	0.00	0.00	0.00
28	0.00	0.00	e0.00	e0.30	e0.00	0.00	4.7	0.62	0.00	0.00	0.00	0.00
29	0.00	0.00	e0.00	e0.00	---	0.00	2.3	0.26	0.00	0.00	0.00	0.00
30	0.00	0.00	e0.00	e0.00	---	0.00	1.2	0.05	0.00	0.00	0.00	0.00
31	0.00	---	e0.00	e0.00	---	0.00	---	0.00	---	0.00	0.00	---
TOTAL	0.00	0.00	0.10	0.30	0.00	2406.18	225.65	624.39	39.10	0.00	0.10	0.00
MEAN	0.000	0.000	0.003	0.010	0.000	77.6	7.52	20.1	1.30	0.000	0.003	0.000
MAX	0.00	0.00	0.10	0.30	0.00	1380	152	148	9.8	0.00	0.10	0.00
MIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AC-FT	0.00	0.00	0.2	0.6	0.00	4770	448	1240	78	0.00	0.2	0.00

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 2000 - 2003, BY WATER YEAR (WY)

MEAN	0.000	0.000	0.001	0.003	0.59	20.7	2.43	5.14	4.10	8.97	0.77	0.000
MAX	0.000	0.000	0.003	0.010	2.28	77.6	7.52	20.1	8.45	32.1	2.17	0.000
(WY)	2001	2001	2003	2003	2000	2003	2003	2003	2001	2001	2002	2000
MIN	0.000	0.000	0.000	0.000	0.000	0.53	0.000	0.000	0.003	0.000	0.000	0.000
(WY)	2001	2001	2001	2001	2001	2001	2001	2001	2000	2003	2000	2000

SUMMARY STATISTICS FOR 2002 CALENDAR YEAR FOR 2003 WATER YEAR WATER YEARS 2000 - 2003

ANNUAL TOTAL	384.87	3295.82		
ANNUAL MEAN	1.05	9.03	4.54	
HIGHEST ANNUAL MEAN			9.03	2003
LOWEST ANNUAL MEAN			1.05	2002
HIGHEST DAILY MEAN	86	Jun 11	1380	Mar 14 2003
LOWEST DAILY MEAN	0.00	Jan 1	0.00	Oct 1 2000
ANNUAL SEVEN-DAY MINIMUM	0.00	Jan 1	0.00	Oct 1 2000
MAXIMUM PEAK FLOW			a2910	Mar 14 2003
MAXIMUM PEAK STAGE			12.85	Mar 14 2003
ANNUAL RUNOFF (AC-FT)	763	6540	3290	
10 PERCENT EXCEEDS	0.29	4.2	1.6	
50 PERCENT EXCEEDS	0.00	0.00	0.00	
90 PERCENT EXCEEDS	0.00	0.00	0.00	

a--On the basis of slope-area measurement of peak flow.  
e--Estimated.

MISSOURI RIVER BASIN

06115300 DUVAL CREEK NEAR LANDUSKY, MT

LOCATION.--Lat 47°45'17", long 108°42'23" (NAD 27), in SW<sup>1</sup>/<sub>4</sub>NW<sup>1</sup>/<sub>4</sub> SE<sup>1</sup>/<sub>4</sub> sec.13, T.23 N., R.23 E., Phillips County, Hydrologic Unit 10040104, at culvert on U.S. Highway 191 at milepost 98, 10.0 miles north of Fred Robinson Bridge, and 11 mi southwest of Landusky.

DRAINAGE AREA.--3.3 mi<sup>2</sup>.

PERIOD OF RECORD.--February 2000 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 2,900 ft (NGVD 29), from topographic map. Prior to Jan. 19, 2000, peak flow gage only at present site and elevation.

REMARKS.--Records good except those days with flow, which are fair and those for estimated daily discharges, which are poor. Several observations of water temperature and specific conductance were made during the year.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum discharge, 660 ft<sup>3</sup>/s, June 29, 1991, gage height, 13.83 ft, present site and elevation. Site operated as crest-stage gage from May 1963 to January 2000.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.00	0.00	0.00	0.00	0.00	e0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	e0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	e0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	e0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	e0.00	0.00	0.02	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	e0.00	0.00	0.01	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	e0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	e0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	e0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	e0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	0.00	0.00	0.00	0.00	0.00	e7.0	0.00	0.00	0.00	0.00	0.00	0.00
12	0.00	0.00	0.00	0.00	0.00	e5.5	0.00	0.00	0.00	0.00	0.00	0.00
13	0.00	0.00	0.00	0.00	0.00	e13	0.00	0.00	0.00	0.00	0.00	0.00
14	0.00	0.00	0.00	0.00	0.00	e20	0.00	0.00	0.00	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00	e9.0	0.00	0.00	0.00	0.00	0.00	0.00
16	0.00	0.00	0.00	0.00	0.02	0.53	0.00	0.00	0.00	0.00	0.00	0.00
17	0.00	0.00	0.00	0.00	0.10	0.08	0.00	0.00	0.00	0.00	0.00	0.00
18	0.00	0.00	0.00	0.00	0.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	0.00	0.00	0.00	0.00	1.2	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00	2.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21	0.00	0.00	0.00	0.00	0.96	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	0.00	0.00	0.00	0.00	0.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00
23	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	0.00	0.00	0.00	0.00	e0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25	0.00	0.00	0.00	0.00	e0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26	0.00	0.00	0.00	0.00	e0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
27	0.00	0.00	0.00	0.00	e0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	0.00	0.00	0.00	0.00	e0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
29	0.00	0.00	0.00	0.00	---	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30	0.00	0.00	0.00	0.00	---	0.00	0.00	0.00	0.00	0.00	0.00	0.00
31	0.00	---	0.00	0.00	---	0.00	---	0.00	---	0.00	---	---
TOTAL	0.00	0.00	0.00	0.00	5.25	55.11	0.00	0.03	0.00	0.00	0.00	0.00
MEAN	0.000	0.000	0.000	0.000	0.19	1.78	0.000	0.001	0.000	0.000	0.000	0.000
MAX	0.00	0.00	0.00	0.00	2.5	20	0.00	0.02	0.00	0.00	0.00	0.00
MIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AC-FT	0.00	0.00	0.00	0.00	10	109	0.00	0.06	0.00	0.00	0.00	0.00

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 2000 - 2003, BY WATER YEAR (WY)

	2000	2001	2002	2003	2000	2001	2002	2003	2000	2001	2002	2003
MEAN	0.000	0.000	0.000	0.064	0.000	0.45	0.000	0.000	0.051	0.16	0.14	0.000
MAX	0.000	0.000	0.000	0.19	0.000	1.78	0.000	0.001	0.17	0.63	0.56	0.000
(WY)	2001	2001	2001	2003	2000	2003	2000	2003	2002	2002	2002	2000
MIN	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
(WY)	2001	2001	2001	2001	2001	2000	2000	2000	2000	2000	2000	2000

SUMMARY STATISTICS FOR 2002 CALENDAR YEAR FOR 2003 WATER YEAR WATER YEARS 2000 - 2003

ANNUAL TOTAL	42.58	60.39	
ANNUAL MEAN	0.12	0.17	0.095
HIGHEST ANNUAL MEAN			0.17 2003
LOWEST ANNUAL MEAN			0.003 2001
HIGHEST DAILY MEAN	19 Jul 8	20 Mar 14	20 Mar 14 2003
LOWEST DAILY MEAN	0.00 Jan 1	0.00 Oct 1	0.00 Feb 1 2000
ANNUAL SEVEN-DAY MINIMUM	0.00 Jan 1	0.00 Oct 1	0.00 Feb 1 2000
MAXIMUM PEAK FLOW		118 Mar 14	238 Jul 8 2002
MAXIMUM PEAK STAGE		a4.65 Mar 14	6.55 Jul 8 2002
ANNUAL RUNOFF (AC-FT)	84	120	69
10 PERCENT EXCEEDS	0.00	0.00	0.00
50 PERCENT EXCEEDS	0.00	0.00	0.00
90 PERCENT EXCEEDS	0.00	0.00	0.00

a--During period of no gage-height record, from crest-stage gage.  
e--Estimated.

MISSOURI RIVER BASIN

06115350 ROCK CREEK NEAR LANDUSKY, MT

LOCATION.--Lat 47°42'17", long 108°32'49" (NAD 27), in NW¼NW¼ NW¼ sec.5, T.22 N., R.25 E., Phillips County, Hydrologic Unit 10040104, on left bank at Charles M. Russell National Wildlife Refuge boundary and 14 mi southeast of Landusky.

DRAINAGE AREA.--72.9 mi².

PERIOD OF RECORD.--November 1999 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 2,670 ft (NGVD 29), from topographic map.

REMARKS.--Records fair except those for estimated daily discharges, which are poor. U.S. Geological Survey satellite telemeter at station. Several observations of water temperature and specific conductance were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003 DAILY MEAN VALUES

Table with 13 columns: DAY, OCT, NOV, DEC, JAN, FEB, MAR, APR, MAY, JUN, JUL, AUG, SEP. Rows 1-31 show daily discharge values. Summary rows include TOTAL, MEAN, MAX, MIN, and AC-FT.

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 2000 - 2003, BY WATER YEAR (WY)

Table with 13 columns for months (OCT-SEP) and 4 rows for MEAN, MAX (WY), MIN, and (WY).

SUMMARY STATISTICS FOR 2002 CALENDAR YEAR FOR 2003 WATER YEAR WATER YEARS 2000 - 2003

Table with 4 columns: 2002 CALENDAR YEAR, 2003 WATER YEAR, and two columns for WATER YEARS 2000 - 2003. Rows include ANNUAL TOTAL, ANNUAL MEAN, HIGHEST ANNUAL MEAN, LOWEST ANNUAL MEAN, HIGHEST DAILY MEAN, LOWEST DAILY MEAN, ANNUAL SEVEN-DAY MINIMUM, MAXIMUM PEAK FLOW, MAXIMUM PEAK STAGE, ANNUAL RUNOFF (AC-FT), 10 PERCENT EXCEEDS, 50 PERCENT EXCEEDS, 90 PERCENT EXCEEDS.

a--On the basis of slope-area measurement of peak flow. e--Estimated.

## MUSSELSHELL RIVER BASIN

06119600 MUSSELSHELL RIVER NEAR MARTINSDALE, MT

LOCATION.--Lat 46°28'37", long 110°14'54" (NAD 27), in SW<sup>1</sup>/<sub>4</sub>SW<sup>1</sup>/<sub>4</sub>SE<sup>1</sup>/<sub>4</sub> sec. 5, T.8N., R.12E., Wheatland County, Hydrologic Unit 10040201, on right bank at private road bridge, 1.7 mi downstream from confluence of North and South Forks, 3.2 mi northeast of Martinsdale, and at river mile 362.5.

DRAINAGE AREA.--538 mi<sup>2</sup>.

PERIOD OF RECORD.--April 2003 to October 2003 (seasonal records only).

GAGE.--Water-stage recorder. Elevation of gage is 4,660 ft (NGVD 29).

REMARKS.--Seasonal records good except those for estimated daily discharges, which are poor. Some regulation by Bair and Martinsdale Reservoirs. Diversions for irrigation of about 21,900 acres upstream from station of which about 21,400 acres are flood irrigated. U. S. Geological Survey satellite telemeter at station. Several observations of water temperature and specific conductance were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003  
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1				e20	183	252	48	22	8.9	17		
2				e25	126	219	48	21	8.4	17		
3				e22	121	221	51	22	7.6	18		
4				e20	170	217	47	28	8.8	18		
5				e20	123	172	46	27	8.6	18		
6				e22	107	180	46	27	8.5	16		
7				e20	110	170	44	25	7.1	13		
8				e18	149	135	35	23	7.7	12		
9				e17	174	117	38	22	8.5	12		
10				e17	192	117	40	22	8.8	13		
11				e18	184	143	53	22	11	13		
12				e17	171	64	67	23	14	15		
13				e15	168	53	69	22	19	17		
14				e30	170	52	67	18	19	18		
15				e70	174	57	65	17	19	18		
16				e80	188	59	61	13	19	22		
17				e75	206	54	58	13	21	21		
18				e80	243	51	56	12	19	20		
19				e75	186	49	54	12	19	19		
20				e70	144	43	53	12	19	20		
21				e65	120	81	51	11	18	20		
22				e60	112	88	49	11	18	19		
23				e75	114	85	44	11	18	20		
24				123	148	78	44	11	17	21		
25				309	213	77	47	10	17	21		
26				447	294	63	43	9.6	15	22		
27				403	396	53	48	9.7	15	22		
28				337	387	46	37	10	16	24		
29				307	324	41	28	9.6	16	29		
30				241	299	39	25	9.8	16	32		
31				---	304	---	23	9.6	---	29		
TOTAL				3098	6000	3076	1485	515.3	427.9	596		
MEAN				103	194	103	47.9	16.6	14.3	19.2		
MAX				447	396	252	69	28	21	32		
MIN				15	107	39	23	9.6	7.1	12		
AC-FT				6140	11900	6100	2950	1020	849	1180		

## SUMMARY STATISTICS

## FOR 2003 SEASON

HIGHEST DAILY MEAN	447	Apr 26
LOWEST DAILY MEAN	7.1	Sep 7
MAXIMUM PEAK FLOW	465	Apr 26
MAXIMUM PEAK STAGE	3.67	Apr 26
INSTANTANEOUS LOW FLOW	a6.4	Sep 3

a--Gage height, 1.49 ft.

e--Estimated.

MUSSELSHELL RIVER BASIN

06120500 MUSSELSHELL RIVER AT HARLOWTON, MT

LOCATION (REVISED).--Lat 46°25'48", long 109°50'24" (NAD 27), in SW 1/4 NW 1/4 NW 1/4 sec.27, T.8 N., R.15 E., Wheatland County, Hydrologic Unit 10040201, on right bank at downstream of bridge on U.S. Highway 191, 1.0 mi southwest of Harlowton, 9.6 mi upstream from American Fork, and at river mile 327.8.

DRAINAGE AREA.--1,125 mi<sup>2</sup>.

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.

REVISED RECORDS.--WSP 1309: 1912, 1915(M), 1918, 1925. WSP 1729: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 4,171.46 ft (NGVD 29) (levels by Morrison and Maierle, Inc.). Prior to Dec. 8, 1937, nonrecording gages at site 1.2 mi downstream at different elevations. Dec. 8, 1937 to Aug. 26, 1955, nonrecording gage at previous bridge 50 ft downstream at elevation 2.0 ft higher. Aug. 27, 1955 to Apr. 9, 2003, water-stage recorder 350 ft downstream at same elevation.

REMARKS.--Records good except those for Oct. 1 to Apr. 9 and those for June 12-16, which are poor. Some regulation by Bair and Martinsdale Reservoirs. Diversions for irrigation of about 21,900 acres upstream from station of which about 21,400 acres are flood irrigated. U. S. Geological Survey satellite telemeter at station. Several observations of water temperature and specific conductance were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	29	e26	e37	e43	e50	e30	41	270	294	77	29	12
2	33	e28	e40	e45	e45	e30	48	193	254	77	26	9.4
3	35	e30	e35	e45	e40	e28	52	157	229	72	24	8.8
4	40	e29	e35	e45	e40	e25	48	156	217	81	23	8.3
5	40	e28	e40	e45	e40	e27	45	181	200	85	25	6.1
6	40	e32	e45	e45	e35	e27	43	133	197	87	22	3.2
7	37	35	e55	e45	e30	e23	42	123	209	90	22	2.3
8	36	33	e50	e45	e32	e20	43	131	168	83	22	1.9
9	34	33	e50	e40	e35	e25	41	156	143	68	24	2.1
10	35	32	e55	e35	e38	e30	37	179	148	68	26	4.1
11	42	35	e60	e40	e35	e40	36	190	243	84	23	5.5
12	43	37	e60	e45	e35	e60	38	184	e150	117	22	7.6
13	42	35	e65	e45	e35	e100	36	176	e120	124	31	13
14	42	35	e65	e40	e37	e130	35	178	e100	125	28	16
15	43	34	e60	e37	e40	e150	55	175	e100	124	26	16
16	47	36	e60	e35	e40	e120	87	183	e130	119	25	18
17	44	30	e55	e35	e40	84	93	195	115	112	26	21
18	43	29	e50	e38	e38	65	89	236	105	103	22	22
19	43	31	e50	e40	e38	54	92	252	89	100	21	21
20	43	38	e45	e40	e35	47	88	184	91	98	20	20
21	42	42	e45	e35	e35	42	81	137	91	94	18	20
22	44	46	e45	e30	e25	38	74	112	133	91	17	20
23	46	50	e40	e32	e18	38	72	100	153	86	15	19
24	47	50	e35	e35	e15	37	90	93	145	78	14	18
25	47	e25	e35	e40	e17	40	150	119	143	75	13	18
26	45	e27	e37	e45	e20	38	354	200	131	86	12	16
27	43	e30	e40	e45	e25	39	400	344	112	96	11	15
28	42	e33	e43	e40	e28	41	364	374	96	91	11	15
29	43	e35	e45	e40	---	40	340	360	89	74	11	16
30	e30	e35	e42	e45	---	40	313	308	84	54	12	19
31	e25	---	e45	e50	---	40	---	321	---	36	12	---
TOTAL	1245	1019	1464	1265	941	1548	3327	6100	4479	2755	633	394.3
MEAN	40.2	34.0	47.2	40.8	33.6	49.9	111	197	149	88.9	20.4	13.1
MAX	47	50	65	50	50	150	400	374	294	125	31	22
MIN	25	25	35	30	15	20	35	93	84	36	11	1.9
AC-FT	2470	2020	2900	2510	1870	3070	6600	12100	8880	5460	1260	782

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1907 - 2003, BY WATER YEAR (WY)\*

MEAN	73.8	77.7	67.2	58.8	65.4	112	175	404	503	161	75.4	62.8
MAX	226	176	206	250	190	500	632	1957	2467	751	292	290
(WY)	1919	1942	1976	1918	1996	1918	1943	1917	1917	1975	1993	1993
MIN	0.000	0.000	0.000	0.000	10.0	20.4	22.1	11.8	27.9	0.84	0.000	0.000
(WY)	1932	1932	1932	1932	1936	1935	1931	1931	1930	1936	1931	1931

## MUSSELSHELL RIVER BASIN

## 06120500 MUSSELSHELL RIVER AT HARLOWTON, MT--Continued

SUMMARY STATISTICS	FOR 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1907 - 2003*	
ANNUAL TOTAL	18293		25170.3			
ANNUAL MEAN	50.1		69.0		155	
HIGHEST ANNUAL MEAN					483 1917	
LOWEST ANNUAL MEAN					21.1 1935	
HIGHEST DAILY MEAN	384	Jun 4	400	Apr 27	6200	Jun 20 1975
LOWEST DAILY MEAN	10	Jul 24	1.9	Sep 8	0.00	Aug 4 1910
ANNUAL SEVEN-DAY MINIMUM	12	Aug 31	3.6	Sep 5	0.00	Aug 4 1910
MAXIMUM PEAK FLOW			a411	Apr 27	7270	Jun 20 1975
MAXIMUM PEAK STAGE			b4.20	Mar 15	10.01	Jun 20 1975
INSTANTANEOUS LOW FLOW			c1.4	Sep 8	0.01	Aug 29 2001
ANNUAL RUNOFF (AC-FT)	36280		49930		112400	
10 PERCENT EXCEEDS	113		156		356	
50 PERCENT EXCEEDS	35		42		75	
90 PERCENT EXCEEDS	15		19		25	

\*--During periods of operation (July 1907 to November 1929, March 1930 to December 1932, April to August 1933, February 1934 to current year).

a--Gage height, 4.06 ft.

b--Backwater from ice.

c--Gage height, 2.22 ft.

e--Estimated.

MUSSELSHELL RIVER BASIN

06123030 MUSSELSHELL RIVER ABOVE MUD CREEK, NEAR SHAWMUT, MT

LOCATION.--Lat 46°19'07", long 109°27'35" (NAD 27), in NE<sup>1</sup>/<sub>4</sub>SW<sup>1</sup>/<sub>4</sub>SW<sup>1</sup>/<sub>4</sub> sec.34, T.7 N., R.18 E., Wheatland County, Hydrologic Unit 10040201, on left bank at private road bridge, 14.1 mi downstream from diversion to Deadmans Basin Reservoir, 3.5 mi southeast of Shawmut, 3.7 mi west of Barber, and at river mile 294.8.

DRAINAGE AREA.--1,513 mi<sup>2</sup>.

PERIOD OF RECORD.--June 1998 to current season (seasonal records only).

REVISED RECORDS.--WDR MT-03-1: 2002-02 (M).

GAGE.--Water-stage recorder. Elevation of gage is 3,780 ft (NGVD 29).

REMARKS.--Seasonal records good. Diversions for irrigation of about 27,000 acres upstream from station. U.S. Geological Survey satellite telemeter at station. Several observations of water temperature and specific conductance were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 2003  
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1				4.6	230	193	65	37	6.6	14		
2				5.4	172	168	60	28	6.3	6.8		
3				5.6	114	145	57	24	6.3	4.9		
4				5.3	107	128	61	22	6.0	5.4		
5				5.1	125	117	55	15	4.6	4.3		
6				4.9	134	138	55	15	3.2	4.0		
7				4.5	96	146	38	13	2.8	3.9		
8				4.5	79	122	41	9.8	2.5	4.0		
9				4.6	80	94	38	8.2	2.3	4.2		
10				4.4	82	82	31	7.3	2.1	5.1		
11				4.3	113	78	26	10	1.9	6.5		
12				4.3	131	114	26	16	2.0	6.4		
13				4.2	149	80	43	16	2.3	6.0		
14				4.1	103	61	60	16	2.2	7.0		
15				5.3	102	49	71	18	2.4	8.1		
16				5.4	98	49	72	16	10	10		
17				5.2	108	52	65	16	14	10		
18				4.9	129	48	56	16	15	11		
19				4.7	171	44	49	15	17	15		
20				6.1	135	40	43	14	18	15		
21				20	86	93	42	13	17	14		
22				14	71	98	41	12	17	17		
23				11	63	142	36	11	17	16		
24				11	57	152	35	10	19	14		
25				33	54	141	37	8.5	18	15		
26				176	93	137	51	7.9	17	15		
27				366	130	86	67	5.8	17	16		
28				373	174	69	74	6.6	15	17		
29				346	208	74	72	6.4	14	20		
30				282	191	69	64	6.4	14	e18		
31				---	179	---	51	6.3	---	e15		
TOTAL				1729.4	3764	3009	1582	426.2	292.5	328.6		
MEAN				57.6	121	100	51.0	13.7	9.75	10.6		
MAX				373	230	193	74	37	19	20		
MIN				4.1	54	40	26	5.8	1.9	3.9		
AC-FT				3430	7470	5970	3140	845	580	652		

STATISTICS OF MONTHLY MEAN DATA FOR SEASONS 1998 - 2003

MEAN	25.9	57.4	127	61.7	28.1	25.7	27.2
MAX	57.6	121	279	201	97.8	70.8	65.4
(WY)	2003	2003	1998	1998	1998	1998	1999
MIN	3.91	8.96	14.4	9.88	1.68	1.38	3.48
(WY)	2002	2001	2000	2000	2000	2000	2002

SUMMARY STATISTICS

	FOR 2003 SEASON		SEASONS 1998 - 2003	
HIGHEST DAILY MEAN	373	Apr 28	661	Jun 22 1998
LOWEST DAILY MEAN	1.9	Sep 11	0.18	Sep 28 2001
MAXIMUM PEAK FLOW	400	Apr 27	672	Jun 22 1998
MAXIMUM PEAK STAGE	3.80	Apr 27	4.57	Jun 22 1998

e--Estimated.

## MUSSELSHELL RIVER BASIN

## 06126050 MUSSELSHELL RIVER NEAR LAVINA, MT

LOCATION.--Lat 46°17'34", long 108°53'31" (NAD 27), in SW<sup>1</sup>/<sub>4</sub>SW<sup>1</sup>/<sub>4</sub>SE<sup>1</sup>/<sub>4</sub> sec. 6, T.6 N., R.23 E., Golden Valley County, Hydrologic Unit 10040201, on left bank, at private bridge 2.2 mi east of Lavina, 4.4 mi downstream from Big Coulee Creek, and at river mile 245.7.

DRAINAGE AREA.--2,970 mi<sup>2</sup>.

PERIOD OF RECORD.--April 1992 to current year (seasonal record only).

GAGE.--Water-stage recorder. Elevation of gage is 3,400 ft (NGVD 29).

REMARKS.--Seasonal records good. Some regulation by Bair (station number 06116500), Martinsdale (station number 06119000), and Deadman's Basin (station number 06122500) Reservoirs. Diversions for irrigation of about 31,900 acres upstream from station, of which about 29,700 acres is flood irrigated. Several observations of water temperature and specific conductance were made during the year. U.S. Geological Survey satellite telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 2003  
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1				8.8	243	158	171	101	10	12		
2				8.8	202	170	156	85	11	12		
3				6.3	157	162	178	84	11	13		
4				7.1	124	148	222	69	11	12		
5				9.3	117	143	233	66	11	9.6		
6				12	138	131	225	46	12	7.1		
7				14	153	149	222	38	14	5.7		
8				13	131	158	255	35	15	4.7		
9				13	120	152	308	22	18	4.3		
10				12	127	139	265	23	15	5.9		
11				6.6	134	288	241	16	13	5.9		
12				6.6	163	287	245	21	12	5.2		
13				5.6	180	199	239	27	12	4.9		
14				5.6	187	140	251	30	13	5.4		
15				5.4	155	96	276	26	12	7.0		
16				7.5	164	157	279	25	10	8.8		
17				8.6	155	200	257	35	11	8.1		
18				8.4	170	119	227	44	11	9.4		
19				8.3	196	101	217	42	12	11		
20				8.0	183	74	211	36	11	12		
21				3.6	132	72	183	27	12	13		
22				2.7	99	113	175	22	14	16		
23				3.4	90	145	167	22	14	16		
24				6.0	61	160	150	21	13	16		
25				12	47	167	116	22	13	17		
26				39	74	164	112	20	13	17		
27				165	111	161	122	21	13	18		
28				307	141	126	140	20	14	18		
29				316	159	118	155	16	14	21		
30				292	177	147	158	17	13	22		
31				---	174	---	138	14	---	e20		
TOTAL				1321.6	4464	4544	6294	1093	378	358.0		
MEAN				44.1	144	151	203	35.3	12.6	11.5		
MAX				316	243	288	308	101	18	22		
MIN				2.7	47	72	112	14	10	4.3		
AC-FT				2620	8850	9010	12480	2170	750	710		

## STATISTICS OF MONTHLY MEAN DATA FOR SEASONS 1992 - 2003

MEAN	109	308	525	315	186	133	86.0
MAX	466	919	2733	1061	507	525	335
(WY)	1996	1997	1997	1997	1993	1993	1994
MIN	8.33	36.7	67.8	35.8	3.00	2.22	0.87
(WY)	2001	2002	2001	2002	2002	2000	2002

## SUMMARY STATISTICS

## FOR 2003 SEASON

## SEASONS 1992 - 2003

HIGHEST DAILY MEAN	316	Apr 29	5850	Jun 14 1997
LOWEST DAILY MEAN	2.7	Apr 22	0.00	Sep 26 2001
MAXIMUM PEAK FLOW	416	Jun 11	6220	Jun 14 1997
MAXIMUM PEAK STAGE	3.83	Jun 11	11.13	Jun 14 1997

e--Estimated.



MUSSELSHELL RIVER BASIN

06126500 MUSSELSHELL RIVER NEAR ROUNDUP, MT

LOCATION.--Lat 46°25'41", long 108°34'19" (NAD 27), in NW 1/4 SE 1/4 SE 1/4 sec. 22, T.8 N., R.25 E., Musselshell County, Hydrologic Unit 10040202, on left bank 20 ft downstream from Halfbreed Creek, 0.1 mi upstream from bridge on U.S. Highway 87, 2.0 mi southwest of Roundup, and at river mile 211.6.

DRAINAGE AREA.--4,023 mi<sup>2</sup>.

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

REVISED RECORDS.--WSP 1086: 1946. WSP 1729: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 3,188.15 ft (NGVD 29) (levels by U.S. Army Corps of Engineers). Prior to Sept. 26, 1949, nonrecording gage at present site and elevation.

REMARKS.--Records good except those for estimated daily discharge, which are poor. Some regulation by Bair (station number 06116500), Martinsdale (station number 06119000) and Deadman's Basin (station number 06122500) Reservoirs. Diversions for irrigation of about 39,100 acres upstream from station, of which about 35,900 acres are flood irrigated. Several observations of water temperature and specific conductance were made during the year. U.S. Army Corps of Engineers satellite telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003 DAILY MEAN VALUES

Table with 13 columns (DAY, OCT, NOV, DEC, JAN, FEB, MAR, APR, MAY, JUN, JUL, AUG, SEP) and 31 rows of daily mean discharge data, including summary statistics at the bottom.

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1947 - 2003, BY WATER YEAR (WY)

Table with 13 columns (MEAN, MAX, (WY), MIN, (WY)) and 13 rows of monthly mean data statistics for water years 1947-2003.

SUMMARY STATISTICS FOR 2002 CALENDAR YEAR FOR 2003 WATER YEAR WATER YEARS 1947 - 2003

Table with 4 columns (ANNUAL TOTAL, ANNUAL MEAN, HIGHEST ANNUAL MEAN, LOWEST ANNUAL MEAN, etc.) and 13 rows of summary statistics for 2002, 2003, and 1947-2003.

- a--October 1 to 4.
b--Gage height, 2.91 ft.
c--Backwater from ice.
d--Median of yearly mean discharges, 184 ft<sup>3</sup>/s, 133,330 ac-ft/yr.
e--Estimated.
f--Gage height, 12.45 ft.
g--Ice jam.

MUSSELSHELL RIVER BASIN

06127020 WILLOW CREEK ABOVE LMGA RESERVOIR, NEAR ROUNDUP, MT

LOCATION.--Lat 46°36'52", long 108°41'40" (NAD 27), in NW<sup>1</sup>/<sub>4</sub>NW<sup>1</sup>/<sub>4</sub>SW<sup>1</sup>/<sub>4</sub> sec. 27, T.10 N., R.24 E., Musselshell County, Hydrologic Unit 10040202, on right bank, 0.8 mi upstream from Lake Mason Grazing Association Reservoir, and 12 mi northwest of Roundup.

DRAINAGE AREA.--124 mi<sup>2</sup>.

PERIOD OF RECORD.--September 1995 to current year (seasonal records only).

GAGE.--Water-stage recorder. Elevation of gage is 3,660 ft (NGVD 29).

REMARKS.--Seasonal records good. Numerous diversions upstream for irrigation. U. S. Geological Survey satellite telemeter at station. U.S. Geological Survey satellite telemeter at station. Several observations of water temperature and specific conductance were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 2003  
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1				0.00	0.00	0.00	0.00	0.00	0.00	0.00		
2				0.00	0.00	0.00	0.00	0.00	0.00	0.00		
3				0.00	0.00	0.00	0.00	0.00	0.00	0.00		
4				0.00	0.00	0.00	0.00	0.00	0.00	0.00		
5				0.00	0.00	0.00	0.00	0.00	0.00	0.00		
6				0.00	0.00	0.00	0.00	0.00	0.00	0.00		
7				0.00	0.00	0.00	0.00	0.00	0.00	0.00		
8				0.00	0.00	0.00	0.00	0.00	0.00	0.00		
9				0.00	0.00	0.00	0.00	0.00	0.00	0.00		
10				0.00	0.00	0.00	0.00	0.00	0.00	0.00		
11				0.00	0.00	0.00	0.00	0.00	0.00	0.00		
12				0.00	0.00	0.00	0.00	0.00	0.00	0.00		
13				0.00	0.00	0.00	0.00	0.00	0.00	0.00		
14				0.00	0.00	0.00	0.00	0.00	0.00	0.00		
15				0.00	0.00	0.00	0.00	0.00	0.00	0.00		
16				0.00	0.00	0.00	0.00	0.00	0.00	0.00		
17				0.00	0.00	0.00	0.00	0.00	0.00	0.00		
18				0.00	0.00	0.00	0.00	0.00	0.00	0.00		
19				0.00	0.00	0.00	0.00	0.00	0.00	0.00		
20				0.00	0.00	0.00	0.00	0.00	0.00	0.00		
21				0.00	0.00	0.00	0.00	0.00	0.00	0.00		
22				0.00	0.00	0.00	0.00	0.00	0.00	0.00		
23				0.00	0.00	0.00	0.00	0.00	0.00	0.00		
24				0.00	0.00	0.00	0.00	0.00	0.00	0.00		
25				0.00	0.00	0.00	0.00	0.00	0.00	0.00		
26				0.00	0.00	0.00	0.00	0.00	0.00	0.00		
27				0.00	0.00	0.00	0.00	0.00	0.00	0.00		
28				0.00	0.00	0.00	0.00	0.00	0.00	0.00		
29				0.00	0.00	0.00	0.00	0.00	0.00	0.00		
30				0.00	0.00	0.00	0.00	0.00	0.00	0.00		
31				---	0.00	---	0.00	0.00	---	0.00		
TOTAL				0.00	0.00	0.00	0.00	0.00	0.00	0.00		
MEAN				0.000	0.000	0.000	0.000	0.000	0.000	0.000		
MAX				0.00	0.00	0.00	0.00	0.00	0.00	0.00		
MIN				0.00	0.00	0.00	0.00	0.00	0.00	0.00		
AC-FT				0.00	0.00	0.00	0.00	0.00	0.00	0.00		

STATISTICS OF MONTHLY MEAN DATA FOR SEASONS 1995 - 2003

MEAN		0.89	0.82	2.38	1.24	0.17	0.045	0.37
MAX		3.33	4.25	13.1	6.04	1.36	0.20	1.82
(WY)		1996	1996	1997	1997	1997	1996	1998
MIN		0.000	0.000	0.000	0.000	0.000	0.000	0.000
(WY)		2000	2000	2000	1999	1998	1998	1999

SUMMARY STATISTICS

FOR 2003 SEASON

SEASONS 1995 - 2003

HIGHEST DAILY MEAN	0.00	Apr 1	150	Jun 6 1997
LOWEST DAILY MEAN	0.00	Apr 1	a0.00	Aug 7 1996
MAXIMUM PEAK FLOW			b607	Jun 6 1997
MAXIMUM PEAK STAGE			5.84	Jun 6 1997

a--No flow many days most years.

b--From rating curve extended above 18 ft<sup>3</sup>/s on basis of slope-area measurement of peak flow.

MUSSELSHELL RIVER BASIN

06127060 WILLOW CREEK AT U.S. CANAL, NEAR ROUNDUP, MT

LOCATION.--Lat 46°33'17", long 108°40'42" (NAD 27), in SW 1/4 SE 1/4 NE 1/4 sec. 10, T.9 N., R.24 E., Musselshell County, Hydrologic Unit 10040202, on right bank, 12 mi northwest of Roundup.

DRAINAGE AREA.--141 mi<sup>2</sup>.

PERIOD OF RECORD.--September 1995 to current year (seasonal records only).

GAGE.--Water-stage recorder. Elevation of gage is 3,610 ft (NGVD 29).

REMARKS.--Seasonal records good. Regulation by Lake Mason Grazing Association Reservoir upstream from the gage. Numerous diversions upstream from station for irrigation. Several observations of water temperature and specific conductance were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 2003  
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1				0.00	0.00	0.00	0.00	0.00	0.00	0.00		
2				0.00	0.00	0.00	0.00	0.00	0.00	0.00		
3				0.00	0.00	0.00	0.00	0.00	0.00	0.00		
4				0.00	0.00	0.00	0.00	0.00	0.00	0.00		
5				0.00	0.00	0.00	0.00	0.00	0.00	0.00		
6				0.00	0.00	0.00	0.00	0.00	0.00	0.00		
7				0.00	0.00	0.00	0.00	0.00	0.00	0.00		
8				0.00	0.00	0.00	0.00	0.00	0.00	0.00		
9				0.00	0.00	0.00	0.00	0.00	0.00	0.00		
10				0.00	0.00	0.00	0.00	0.00	0.00	0.00		
11				0.00	0.00	0.00	0.00	0.00	0.00	0.00		
12				0.00	0.00	0.00	0.00	0.00	0.00	0.00		
13				0.00	0.00	0.00	0.00	0.00	0.00	0.00		
14				0.00	0.00	0.00	0.00	0.00	0.00	0.00		
15				0.00	0.00	0.00	0.00	0.00	0.00	0.00		
16				0.00	0.00	0.00	0.00	0.00	0.00	0.00		
17				0.00	0.00	0.00	0.00	0.00	0.00	0.00		
18				0.00	0.00	0.00	0.00	0.00	0.00	0.00		
19				0.00	0.00	0.00	0.00	0.00	0.00	0.00		
20				0.00	0.00	0.00	0.00	0.00	0.00	0.00		
21				0.00	0.00	0.00	0.00	0.00	0.00	0.00		
22				0.00	0.00	0.00	0.00	0.00	0.00	0.00		
23				0.00	0.00	0.00	0.00	0.00	0.00	0.00		
24				0.00	0.00	0.00	0.00	0.00	0.00	0.00		
25				0.00	0.00	0.00	0.00	0.00	0.00	0.00		
26				0.00	0.00	0.00	0.00	0.00	0.00	0.00		
27				0.00	0.00	0.00	0.00	0.00	0.00	0.00		
28				0.00	0.00	0.00	0.00	0.00	0.00	0.00		
29				0.00	0.00	0.00	0.00	0.00	0.00	0.00		
30				0.00	0.00	0.00	0.00	0.00	0.00	0.00		
31				---	0.00	---	0.00	0.00	---	0.00		
TOTAL				0.00	0.00	0.00	0.00	0.00	0.00	0.00		
MEAN				0.000	0.000	0.000	0.000	0.000	0.000	0.000		
MAX				0.00	0.00	0.00	0.00	0.00	0.00	0.00		
MIN				0.00	0.00	0.00	0.00	0.00	0.00	0.00		
AC-FT				0.00	0.00	0.00	0.00	0.00	0.00	0.00		

STATISTICS OF MONTHLY MEAN DATA FOR SEASONS 1995 - 2003

MEAN	0.51	0.45	1.67	0.32	0.060	0.000	0.072
MAX	2.03	2.95	9.55	1.44	0.48	0.000	0.64
(WY)	1996	1996	1997	1997	1997	1995	1998
MIN	0.000	0.000	0.000	0.000	0.000	0.000	0.000
(WY)	1999	1998	1998	1998	1996	1995	1996

SUMMARY STATISTICS

FOR 2003 SEASON

SEASONS 1995 - 2003

HIGHEST DAILY MEAN	0.00	Apr 1	33	Jun 7 1997
LOWEST DAILY MEAN	0.00	Apr 1	a0.00	Aug 26 1995
MAXIMUM PEAK FLOW			39	Jun 7 1997
MAXIMUM PEAK STAGE			2.78	Jun 7 1997

a--No flow many days most years.

## MUSSELSHELL RIVER BASIN

## 06127500 MUSSELSHELL RIVER AT MUSSELSHELL, MT

LOCATION.--Lat 46°31'23", long 108°06'30" (NAD 27), in SE<sup>1</sup>/<sub>4</sub>SW<sup>1</sup>/<sub>4</sub>SW<sup>1</sup>/<sub>4</sub> sec.20, T.9 N., R.29 E., Musselshell County, Hydrologic Unit 10040202, on left bank 0.9 mi upstream from Hawk Creek, 1 mi west of Musselshell, and at river mile 164.5.

DRAINAGE AREA.--4,568 mi<sup>2</sup>.

PERIOD OF RECORD.--August 1928 to September 1932 (no records December to February for the water years 1930-31), August 1945 to September 1979, October 1982 to September 1983, October 1983 to current season (seasonal record only). Monthly discharge only for some periods, published in WSP 1309.

REVISED RECORDS.--WSP 1729: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 2,984.72 ft (NGVD 29) (levels by U.S. Army Corps of Engineers). Prior to Oct. 8, 1949, nonrecording gage at site 1 mi downstream at different elevations.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Some regulation by Bair (station number 06116500), Martinsdale (station number 06119000), and Deadman's Basin (station number 06122500) Reservoirs. Diversions for irrigation of about 44,600 acres upstream from station, of which about 39,400 acres is flood irrigated. U. S. Geological Survey satellite telemeter at station. Several observations of water temperature and specific conductance were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 2003  
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1				8.6	181	83	51	68	e1.0	4.4		
2				5.5	112	89	56	55	e1.0	5.8		
3				6.5	65	111	65	44	e1.0	5.5		
4				3.5	44	117	66	34	e1.0	4.9		
5				3.6	28	124	80	25	e0.70	3.1		
6				5.7	16	113	84	19	e0.70	1.9		
7				4.3	4.4	94	82	16	e1.0	0.74		
8				3.9	6.6	89	75	13	e1.2	0.33		
9				3.9	14	88	77	10	e1.5	0.23		
10				3.6	34	96	128	7.6	e2.5	0.22		
11				3.8	49	99	127	6.2	e2.0	2.6		
12				4.2	59	167	96	3.9	e1.9	1.5		
13				3.9	72	297	85	2.3	e1.4	1.0		
14				3.6	81	212	80	1.6	e1.4	0.89		
15				3.4	74	152	71	1.0	e1.5	0.75		
16				2.8	58	e200	77	0.70	e2.0	2.0		
17				2.3	42	e260	127	0.65	e3.0	1.8		
18				2.2	65	e185	139	0.80	e3.5	0.45		
19				2.2	85	e125	126	1.2	e5.0	0.43		
20				2.0	80	e100	104	1.3	6.9	0.01		
21				1.8	98	e80	92	2.0	6.2	0.48		
22				1.6	89	e75	90	3.4	5.4	0.05		
23				1.5	66	e130	82	4.4	4.7	0.00		
24				1.4	36	e135	77	4.4	4.3	0.00		
25				1.3	21	e150	83	5.1	3.6	0.76		
26				1.6	21	102	79	4.6	3.4	1.2		
27				4.1	13	100	61	3.8	5.2	1.6		
28				3.6	13	77	48	2.9	5.6	2.9		
29				164	38	61	43	1.9	5.0	9.2		
30				198	63	36	52	1.1	4.8	16		
31				---	67	---	68	e1.0	---	19		
TOTAL				458.4	1695.0	3747	2571	345.85	88.40	89.74		
MEAN				15.3	54.7	125	82.9	11.2	2.95	2.89		
MAX				198	181	297	139	68	6.9	19		
MIN				1.3	4.4	36	43	0.65	0.70	0.00		
AC-FT				909	3360	7430	5100	686	175	178		

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1929 - 1983 AND SEASONS 1984 - 2003\*

MEAN	71.0	108	273	188.5	351.2	570.9	235.3	138.2	106.5	75.64	76.5	77.5
MAX	222	460	1356	859	1670	4223	1376	534	477	328	236	269
(WY)	1976	1971	1979	1975	1976	1967	1975	1993	1993	1994	1976	1976
MIN	0.000	0.041	12.7	1.22	0.36	0.49	0.000	0.000	0.000	0.000	0.000	0.000
(WY)	1932	1932	1932	2001	1931	1931	1930	1931	1931	1932	1932	1932

## SUMMARY STATISTICS FOR 2003 SEASON WATER YEARS 1929 - 1983\*\* SEASONS 1984 - 2003\*\*\*

ANNUAL MEAN						215						
HIGHEST ANNUAL MEAN						609		1975				
LOWEST ANNUAL MEAN						34.1		1961				
HIGHEST DAILY MEAN			297	Jun 12		8600	Jun 19	1967		6270	Jun 16	1997
LOWEST DAILY MEAN			.00	Oct 23		0.00	Sep 1	1929		0.00	Aug 14	2001
ANNUAL SEVEN-DAY MINIMUM						0.00	Sep 8	1929				
MAXIMUM PEAK FLOW			330	Jun 12		a9850	Jun 19	1997		6420	Jun 16	1997
MAXIMUM PEAK STAGE			3.92	Jun 12		b12.96	Mar 19	1979		11.25	Jun 16	1997
ANNUAL RUNOFF (AC-FT)						155800						
10 PERCENT EXCEEDS						464						
50 PERCENT EXCEEDS						105						
90 PERCENT EXCEEDS						17						

\*--During period of operation.

\*\*--During period of continuous operation 1928-29, 1931-32, 1945-79, 1982-83.

\*\*\*--Seasonal records October 1983 to current season.

a--Gage height, 11.57 ft.

b--Ice jam.

e--Estimated.

MUSSELSHELL RIVER BASIN

06130500 MUSSELSHELL RIVER AT MOSBY, MT

LOCATION.--Lat 46°59'41", long 107°53'18" (NAD 27), in SW 1/4NW 1/4NW 1/4 sec.11, T.14 N., R.30 E., Petroleum County, Hydrologic Unit 10040205, on right bank, downstream side of bridge on State Highway 20, 0.3 mi west of Mosby, 10.9 mi downstream from Flatwillow Creek, and at river mile 60.0.

DRAINAGE AREA.--7,846 mi<sup>2</sup>.

WATER-DISCHARGE RECORDS

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.

REVISED RECORDS.--WSP 1559: 1935-36. WSP 1729: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 2,493.23 ft (NGVD 29). Dec. 6, 1962 to Mar. 14, 1966, water-stage recorder at site 900 ft downstream at different elevation. Mar. 15, 1966 to Dec. 11, 1973, water-stage recorder and nonrecording gages at site 400 ft downstream at same elevation. Dec. 12, 1973 to Oct. 1, 1981, nonrecording gage at site 400 ft downstream at same elevation. Oct. 1, 1981 to July 25, 1995, water-stage recorder at site 400 ft upstream from bridge at elevation 2.67 ft higher. See WSP 2116 for history of changes prior to 1962.

REMARKS.--Water-discharge records poor Oct. 1 to Mar. 22 and fair Mar. 23 to Sept. 30. Some regulation by Bair (station number 06116500), Martinsdale (station number 06119000) and Deadman's Basin (station number 06122500) Reservoirs. Diversions for irrigation of about 47,000 acres upstream from station. U. S. Geological Survey satellite telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003 DAILY MEAN VALUES

Table with 13 columns (DAY, OCT, NOV, DEC, JAN, FEB, MAR, APR, MAY, JUN, JUL, AUG, SEP) and 31 rows of daily discharge data. Includes summary rows for TOTAL, MEAN, MAX, MIN, and AC-FT.

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1931 - 2003, BY WATER YEAR (WY)\*

Table with 13 columns (MEAN, MAX, (WY), MIN, (WY)) and 13 rows of monthly mean discharge statistics for water years 1931 through 1934.

MUSSELSHELL RIVER BASIN

06130500 MUSSELSHELL RIVER AT MOSBY, MT--Continued

SUMMARY STATISTICS	FOR 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1931 - 2003*	
ANNUAL TOTAL	2961.78		4832.97			
ANNUAL MEAN	8.11		13.2		c265	
HIGHEST ANNUAL MEAN					1089 1978	
LOWEST ANNUAL MEAN					8.12 2002	
HIGHEST DAILY MEAN	1080	Jun 23	400	Mar 15	15700	Jun 18 1944
LOWEST DAILY MEAN	0.00	Jan 1	a0.00	Oct 1	0.00	Oct 1 1930
ANNUAL SEVEN-DAY MINIMUM	0.00	Jan 7	0.00	Oct 22	0.00	Oct 1 1930
MAXIMUM PEAK FLOW			unknown		d18000 Jun 18 1944	
MAXIMUM PEAK STAGE			b8.23 Mar 15		f15.10 Mar 12 1979	
ANNUAL RUNOFF (AC-FT)	5870		9590		191600	
10 PERCENT EXCEEDS	8.0		43		577	
50 PERCENT EXCEEDS	0.09		0.01		81	
90 PERCENT EXCEEDS	0.00		0.00		0.10	

\*--During period of operation (1931-32, 1935 to current year).  
a--No flow occurred on part or all of many days.  
b--Backwater from ice.  
c--Median of yearly mean discharge, 200 ft<sup>3</sup>/s, 144,900 acre-ft/year.  
d--Gage height, 14.43 ft, from rating extension above 10,000 ft<sup>3</sup>/s.  
e--Estimated.  
f--From floodmark, backwater from ice.

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1975 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: October 1974 to September 1981.

WATER TEMPERATURE: October 1974 to September 1979, May 2000 to current year (seasonal records only).

SUSPENDED-SEDIMENT DISCHARGE: October 1982 to September 1991, October 1991 to 1995 (seasonal records only).

INSTRUMENTATION.--Temperature recorder installed March 20, 2000.

REMARKS.--Unable to collect sample from July through September visits due to no flow. Daily water temperature record good during period of flow. No daily water temperature data during periods of no flow: Apr. 1-30, May 28 to June 3, June 5, 28, 29, and July 1 to Sept. 30. Unpublished records of instantaneous water temperature and specific conductance are available in files of District office.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: Maximum daily, 4,900 microsiemens per centimeter (µS/cm) at 25°C, Aug. 14, 1977; minimum daily, 678 µS/cm at 25°C, Mar. 23, 1978.

WATER TEMPERATURE: Maximum daily, 33.0°C, July 13, 2000, July 3 and Aug. 6, 2001; minimum daily, 0.0°C on many days during winters.

SEDIMENT CONCENTRATION: Maximum daily mean, 25,800 mg/L, Aug. 3, 1985; minimum daily mean, 7 mg/L Oct. 30, 1989.

SEDIMENT LOAD: Maximum daily, 242,000 tons, Sep. 26, 1986; minimum daily, no load, 1985, 1988 during periods of no flow.

EXTREMES FOR CURRENT YEAR.--

WATER TEMPERATURE: During period of seasonal operation and flow, maximum daily, 29.5°C, June 19, 30; minimum daily, 2.5°C, Apr. 3

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

Date	Time	Instan- taneous dis- charge, cfs (00061)	pH, water, unfltrd std field, mg/L (00400)	Specif. conduc- tance, wat unfltrd uS/cm 25 degC (00095)	Temper- ature, air, deg C (00020)	Temper- ature, water, deg C (00010)	Ammonia + org-N, unfltrd mg/L as N (00625)	Nitrite + nitrate water, fltrd, mg/L as N (00631)	Nitrite water, fltrd, mg/L as N (00613)	Ortho- phos- phate, water, mg/L as P (00671)	Phos- phorus, water, unfltrd mg/L (00665)
OCT 2002											
02...	1145	.15	--	6050	6.5	11.5	--	--	--	--	--
MAR 2003											
26...	1115	35	8.4	1640	8.5	7.5	1.0	.365	.018	<.007	.125
MAY											
22...	1030	26	8.3	2480	21.0	16.0	.67	<.022	E.002	<.007	.090
JUN											
17...	0950	126	8.1	1410	26.0	23.5	1.3	<.022	<.002	<.007	.35
Date	Time	Hard- ness, water, unfltrd mg/L as CaCO3 (00900)	Calcium water, fltrd, mg/L (00915)	Magnes- ium, water, fltrd, mg/L (00925)	Potas- sium, water, fltrd, mg/L (00935)	Sodium adsorp- tion ratio (00931)	Sodium, water, fltrd, mg/L (00930)	Alka- linity, wat flt fxd end lab, mg/L as CaCO3 (29801)	Chlor- ide, water, fltrd, mg/L (00940)	Fluor- ide, water, fltrd, mg/L (00950)	Silica, water, fltrd, mg/L (00955)
MAR 2003											
26...	1115	490	100	58.8	6.21	4	198	172	12.3	.26	5.71

E--Estimated.

MUSSELSHELL RIVER BASIN

06130500 MUSSELSHELL RIVER AT MOSBY, MT--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003--Continued

Date	Sulfate water, fltrd, mg/L (00945)	Residue water, fltrd, sum of constituents mg/L (70301)	Residue water, fltrd, tons/acre-ft (70303)	Residue water, fltrd, tons/d (70302)	Arsenic water, unfltrd, ug/L (01002)	Cadmium water, unfltrd, ug/L (01027)	Chromium, water, unfltrd recover-able, ug/L (01034)	Copper, water, unfltrd recover-able, ug/L (01042)	Lead, water, unfltrd recover-able, ug/L (01051)	Nickel, water, unfltrd recover-able, ug/L (01067)	Zinc, water, unfltrd recover-able, ug/L (01092)
MAR 2003 26...	666	1150	1.57	109	<2	<.2	1.6	8.7	1.92	8.08	12

Date	Time	Suspnd. sedi-ment, sieve diametr <.063mm (70331)	Sus-pended sedi-ment concen-tration mg/L (80154)	Sus-pended sedi-ment load, tons/d (80155)	Bed sedi-ment, dry svd sve dia <.063mm (80164)	Bed sedi-ment, dry svd sve dia <.125mm (80165)	Bed sedi-ment, dry svd sve dia <.25mm (80166)	Bed sedi-ment, dry svd sve dia <.5 mm (80167)	Bed sedi-ment, dry svd sve dia <1 mm (80168)
OCT 2002 02...	1145	36	51	.02	<1	1	2	3	4
MAR 2003 26...	1115	99	95	9.0	2	3	7	11	14
MAY 22...	1030	99	169	12	<1	1	3	8	12
JUN 17...	0950	99	658	224	1	3	7	11	13

Date	Bed sedi-ment, dry svd sve dia <2 mm (80169)	Bed sedi-ment, dry svd sve dia <4 mm (80170)	Bed sedi-ment, dry svd sve dia <8 mm (80171)	Bed sedi-ment, dry svd sve dia <16 mm (80172)	Bed sedi-ment, dry svd sve dia <32 mm (80173)	Bed sedi-ment, dry svd sve dia <64 mm (80174)
OCT 2002 02...	6	9	19	48	100	100
MAR 2003 26...	15	18	23	35	72	100
MAY 22...	18	25	37	58	100	100
JUN 17...	14	18	26	50	100	100





HELL CREEK BASIN

06130650 HELL CREEK NEAR JORDAN, MT

LOCATION.--Lat 47°34'44", long 106°55'37" (NAD 27), in NW¼ NE¼ SE¼ sec.14, T.21 N., R.37 E., Garfield County, Hydrologic Unit 10040104, on left bank 1.5 mi upstream from Fort Peck Lake, and 19 mi north of Jordan.

DRAINAGE AREA.--70.6 mi².

PERIOD OF RECORD.--February 2000 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 2,270 ft (NGVD 29). Prior to Oct. 1, 2000, at elevation 1.0 ft higher.

REMARKS.--Records fair except those for estimated daily discharges, which are poor. U. S. Geological Survey satellite telemeter at station. Several observations of water temperature and specific conductance were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003 DAILY MEAN VALUES

Table with 13 columns (DAY, OCT, NOV, DEC, JAN, FEB, MAR, APR, MAY, JUN, JUL, AUG, SEP) and 31 rows of daily discharge data. Includes summary statistics for AC-FT at the bottom.

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 2000 - 2003, BY WATER YEAR (WY)

Table with 13 columns (MEAN, MAX, MIN, MED, AC-FT) and 4 rows (WY) showing monthly mean data for water years 2000, 2001, 2002, and 2003.

SUMMARY STATISTICS FOR 2002 CALENDAR YEAR FOR 2003 WATER YEAR WATER YEARS 2000 - 2003

Table with 4 columns (ANNUAL TOTAL, ANNUAL MEAN, HIGHEST ANNUAL MEAN, LOWEST ANNUAL MEAN, etc.) and 13 rows of summary statistics for 2002, 2003, and 2000-2003.

a--From crest-stage gage, during period of no recorded gage-height record. b--From slope-area measurement of peak flow. e--Estimated.

## BIG DRY CREEK BASIN

## 06131000 BIG DRY CREEK NEAR VAN NORMAN, MT

LOCATION.--Lat 47°20'58", long 106°21'26" (NAD 27), in NE<sup>1</sup>/<sub>4</sub>SW<sup>1</sup>/<sub>4</sub>NW<sup>1</sup>/<sub>4</sub> sec.3, T.18 N., R.42 E., Garfield County, Hydrologic Unit 10040105, on left bank 900 ft downstream from Little Dry Creek, 3.2 mi northeast of Van Norman Post Office, 26 mi east of Jordan, and at river mile 55.1.

DRAINAGE AREA.--2,554 mi<sup>2</sup>.

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."

REVISED RECORDS.--WSP 1309: 1947(M). WSP 1559: 1944(M), 1947. WSP 1729: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 2,330 ft (NGVD 29). Prior to July 24, 1978, at site 400 ft upstream at same elevation.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Few small diversions for irrigation of hay meadows upstream from station. U.S. Army Corps of Engineers satellite telemeter at station. Several observations of water temperature and specific conductance were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.9	2.6	e2.5	e2.0	e2.5	e2.0	20	6.2	2.6	12	0.00	0.01
2	1.9	2.6	e2.5	e2.5	e2.5	e2.5	16	6.1	2.9	0.97	0.00	0.01
3	1.9	2.6	e2.5	e2.5	e2.5	e3.0	15	5.7	6.2	0.52	0.00	0.01
4	2.2	2.7	e2.0	e2.5	e2.0	e2.5	14	6.5	4.6	0.34	26	0.01
5	3.1	2.7	e2.0	e2.5	e2.0	e2.0	13	17	4.3	0.22	0.14	0.01
6	3.8	e2.5	e2.0	e2.5	e2.0	e2.0	12	19	6.5	0.12	0.05	0.01
7	3.4	e2.5	e2.0	e2.5	e2.0	e2.0	11	13	7.4	0.10	1.5	0.01
8	3.0	e2.5	e2.0	e2.5	e2.0	e2.0	11	12	6.1	39	1.8	0.01
9	2.7	e2.5	e2.0	e2.5	e2.0	e2.0	9.8	17	5.3	386	27	0.01
10	2.6	e2.5	e2.0	e2.0	e2.0	e2.5	8.8	40	6.1	197	1.6	0.01
11	2.4	e2.5	e2.0	e2.0	e2.0	e2.5	8.1	27	17	51	0.32	0.01
12	2.4	e2.5	e2.0	e2.0	e2.0	e2.5	7.6	26	15	28	0.17	0.03
13	2.4	e2.5	e2.0	e2.0	e2.5	e100	7.3	29	15	17	0.07	0.01
14	2.3	e2.5	e2.0	e2.0	e2.5	e2300	7.9	20	18	11	0.04	0.01
15	2.3	e2.5	e2.5	e2.0	e2.0	2010	8.9	20	15	6.1	0.02	0.01
16	2.3	e2.5	e2.5	e2.0	e2.5	1030	9.4	17	12	3.2	0.01	0.01
17	2.4	e2.5	e2.5	e2.0	e2.5	494	9.1	14	8.7	1.6	0.00	0.01
18	2.4	e2.5	e2.5	e2.0	e2.5	322	10	10	7.9	0.78	0.00	0.01
19	2.4	e2.5	e2.0	e2.0	e2.5	253	10	8.6	5.7	0.45	0.00	0.01
20	2.6	e2.5	e2.0	e2.0	e2.5	209	9.0	7.9	4.3	0.21	0.00	0.01
21	2.6	e2.5	e2.0	e2.0	e2.0	136	7.6	7.5	5.3	0.11	0.00	0.04
22	2.5	e2.5	e2.0	e2.0	e2.0	88	6.7	7.0	3.1	0.07	0.00	0.05
23	2.6	e2.5	e2.0	e2.0	e2.0	50	6.5	5.7	2.5	0.05	0.00	0.04
24	2.6	e2.0	e2.0	e2.0	e2.0	37	5.9	5.3	2.2	0.03	0.00	0.02
25	2.6	e2.0	e2.0	e2.0	e2.0	28	5.3	5.5	1.7	0.02	0.00	0.02
26	2.6	e2.0	e2.0	e2.0	e2.5	22	5.1	5.2	1.4	0.01	0.00	0.02
27	2.7	e2.0	e2.0	e2.0	e2.5	18	5.6	4.8	1.2	0.01	0.00	0.01
28	2.7	e2.5	e2.5	e2.0	e2.5	18	5.4	3.8	1.1	0.01	0.01	0.01
29	2.7	e2.5	e2.5	e2.0	---	26	6.2	3.0	0.83	0.00	0.01	0.02
30	2.7	e2.5	e2.5	e2.5	---	23	6.7	2.3	2.5	0.00	0.01	0.02
31	2.6	---	e2.0	e2.5	---	28	---	2.2	---	0.00	0.01	---
TOTAL	79.3	73.7	67.0	67.0	62.5	7219.5	278.9	374.3	192.43	755.92	58.76	0.47
MEAN	2.56	2.46	2.16	2.16	2.23	233	9.30	12.1	6.41	24.4	1.90	0.016
MAX	3.8	2.7	2.5	2.5	2.5	2300	20	40	18	386	27	0.05
MIN	1.9	2.0	2.0	2.0	2.0	2.0	5.1	2.2	0.83	0.00	0.00	0.01
AC-FT	157	146	133	133	124	14320	553	742	382	1500	117	0.9

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1940 - 2003, BY WATER YEAR (WY)\*

	MEAN	MAX	(WY)	MIN	(WY)	MEAN	MAX	(WY)	MIN	(WY)	MEAN	MAX	(WY)	MIN	(WY)
1940	6.31	97.5	1987	0.000	1940	2.99	14.2	1961	0.000	1961	2.66	33.7	1976	0.000	1961
1941	6.47	192	1997	0.000	1940	72.8	1004	1997	0.000	1940	256	1760	1959	0.000	1940
1942	83.9	2043	1952	1.05	1961	28.9	300	1975	0.21	1961	58.2	552	1944	0.000	1961
1943	58.2	552	1944	0.072	1958	43.8	458	1993	0.000	1958	16.1	367	1954	0.000	1958
1944	16.1	367	1954	0.000	1959	16.4	391	1986	0.000	1959	0.000	377	1986	0.000	1959

SUMMARY STATISTICS	FOR 2002 CALENDAR YEAR	FOR 2003 WATER YEAR	FOR WATER YEARS 1940 - 2003*
ANNUAL TOTAL	11736.40	9229.78	
ANNUAL MEAN	32.2	25.3	49.7**
HIGHEST ANNUAL MEAN			243 1978
LOWEST ANNUAL MEAN			1.18 1985
HIGHEST DAILY MEAN	6330 Jun 23	2300 Mar 14	21300 Mar 22 1947
LOWEST DAILY MEAN	0.50 Jan 28	0.00 Jul 29	0.00 Oct 1 1939
ANNUAL SEVEN-DAY MINIMUM	0.57 Jan 26	0.00 Aug 17	0.00 Oct 1 1939
MAXIMUM PEAK FLOW		2300 Mar 14	b24600 Mar 21 1947
MAXIMUM PEAK STAGE		a6.44 Mar 14	a15.26 Mar 21 1947
INSTANTANEOUS LOW FLOW		0.00 Jul 29	c0.00 Oct 1 1940
ANNUAL RUNOFF (AC-FT)	23280	18310	35990
10 PERCENT EXCEEDS	24	17	41
50 PERCENT EXCEEDS	2.5	2.5	2.5
90 PERCENT EXCEEDS	1.0	0.01	0.00

\*--During period of operation (1940-47, 1949-68, 1970 to current year).

\*\*--Median of yearly mean discharges, 27.4 ft<sup>3</sup>/s.

a--Backwater from ice.

b--Gage height, 13.39 ft, at different site and datum.

c--No flow at times most years.

e--Estimated.

MISSOURI RIVER MAIN STEM

06131200 NELSON CREEK NEAR VAN NORMAN, MT

LOCATION.--Lat 47°32'08", long 106°09'11" (NAD 27), in SW<sup>1</sup>/<sub>4</sub> NW<sup>1</sup>/<sub>4</sub> sec.36, T.21 N., R.43 E., McCone County, Hydrologic Unit 10040104, on left bank at upstream side of bridge on State Highway 24, 1.5 mi upstream from Fort Peck Lake, and 19 mi northeast of Van Norman.

DRAINAGE AREA.--100 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1975 to September 1985, February 2000 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 2,300 ft (NGVD 29).

REMARKS.--Records fair. Diversions for irrigation of about 163 acres upstream from station of which about 158 acres are flood irrigated. Some storage in stock ponds upstream. Several observations of water temperature and specific conductance were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003  
DAILY MEAN VALUES

Table with 13 columns: DAY, OCT, NOV, DEC, JAN, FEB, MAR, APR, MAY, JUN, JUL, AUG, SEP. Rows 1-31 show daily discharge values. Summary rows include TOTAL, MEAN, MAX, MIN, AC-FT.

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1976 - 2003, BY WATER YEAR (WY)\*

Table with 13 columns for months (OCT-SEP) and 4 rows for MEAN, MAX (WY), MIN (WY). Values represent monthly mean discharge statistics.

SUMMARY STATISTICS FOR 2002 CALENDAR YEAR FOR 2003 WATER YEAR WATER YEARS 1976 - 2003\*

Table with 4 columns: 2002 CALENDAR YEAR, 2003 WATER YEAR, and two columns for WATER YEARS 1976-2003\*. Rows include ANNUAL TOTAL, ANNUAL MEAN, HIGHEST ANNUAL MEAN, LOWEST ANNUAL MEAN, HIGHEST DAILY MEAN, LOWEST DAILY MEAN, ANNUAL SEVEN-DAY MINIMUM, MAXIMUM PEAK FLOW, MAXIMUM PEAK STAGE, ANNUAL RUNOFF (AC-FT), and 10, 50, 90 PERCENT EXCEEDS.

\*--During period of operation (1975-1985, February 2000 to current year).  
a--No flow at times most years.

## MISSOURI RIVER MAIN STEM

## 06131500 FORT PECK LAKE AT FORT PECK, MT

LOCATION.--Lat 48°00'26", long 106°23'49" (NAD 27), in sec. 14, T.26 N., R.41 E., McCone County, Hydrologic Unit 10040104, in No. 4 emergency gate shaft of Fort Peck Dam on Missouri River at Fort Peck, 2 mi downstream from Bear Creek, 9.5 mi southwest of Nashua, 9.5 mi upstream from Milk River, and at river mile 1,771.6.

DRAINAGE AREA.--57,500 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1937 to current year. (Monthend contents only, except October 1938 to September 1940, when elevations were included.) 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. Prior to October 1970, published as "Fort Peck Reservoir." Daily elevations on file in Helena district office.

REVISED RECORDS.--WSP 1729: Drainage area.

GAGE.--Water-stage recorder. Prior to May 1, 1941, nonrecording gage at same site and elevation. Elevation of gage is 2095.00 (NGVD 29).

REMARKS.--Reservoir is formed by earthfill dam completed in 1939; storage began in 1937. The following capacity figures are from capacity table effective July 1, 1973; see previous reports for superseded figures. All elevations are referenced to the National Geodetic Vertical Datum of 1929. Total capacity, 18,910,000 acre-ft between elevation 2,095.00 ft, invert of lower ring gates, and 2,250.00 ft, top of 25 ft gates. Elevation of spillway crest, 2,225.00 ft. Normal operating level, 17,930,000 acre-ft, elevation, 2,246.00 ft. Dead storage, 542,800 acre-ft below elevation 2,095.00 ft. Minimum operating level, 4,283,000 acre-ft, elevation, 2,160.00 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 U.S. Army Corps of Engineers.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 19,310,000 acre-ft, July 15-17, 1975, elevation, 2,251.6 ft; minimum since first filling, 5,061,000 acre-ft, Jan. 25, 26, 1956, elevation, 2,167.67 ft, by capacity table used Mar. 1, 1940, to Dec. 31, 1965.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 11,860,000 acre-ft, Oct. 1, elevation, 2,217.62 ft; minimum, 10,490,000 acre-ft, Sept. 29, elevation, 2,209.55 ft.

## MONTHEND ELEVATION AND CONTENTS AT 2400 HOURS, SEPTEMBER 2002 TO SEPTEMBER 2003

Date	Elevation (feet)	Contents (acre-feet)	Change in Contents (acre-feet)
Sept. 30	2,217.62	11,860,000	--
Oct. 31	2,217.26	11,800,000	-60,000
Nov. 30	2,216.77	11,710,000	-90,000
Dec. 31	2,214.58	11,340,000	-370,000
CALENDAR YEAR 2002			-1,810,000
Jan. 31	2,212.61	11,000,000	-340,000
Feb. 28	2,210.96	10,720,000	-280,000
Mar. 31	2,212.83	11,040,000	+320,000
Apr. 30	2,212.76	11,030,000	-10,000
May 31	2,213.04	11,070,000	+40,000
June 30	2,213.59	11,170,000	+100,000
July 31	2,212.34	10,960,000	-210,000
Aug. 31	2,210.68	10,680,000	-280,000
Sept. 30	2,209.56	10,490,000	-190,000
WATER YEAR 2003			-1,370,000

MISSOURI RIVER MAIN STEM

06132000 MISSOURI RIVER BELOW FORT PECK DAM, MT

LOCATION.--Lat 48°02'39" (NAD 27), long 106°21'21", in NW¼ sec.6, T.26 N., R.42 E., McCone County, Hydrologic Unit 10060001, on right bank 2 mi upstream from Milk River, 6 mi south of Nashua, 8 mi downstream from Fort Peck Dam, and at river mile 1,763.5.

DRAINAGE AREA.--57,556 mi².

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

REVISED RECORDS.--WSP 1729: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 2,018 ft (NGVD 29) (U.S. Army Corps of Engineers bench mark). Prior to Apr. 14, 1938, at site 0.7 mi upstream at different elevation; Apr. 14, 1938, to Sept. 30, 1963, at present site at elevation 2.00 ft higher, all water-stage recorders. Since Oct. 1, 1969, published discharge is determined by flowmeters and spillway discharge at Fort Peck Dam.

REMARKS.--Flow completely regulated by Fort Peck Lake. Diversions for irrigation of about 880,400 acres upstream from station. Operational level in Fort Peck Lake was reached beginning 1944 water year.

COOPERATION.--Records since Oct. 1, 1969, furnished by U.S. Army Corps of Engineers; 2 to 4 discharge measurements are made each year and the records are reviewed by Geological Survey. Records for March 1934 to September 1969 collected and computed by Geological Survey.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 51,000 ft³/s including 32,000 ft³/s inflow from spillway 1 mi downstream from station, Aug. 8, 1946; maximum gage height observed, 12.30 ft, Mar. 10, 1936 (ice jam), site and elevation then in use; maximum daily reverse flow, 400 ft³/s, Mar. 29, 1943, backwater from Milk River.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003 DAILY MEAN VALUES

Table with 13 columns (DAY, OCT, NOV, DEC, JAN, FEB, MAR, APR, MAY, JUN, JUL, AUG, SEP) and 31 rows of daily mean discharge values. Includes summary statistics at the bottom: TOTAL, MEAN, MAX, MIN, AC-FT.

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1944 - 2003, BY WATER YEAR (WY) \*

Table with 13 columns (MEAN, MAX, MIN, WY) and 12 rows of monthly mean discharge statistics for water years 1944 through 1992.

SUMMARY STATISTICS FOR 2002 CALENDAR YEAR FOR 2003 WATER YEAR WATER YEARS 1944 - 2003\*

Table with 4 columns (Statistic, 2002 Calendar Year, 2003 Water Year, 1944-2003\*) and 12 rows of summary statistics including annual total, mean, highest/lowest annual and daily means, and runoff/exceedance data.

\*--Period of record after operational level in Fort Peck Lake was reached.

## MISSOURI RIVER MAIN STEM

06132000 MISSOURI RIVER BELOW FORT PECK DAM, MT--Continued

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1964, 1975 to 1987, May 2002 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: Water years 1974 to 1981.

WATER TEMPERATURE: Water years, 1974 to 1979; seasonal records, July 2002 to current year.

INSTRUMENTATION.--Temperature recorder installed July 31, 2002.

REMARKS.--Unpublished records of instantaneous water temperature and specific conductance are available in files of District office.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE (water years 1975-81): Maximum daily, 1,080 microsiemens per centimeter ( $\mu\text{S}/\text{cm}$ ), Nov. 30, 1976; minimum daily, 520  $\mu\text{S}/\text{cm}$ , June 29, 1978.

WATER TEMPERATURE: Maximum, 18.5°C, Aug. 10, Sept. 4, 19, 2002 and several days in August 2003; minimum, 0.0°C, on several days from December 1977 to January 1978.

EXTREMES FOR CURRENT YEAR.--

WATER TEMPERATURE: During period of seasonal operation, maximum, 18.5°C, several days in August; minimum, 0.5°C, Apr. 3.

## WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

Date	Time	Instantaneous discharge, cfs (00061)	Barometric pressure, mm Hg (00025)	Dissolved oxygen, mg/L (00300)	Dissolved oxygen, percent of saturation (00301)	pH, water, unfltrd field, std units (00400)	Specific conductance, wat unfltrd, uS/cm 25 degC (00095)	Temperature, air, deg C (00020)	Temperature, water, deg C (00010)	Hardness, water, unfltrd, mg/L as CaCO3 (00900)	Calcium, water, fltrd, mg/L (00915)	Magnesium, water, fltrd, mg/L (00925)
MAR 2003												
31...	1030	4100	708	10.2	94	8.4	556	20.5	8.5	210	52.4	19.6
MAY												
21...	1045	10500	720	12.6	121	8.4	557	16.0	11.0	210	51.0	19.3
JUN												
30...	0940	8500	714	10.1	105	8.4	550	29.0	14.0	200	49.5	19.1
AUG												
26...	1430	7800	715	9.3	105	8.2	563	27.5	18.0	200	48.8	18.7

Date	Potassium, water, fltrd, mg/L (00935)	Sodium adsorption ratio (00931)	Sodium, water, fltrd, mg/L (00930)	Alkalinity, wat flt lab, mg/L as CaCO3 (29801)	Chloride, water, fltrd, mg/L (00940)	Fluoride, water, fltrd, mg/L (00950)	Silica, water, fltrd, mg/L (00955)	Sulfate, water, fltrd, mg/L (00945)	Residue, water, fltrd, mg/L (70301)	Residue sum of water, constituents, acre-ft (70303)	Residue, water, fltrd, tons/d (70302)
MAR 2003											
31...	3.59	1	36.2	160	7.76	.92	7.0	117	340	.46	3770
MAY											
21...	3.64	1	37.9	157	8.51	.9	7.1	115	337	.46	9550
JUN											
30...	3.70	1	37.2	157	8.80	.9	6.9	115	336	.46	7700
AUG											
26...	3.42	1	35.2	163	8.70	.9	7.7	115	337	.46	7090

Date	Ammonia + org-N, water, unfltrd, mg/L as N (00625)	Ammonia, water, fltrd, mg/L as N (00608)	Nitrite + nitrate, water, fltrd, mg/L as N (00631)	Nitrite, water, fltrd, mg/L as N (00613)	Orthophosphate, water, fltrd, mg/L as P (00671)	Phosphorus, water, unfltrd, mg/L (00665)	Arsenic, water, fltrd, ug/L (01000)	Arsenic, water, unfltrd, ug/L (01002)	Barium, water, fltrd, ug/L (01005)	Barium, water, unfltrd, recoverable, ug/L (01007)	Cadmium, water, fltrd, ug/L (01025)
MAR 2003											
31...	.15	<.015	<.022	<.002	<.007	.010	3.9	3	32	36	<.04
MAY											
21...	.18	<.015	<.022	<.002	<.007	.009	3.6	3	38	35	<.04
JUN											
30...	.13	<.015	<.013	<.002	<.007	.008	3.8	3	35	34	<.04
AUG											
26...	.16	<.015	<.022	<.002	<.007	.011	3.8	5	35	37	<.04

MISSOURI RIVER MAIN STEM

06132000 MISSOURI RIVER BELOW FORT PECK DAM, MT--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003--Continued

Date	Cadmium water, unfltrd ug/L (01027)	Chrom- ium, water, fltrd, ug/L (01030)	Chrom- ium, water, unfltrd recover- able, ug/L (01034)	Copper, water, fltrd, ug/L (01040)	Copper, water, unfltrd recover- able, ug/L (01042)	Iron, water, fltrd, ug/L (01046)	Iron, water, unfltrd recover- able, ug/L (01045)	Lead, water, fltrd, ug/L (01049)	Lead, water, unfltrd recover- able, ug/L (01051)	Mangan- ese, water, fltrd, ug/L (01056)	Mangan- ese, water, unfltrd recover- able, ug/L (01055)
MAR 2003											
31...	<.04	<.8	<.8	1.7	2.0	<10	E10	<.08	.06	2.7	6
MAY											
21...	.04	<.8	<.8	1.3	2.1	<10	60	E.05	.06	1.3	4
JUN											
30...	<.04	<.8	<.8	1.3	1.5	<8	70	<.08	.06	1.3	5
AUG											
26...	<.04	<.8	<.8	1.4	1.9	<8	60	<.08	.07	2.2	6

Date	Mercury water, fltrd, ug/L (71890)	Mercury water, unfltrd recover- able, ug/L (71900)	Nickel, water, fltrd, ug/L (01065)	Nickel, water, unfltrd recover- able, ug/L (01067)	Selen- ium, water, fltrd, ug/L (01145)	Selen- ium, water, unfltrd ug/L (01147)	Zinc, water, fltrd, ug/L (01090)	Zinc, water, unfltrd recover- able, ug/L (01092)	Suspd. sedi- ment, sieve diametr percent <.063mm (70331)	Sus- pended sedi- ment concen- tration mg/L (80154)	Sus- pended sedi- ment load, tons/d (80155)
MAR 2003											
31...	<.02	<.02	1.64	2.17	.8	.6	1	E1	75	3	33
MAY											
21...	<.02	<.02	2.90	1.54	.7	.8	3	2	--	--	--
JUN											
30...	<.01	<.01	2.77	2.51	1.0	.7	2	2	88	4	92
AUG											
26...	<.02	<.02	2.86	3.40	.7	1.0	<1	E1	63	4	84

E--Estimated.

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR APRIL 2003 TO SEPTEMBER 2003

DAY	APRIL			MAY			JUNE			JULY		
	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
1	5.5	3.0	4.0	10.0	6.0	7.5	10.0	9.0	9.5	15.5	12.0	13.5
2	3.0	1.0	1.5	10.0	6.5	8.0	12.0	9.0	10.5	15.5	11.0	13.0
3	4.5	0.5	2.0	11.0	6.5	8.5	13.0	9.5	11.0	14.5	10.5	12.0
4	5.0	1.0	2.5	9.5	7.0	8.0	10.0	8.5	9.0	15.0	10.0	12.5
5	6.5	2.0	4.0	7.0	6.0	7.0	11.0	8.0	9.5	16.0	11.0	13.0
6	5.0	2.0	3.5	8.0	5.5	6.5	11.5	8.5	10.0	15.5	11.5	13.5
7	7.5	2.0	4.5	8.5	5.0	6.5	12.5	10.0	11.0	15.5	11.0	13.0
8	8.0	2.5	5.0	8.0	6.0	7.0	12.5	9.5	11.0	14.0	11.5	13.0
9	9.5	3.0	6.0	7.5	6.5	7.0	13.0	11.0	11.5	15.5	11.0	13.0
10	8.5	3.5	6.0	8.5	6.0	7.0	11.5	10.0	11.0	15.0	11.0	13.0
11	9.5	3.5	6.0	10.5	5.5	7.5	11.5	10.0	10.5	15.5	10.5	13.0
12	9.0	4.0	6.0	11.0	6.0	8.5	14.0	9.5	11.5	16.5	11.0	13.5
13	8.5	4.0	6.0	11.5	7.5	9.0	13.5	9.5	11.5	16.5	12.5	14.0
14	9.0	4.5	6.5	12.0	7.0	9.0	13.5	10.0	11.5	16.0	12.0	13.5
15	7.5	4.5	6.0	12.5	7.5	10.0	12.5	9.5	11.0	16.0	11.0	13.5
16	8.0	4.0	5.5	11.0	8.0	9.5	12.5	9.5	10.5	17.0	12.0	14.0
17	9.5	4.5	6.5	10.5	7.5	8.5	13.0	9.5	11.0	17.0	12.5	14.5
18	6.5	5.5	6.0	8.5	7.0	7.5	14.0	9.5	11.5	17.5	13.0	15.0
19	8.5	5.0	6.0	9.5	6.0	8.0	16.0	11.0	13.5	16.0	11.5	13.5
20	10.0	4.5	7.0	11.0	6.0	8.5	16.0	10.5	13.0	15.5	11.5	13.5
21	10.5	5.0	7.0	10.5	7.5	9.0	12.5	9.5	11.0	16.5	12.0	14.0
22	11.0	5.0	7.5	11.0	8.0	9.5	13.5	9.5	11.0	16.5	12.0	14.0
23	10.5	6.0	8.0	12.5	9.0	10.5	14.0	10.0	12.0	17.0	12.0	14.0
24	8.5	6.5	7.5	12.5	8.5	10.5	13.5	10.5	12.0	16.0	12.0	13.5
25	11.0	6.0	8.0	13.5	9.0	11.0	13.0	10.0	11.5	15.5	12.0	13.5
26	8.5	6.5	7.5	14.0	10.5	12.0	14.5	10.5	12.0	16.0	12.0	14.0
27	9.5	6.0	7.5	13.0	10.0	11.5	14.0	10.5	12.0	17.5	13.0	15.0
28	10.0	5.0	7.0	12.0	8.5	10.0	13.5	10.0	11.5	17.0	13.0	14.5
29	8.5	6.0	7.0	14.0	9.0	11.0	14.5	10.0	12.0	16.0	12.5	14.0
30	10.0	6.0	7.5	12.0	8.5	10.0	15.5	10.5	13.0	16.0	11.5	13.5
31	---	---	---	11.5	9.0	10.0	---	---	---	16.0	12.0	14.0
MONTH	11.0	0.5	5.8	14.0	5.0	8.8	16.0	8.0	11.2	17.5	10.0	13.5

## MISSOURI RIVER MAIN STEM

06132000 MISSOURI RIVER BELOW FORT PECK DAM, MT--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR APRIL 2003 TO SEPTEMBER 2003--Continued

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN
	AUGUST			SEPTEMBER		
1	16.0	11.5	13.5	16.5	12.5	14.0
2	17.0	11.5	14.0	16.0	12.0	13.5
3	16.0	12.0	13.5	16.0	11.5	13.5
4	15.5	12.5	14.0	16.0	12.0	13.5
5	17.0	12.0	14.0	15.5	12.5	13.5
6	17.5	12.0	14.5	16.0	12.0	13.5
7	18.5	13.5	15.5	16.5	12.0	14.0
8	18.5	13.5	15.5	16.5	13.0	14.5
9	17.0	13.0	14.5	16.0	13.0	14.0
10	18.5	13.0	15.5	13.5	12.0	12.5
11	18.5	13.5	16.0	15.0	11.5	13.5
12	18.5	14.5	16.0	14.5	12.5	13.0
13	18.0	13.5	15.5	13.0	11.0	12.0
14	17.5	13.0	15.0	16.0	11.5	13.5
15	17.5	13.0	15.0	15.0	12.5	14.0
16	18.5	13.5	16.0	12.5	10.5	11.5
17	18.0	14.0	16.0	11.0	10.0	10.5
18	17.0	13.0	15.0	14.0	9.5	11.5
19	18.5	14.0	16.0	15.0	10.5	12.5
20	16.5	13.0	14.5	14.0	12.5	13.5
21	16.0	12.0	14.0	12.5	11.5	12.0
22	17.0	13.0	14.5	14.5	10.5	12.5
23	17.0	13.0	14.5	14.0	11.5	12.5
24	16.5	12.5	14.5	14.0	10.0	11.5
25	16.5	12.5	14.5	16.0	11.0	13.0
26	16.5	12.0	14.0	15.5	13.0	14.0
27	14.0	12.5	13.0	15.0	11.5	13.0
28	15.5	12.0	13.5	15.0	11.5	13.0
29	16.0	12.0	13.5	14.5	11.5	12.5
30	17.5	12.5	14.5	15.0	10.5	12.5
31	17.0	12.0	14.0	---	---	---
MONTH	18.5	11.5	14.5	16.5	9.5	13.0



MILK RIVER BASIN

06132200 SOUTH FORK MILK RIVER NEAR BABB, MT

LOCATION.--Lat 48°45'14", long 113°10'00" (NAD 27), in NE 1/4NW 1/4NW 1/4 sec.34, T.35 N., R.12 W., Glacier County, Hydrologic Unit 10050001, Blackfeet Indian Reservation, on right bank 0.4 mi upstream from bridge on FAS 464 ("Duck Lake Road"), 14.4 mi southeast of Babb, 15.2 mi northwest of Browning, and at river mile 17.3.

DRAINAGE AREA.--70.4 mi<sup>2</sup>.

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

REVISED RECORDS.--W 1983: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 4,731.6 ft (NGVD 29).

REMARKS.--Records good except those for estimated daily discharges, which are poor. Many small diversions for irrigation upstream from station. U.S. Geological Survey satellite telemeter at station. Several observations of water temperature and specific conductance were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 2003  
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			e18	181	44	29	10	1.9	1.5	5.6		
2			e19	73	40	26	9.0	1.9	1.5	5.5		
3			e18	52	37	25	7.6	2.2	1.6	5.2		
4			e16	47	39	23	6.8	2.8	1.5	5.5		
5			e17	35	41	23	7.1	2.7	1.4	5.5		
6			e15	30	38	25	7.8	3.0	1.3	5.3		
7			e14	27	36	28	9.1	2.6	1.3	5.0		
8			e13	30	34	24	8.9	2.3	1.4	5.1		
9			e10	58	35	33	8.4	2.2	2.2	5.4		
10			e11	86	41	41	7.1	2.0	2.7	5.8		
11			e13	81	43	40	6.3	1.6	2.5	5.8		
12			e17	72	38	33	5.6	1.4	2.4	5.9		
13			e50	82	36	27	4.7	1.3	2.6	6.2		
14			e400	91	32	23	4.1	1.2	2.6	6.5		
15			e250	72	30	21	3.9	1.1	3.1	6.3		
16			178	58	30	19	3.7	1.1	5.5	6.4		
17			101	52	28	18	3.6	1.2	9.8	6.4		
18			71	48	30	17	3.0	1.7	9.5	6.2		
19			54	44	36	19	2.6	1.7	6.7	6.2		
20			50	42	36	23	2.3	1.5	6.5	6.1		
21			50	41	32	22	2.1	2.8	6.2	6.1		
22			44	43	28	19	1.9	1.5	5.9	6.1		
23			65	48	28	18	1.7	1.5	5.7	5.9		
24			52	54	26	20	1.6	1.8	5.3	6.1		
25			41	57	26	19	1.6	1.5	5.3	6.2		
26			34	53	38	18	1.8	1.4	5.1	6.2		
27			25	49	34	14	1.9	1.4	5.0	6.1		
28			25	46	31	13	2.1	1.2	5.2	5.9		
29			27	43	27	12	2.6	1.4	5.4	6.3		
30			40	44	25	11	2.6	1.6	5.5	7.5		
31			149	---	30	---	2.2	1.7	---	8.1		
TOTAL			1887	1739	1049	683	143.7	55.2	122.2	186.4		
MEAN			60.9	58.0	33.8	22.8	4.64	1.78	4.07	6.01		
MAX			400	181	44	41	10	3.0	9.8	8.1		
MIN			10	27	25	11	1.6	1.1	1.3	5.0		
AC-FT			3740	3450	2080	1350	285	109	242	370		

STATISTICS OF MONTHLY MEAN DATA FOR SEASONS 1961 - 2003

MEAN	46.0	32.0	66.3	86.6	90.7	37.1	17.3	15.0	16.5
MAX	46.0	136	153	239	465	96.6	42.6	43.8	37.0
(WY)	1963	1972	1969	1967	1975	1975	1993	1993	1986
MIN	46.0	5.76	20.7	10.2	0.89	0.000	0.38	0.22	5.07
(WY)	1963	2001	1984	1977	1977	1977	2001	2001	1964

SUMMARY STATISTICS

FOR 2003 SEASON

SEASONS 1961 - 2003

HIGHEST DAILY MEAN	400	Mar 14	5590	Jun 20 1975
LOWEST DAILY MEAN	1.1	Aug 15	0.00	Aug 23 1973
MAXIMUM PEAK FLOW	a500	Mar 14	c12000	Jun 8 1964
MAXIMUM PEAK STAGE	b6.39	Mar 14	7.17	Feb 24 1986
INSTANTANEOUS LOW FLOW			0.00	Aug 23 1973

a--About, occurred during ice breakup event.

b--Backwater from ice.

c--Gage height, 6.61 ft, from rating extended above 400 ft<sup>3</sup>/s, on basis of slope-area measurement of peak flow.

e--Estimated.

## MILK RIVER BASIN

## 06133000 MILK RIVER AT WESTERN CROSSING OF INTERNATIONAL BOUNDARY

(International gaging station)

LOCATION.--Lat 49°00'27", long 112°32'42" (NAD 27), in NE<sup>1</sup>/<sub>4</sub> sec.1, T.1, R.20 W., fourth meridian, in Alberta, Hydrologic Unit 10050001, on left bank 0.8 mi north of international boundary, 22 mi upstream from North Milk River, 23 mi southwest of Milk River, Alberta, and at river mile 656.4.

DRAINAGE AREA.--401 mi<sup>2</sup>.

PERIOD OF RECORD.--March 1931 to current season (seasonal records only). Prior to October 1961, published as South Fork Milk River near international boundary.

REVISED RECORDS.--WSP 1389: 1934(M), 1935, 1936(M), 1937, 1942(M), 1947-48(M). W 1983: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 3,820 ft (NGVD 29). Prior to Aug. 9, 1948, and Aug. 9, 1948, to Oct. 31, 1958, water-stage recorders at sites 0.4 mi and 0.5 mi downstream, respectively, at different elevations.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Several diversions for irrigation upstream from station. Environment Canada satellite telemeter at station. Several observations of water temperature and specific conductance were made during the year.

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

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 2003  
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			e16	256	127	52	14	0.00	0.00	0.00		
2			e16	333	119	54	12	0.00	0.00	0.00		
3			e16	200	108	51	11	0.00	0.00	0.00		
4			e16	133	113	46	9.7	0.00	0.00	0.00		
5			e16	122	117	41	8.8	0.00	0.00	0.00		
6			e15	112	127	40	7.7	0.00	0.00	0.00		
7			e14	104	129	38	6.2	0.00	0.00	0.00		
8			e14	100	120	42	5.2	0.00	0.00	0.00		
9			e14	98	107	52	4.3	0.00	0.00	0.00		
10			e15	126	108	53	3.8	0.00	0.00	0.00		
11			e18	182	125	86	3.0	0.00	0.00	0.00		
12			e35	192	127	140	1.8	0.00	0.00	0.00		
13			e88	213	109	98	0.71	0.00	0.00	0.00		
14			e212	248	101	77	0.32	0.00	0.00	0.00		
15			e494	256	90	51	0.14	0.00	0.00	0.00		
16			e989	207	79	40	0.04	0.00	0.00	0.00		
17			e710	170	74	34	0.00	0.00	0.00	0.00		
18			325	150	76	30	0.00	0.00	0.00	0.00		
19			238	137	78	27	0.00	0.00	0.00	0.00		
20			180	126	90	29	0.00	0.00	0.00	0.00		
21			161	119	95	26	0.00	0.00	0.00	0.00		
22			168	115	89	27	0.00	0.00	0.00	0.00		
23			153	116	79	27	0.00	0.00	0.00	0.00		
24			182	137	72	25	0.00	0.00	0.00	0.00		
25			122	156	69	24	0.00	0.00	0.00	0.00		
26			116	179	73	26	0.00	0.00	0.00	0.00		
27			97	161	87	25	0.00	0.00	0.00	0.00		
28			95	142	80	22	0.00	0.00	0.00	0.00		
29			81	133	68	19	0.00	0.00	0.00	0.00		
30			78	128	59	16	0.00	0.00	0.00	0.00		
31			107		53		0.00	0.00	0.00	0.00		
TOTAL			4801	4851	2948	1318	88.71	0.00	0.00	0.00		
MEAN			155	162	95.1	43.9	2.86	0.000	0.000	0.000		
MAX			989	333	129	140	14	0.00	0.00	0.00		
MIN			14	98	53	16	0.00	0.00	0.00	0.00		
AC-FT			9520	9620	5850	2610	176	0.00	0.00	0.00		

## STATISTICS OF MONTHLY MEAN DATA FOR SEASONS 1931 - 2003

MEAN	68.0	105	208	208	180	58.1	20.5	20.6	25.0
MAX	99.0	717	615	679	907	348	142	168	133
(WY)	1963	1972	1969	1967	2002	1951	1951	1951	1952
MIN	37.0	1.95	41.5	13.3	3.07	0.008	0.000	0.000	0.000
(WY)	1935	2002	1941	1941	1977	1977	1939	1939	1964

## SUMMARY STATISTICS

FOR 2003 SEASON

SEASONS 1931 - 2003

HIGHEST DAILY MEAN	989	Mar 16	5410	Jun 9 1964
LOWEST DAILY MEAN	0.00	Jul 17	0.00	Jul 31 1931
MAXIMUM PEAK FLOW	a1000	Mar 16	c7930	Jun 9 1964
MAXIMUM PEAK STAGE	b6.40	Mar 15	b12.55	Mar 18 1976

a--About.

b--Backwater from ice.

c--Gage height, 9.77 ft.

e--Estimated.

MILK RIVER BASIN

06133500 NORTH FORK MILK RIVER ABOVE ST. MARY CANAL, NEAR BROWNING, MT

(International gaging station)

LOCATION.--Lat 48°57'48", long 113°03'43" (NAD 27), in NE<sup>1</sup>/<sub>4</sub>NE<sup>1</sup>/<sub>4</sub>SW<sup>1</sup>/<sub>4</sub> sec.16, T.37 N., R.11 W., Glacier County, Hydrologic Unit 10050001, Blackfeet Indian Reservation, on left bank 2.3 mi upstream from outlet of canal, 2.3 mi south of international boundary, 29 mi north of Browning, and at river mile 58.3.

DRAINAGE AREA.--59.0 mi<sup>2</sup>.

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.

REVISED RECORDS.--W 1983: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 4,240 ft (NGVD 29). Prior to June 20, 1921, nonrecording gages at several sites within 1 mi of present site at different elevations. June 20, 1921 to Mar. 19, 1997 water-stage recorder at site 0.5 mile downstream from current site at elevation 15 ft lower.

REMARKS.--Records fair except those for estimated daily discharges, which are poor. Many small diversions for irrigation upstream from station.

Bureau of Reclamation satellite telemeter at station. Several observations of water temperature and specific conductance were made during the year.

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

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 2003  
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			e20	36	29	22	14	13	11	14		
2			e21	31	28	21	15	12	11	15		
3			e19	30	27	21	15	13	11	15		
4			e18	29	29	20	15	13	11	14		
5			e19	29	29	20	15	17	11	14		
6			e17	29	30	20	16	18	12	13		
7			e15	29	30	20	16	17	12	14		
8			e14	30	29	19	15	17	15	13		
9			e12	34	32	25	15	17	17	13		
10			e13	34	36	22	15	16	13	13		
11			e15	33	38	33	14	15	13	13		
12			e19	32	31	23	14	15	15	14		
13			e50	40	28	19	13	15	16	13		
14			e300	42	26	18	13	14	13	14		
15			e200	35	26	17	13	14	14	14		
16			e100	32	25	17	13	15	16	15		
17			e50	31	24	16	13	15	18	14		
18			43	30	26	16	12	15	17	13		
19			36	29	28	17	12	14	13	13		
20			37	28	28	17	12	13	13	13		
21			37	28	25	17	12	14	12	13		
22			38	28	24	16	13	13	13	12		
23			43	30	23	16	13	13	13	12		
24			30	32	23	17	14	13	14	12		
25			29	31	22	16	15	12	14	13		
26			29	31	27	15	16	12	12	13		
27			28	32	23	15	15	12	13	12		
28			28	31	22	15	15	12	13	13		
29			29	30	21	14	14	13	14	e13		
30			38	30	21	14	13	12	13	e13		
31			47	---	22	---	13	12	---	e13		
TOTAL			1394	946	832	558	433	436	403	413		
MEAN			45.0	31.5	26.8	18.6	14.0	14.1	13.4	13.3		
MAX			300	42	38	33	16	18	18	15		
MIN			12	28	21	14	12	12	11	12		
AC-FT			2760	1880	1650	1110	859	865	799	819		

STATISTICS OF MONTHLY MEAN DATA FOR SEASONS 1911 - 2003\*

MEAN	23.4	38.0	34.3	30.4	19.8	16.6	18.4	17.8
MAX	72.1	167	164	147	101	65.5	86.8	55.0
(WY)	1997	1948	1967	1995	1995	1951	1911	1996
MIN	8.14	9.47	7.14	6.95	4.12	3.30	3.90	4.95
(WY)	2001	2002	1941	1988	1985	1940	1940	1941

SUMMARY STATISTICS

FOR 2003 SEASON

SEASONS 1911 - 2003

HIGHEST DAILY MEAN	300	Mar 14	1320	Apr 22 1953
LOWEST DAILY MEAN	11	Sep 1	1.7	Sep 17 1940
MAXIMUM PEAK FLOW	a500	Mar 14	c3090	May 8 1967
MAXIMUM PEAK STAGE	b9.34	Mar 14	d10.50	Mar 19 1997

\*--During periods of operation (May 1911 to July 1912, June to July 1918, May 1919 to current season).

a--About, occurred during ice breakup event.

b--Backwater from ice.

c--Gage height, 7.95 ft, from rating curve extended above 130 ft<sup>3</sup>/s, on basis of slope-area measurements at gage heights 7.55 ft and 7.95 ft, at previous site and datum.

d--Backwater from ice, gage height, 9.07 ft from floodmarks at previous site, which was destroyed.

e--Estimated.

## MILK RIVER BASIN

## 06134000 NORTH MILK RIVER NEAR INTERNATIONAL BOUNDARY

(International gaging station)

LOCATION.--Lat 49°01'19", long 112°58'16" (NAD 27), in SW<sup>1</sup>/<sub>4</sub>NE<sup>1</sup>/<sub>4</sub> sec.11, T.1, R.23 W., fourth meridian, in Alberta, Hydrologic Unit 10050001, on right bank 0.4 mi upstream from highway bridge, 1.6 mi north of international boundary, 2.8 mi east of Whiskey Gap, Alberta, 11 mi southeast of Kimball, Alberta, and at river mile 49.9.

DRAINAGE AREA.--91.8 mi<sup>2</sup>. Area at site used Apr. 12, 1930, to Aug. 15, 1962, 97.4 mi<sup>2</sup>.

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.

REVISED RECORDS.--WSP 1309: 1909-13, 1915(M), 1920(M), 1937(M). WSP 1559: 1948(M). WSP 1729: 1944(M). W 1983: Drainage area. See also PERIOD OF RECORD.

GAGE.--Water-stage recorder. Elevation of gage is 4,112.16 ft, Canadian Geodetic Vertical Datum 1928. Prior to May 1913, nonrecording gage at site 2 mi downstream at different elevation. May 1, 1913, to Apr. 11, 1930, water-stage recorder 700 ft downstream at different elevation. Apr. 12, 1930, to Aug. 15, 1962, water-stage recorder 1,500 ft downstream at different elevation.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Since 1917, flow increased during irrigation season by water from St. Mary Canal (station number 05018500). Several small diversions for irrigation upstream from station. Water Survey of Canada satellite telemeter at station.

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

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 2003  
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			e21	51	576	636	625	600	403	14		
2			e21	41	572	632	625	600	399	14		
3			e20	34	561	629	625	604	381	14		
4			e20	35	572	625	625	604	349	14		
5			e20	35	569	625	625	593	341	14		
6			e20	35	572	622	625	597	314	14		
7			e19	36	533	614	622	593	280	13		
8			e18	57	466	618	625	593	280	13		
9			e16	374	360	625	622	593	279	14		
10			e17	417	301	604	614	593	275	14		
11			e18	431	290	611	614	590	275	14		
12			e21	410	274	583	618	590	266	14		
13			e106	413	306	600	618	590	216	14		
14			e353	427	336	614	614	586	146	14		
15			e247	417	367	618	611	590	135	14		
16			e124	406	392	622	614	593	138	15		
17			e67	403	388	614	614	586	138	14		
18			e62	403	403	622	614	590	137	13		
19			e58	403	406	636	611	586	111	13		
20			e52	403	406	643	611	586	50	13		
21			e48	403	406	650	607	561	30	13		
22			e49	427	406	643	607	537	25	13		
23			e49	448	431	646	604	530	24	13		
24			e42	459	516	646	604	523	19	13		
25			e37	463	547	639	604	526	21	13		
26			e38	463	561	632	607	501	16	13		
27			36	470	565	629	604	445	15	13		
28			36	487	593	625	600	417	15	e14		
29			36	540	629	625	600	413	15	e13		
30			46	576	625	625	600	410	15	e13		
31			64		636		600	406		e13		
TOTAL			1781	9967	14565	18753	19009	17126	5108	420		
MEAN			57.5	332	470	625	613	552	170	13.5		
MAX			353	576	636	650	625	604	403	15		
MIN			16	34	274	583	600	406	15	13		
AC-FT			3530	19770	28890	37200	37700	33970	10130	833		

## STATISTICS OF MONTHLY MEAN DATA FOR SEASONS 1917 - 2003

MEAN	66.4	194	422	521	559	529	308	59.0
MAX	402	633	732	745	727	721	702	524
(WY)	1981	1991	2001	1976	1936	1969	2002	1951
MIN	9.67	23.6	38.6	43.5	84.3	16.0	5.57	6.06
(WY)	2002	1940	1918	1952	2002	1982	1988	1942

## SUMMARY STATISTICS

## FOR 2003 SEASON

## SEASONS 1917 - 2003

HIGHEST DAILY MEAN	650	Jun 21	2170	Jun 7 1995
LOWEST DAILY MEAN	13	Oct 7	0.00	Mar 1 1940
MAXIMUM PEAK FLOW	a657	Jun 22	c3670	Jun 6 1995
MAXIMUM PEAK STAGE	b4.73	Mar 14	6.89	Jun 6 1995

a--Gage height, 3.22 ft.

b--Backwater from ice.

c--From rating curve extended above 1,500 ft<sup>3</sup>/s.

e--Estimated.

MILK RIVER BASIN

06134500 MILK RIVER AT MILK RIVER, ALBERTA

(International gaging station)

LOCATION.--Lat 49°08'37", long 112°04'44" (NAD 27), in NE 1/4 sec.21, T.2, R.16 W., fourth meridian, in Alberta, Hydrologic Unit 10050002, on right bank 5 ft downstream from highway bridge at Milk River, Alberta, 22 mi downstream from North Milk River, and at river mile 613.4.

DRAINAGE AREA.--1,050 mi<sup>2</sup>.

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.

REVISED RECORDS.--WSP 1309: 1912. WSP 1599: 1916, 1927(M), 1947(M). W 1983: Drainage area. W 1984: 1983 (M).

GAGE.--Water-stage recorder. Elevation of gage is 3,402.78 ft, Canadian Geodetic Vertical Datum 1928. Prior to June 17, 1919, nonrecording gages, and June 17, 1919, to Nov. 2, 1921, water-stage recorder at several sites 300 ft upstream at elevation 0.61 ft higher. Nov. 3, 1921, to Aug. 28, 1947, water-stage recorder at site 60 ft upstream at present elevation. Aug. 29, 1947, to Nov. 10, 1976, water-stage recorder located 700 ft downstream on left bank at present elevation.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Since 1917, flow increased during irrigation season by water from St. Mary Canal (station number 05018500). Several diversions for irrigation upstream from station. Environment Canada satellite telemeter at station. Several observations of water temperature and specific conductance were made during the year.

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

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	639	e88	e58	e66	e59	e37	219	766	727	639	600	388
2	629	e94	e55	e67	e59	e37	448	798	727	625	597	385
3	622	e108	e51	e68	e58	e36	410	788	735	625	604	381
4	600	e120	e54	e70	e58	e36	260	784	720	625	611	367
5	540	e126	e55	e70	e57	e35	212	742	710	632	607	334
6	463	137	e54	e70	e53	e34	195	742	710	636	600	329
7	406	136	e62	e69	e53	e33	177	756	706	636	597	311
8	388	e132	72	e67	e56	e32	164	717	699	632	597	280
9	346	e120	76	e65	e58	e39	152	643	720	625	593	278
10	266	e113	75	e63	e60	e49	427	540	720	622	590	276
11	222	e117	76	e59	e59	e54	614	473	706	618	586	273
12	176	e125	72	e47	e60	e67	664	473	745	622	590	284
13	139	e120	69	e37	e58	e85	678	441	738	614	586	284
14	118	e106	69	e37	e53	e424	713	441	720	614	583	248
15	114	e102	e67	e42	e55	e1410	752	463	706	614	583	185
16	111	e99	e60	e49	e56	e2650	731	466	682	611	583	165
17	108	e88	e54	e49	e57	e1410	653	484	671	604	590	168
18	100	e84	e47	e48	e54	e699	600	491	660	600	583	163
19	101	e99	e39	e48	e55	600	569	501	660	604	579	156
20	95	107	e34	e42	e54	470	544	509	685	604	583	151
21	94	85	e32	e35	e50	388	530	519	678	607	583	113
22	93	98	e34	e34	e45	360	530	516	682	600	565	76
23	e89	e94	e37	e35	e46	328	569	505	678	604	540	58
24	e77	e87	e49	e37	e42	322	590	523	682	600	523	48
25	e72	e76	e59	e46	e43	309	625	607	682	604	512	43
26	e71	e95	e55	e47	e38	244	646	653	667	607	512	38
27	e70	e98	e54	e46	e37	224	625	650	667	611	484	34
28	e72	e93	e57	e46	e37	196	597	671	657	607	427	33
29	e78	e81	e60	e51	---	185	632	692	653	604	403	30
30	e82	e66	e63	e54	---	164	703	713	643	607	392	27
31	e85	---	e65	e57	---	160	---	710	---	600	396	---
TOTAL	7066	3094	1764	1621	1470	11117	15229	18777	20836	19053	17179	5906
MEAN	228	103	56.9	52.3	52.5	359	508	606	695	615	554	197
MAX	639	137	76	70	60	2650	752	798	745	639	611	388
MIN	70	66	32	34	37	32	152	441	643	600	392	27
AC-FT	14020	6140	3500	3220	2920	22050	30210	37240	41330	37790	34070	11710

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1917 - 2003, BY WATER YEAR (WY)\*

MEAN	103	56.9	34.0	30.5	61.6	230	496	659	720	616	552	351
MAX	555	216	133	268	616	1025	1384	1179	1633	965	795	713
(WY)	1951	1952	1952	1928	1986	1972	1917	1967	1953	1951	1976	1959
MIN	7.83	8.74	2.06	0.000	0.000	3.44	94.5	236	162	192	29.2	3.65
(WY)	1989	2002	1923	1923	1922	1922	1945	1918	1952	2002	1982	2001

## MILK RIVER BASIN

## 06134500 MILK RIVER AT MILK RIVER, ALBERTA--Continued

SUMMARY STATISTICS	FOR 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1917 - 2003*	
ANNUAL TOTAL	153912.92		123112			
ANNUAL MEAN	422		337		327	
HIGHEST ANNUAL MEAN					489 1953	
LOWEST ANNUAL MEAN					157 1921	
HIGHEST DAILY MEAN	7840	Jun 11	2650	Mar 16	7840	Jun 11 2002
LOWEST DAILY MEAN	0.92	Jan 1	27	Sep 30	0.00	Jan 19 1922
ANNUAL SEVEN-DAY MINIMUM	3.2	Jan 25	35	Mar 2	0.00	Jan 19 1922
MAXIMUM PEAK FLOW			a3000	Mar 16	9850	Feb 25 1986
MAXIMUM PEAK STAGE			b7.64	Mar 14	c12.46	Feb 25 1986
ANNUAL RUNOFF (AC-FT)	305300		244200		236800	
10 PERCENT EXCEEDS	858		682		741	
50 PERCENT EXCEEDS	126		248		158	
90 PERCENT EXCEEDS	4.9		46		13	

\*--Flow increased during irrigation season by water from St. Mary Canal since 1917.

a--About.

b--Backwater from ice.

c--From floodmarks, backwater from ice.

e--Estimated.

MILK RIVER BASIN

06134700 VERDIGRIS COULEE NEAR THE MOUTH, NEAR MILK RIVER, ALBERTA

(International gaging station)

LOCATION.--Lat 49°06'39", long 111°45'31" (NAD 27), in NW<sup>1</sup>/<sub>4</sub> sec.12, T.2, R.14 W., fourth meridian, in Alberta, Hydrologic Unit 10050002, on left bank, 0.6 mi upstream from mouth, 5 mi downstream from culvert on provincial highway 501, and 15 mi east of Milk River, Alberta.

DRAINAGE AREA.--137 mi<sup>2</sup>, of which 130 mi<sup>2</sup> is probably noncontributing.

PERIOD OF RECORD.--May 1985 to current season (seasonal records only).

GAGE.--Water-stage recorder. Elevation of gage is 3,040 ft (NGVD 29).

REMARKS.--Records fair except those for estimated daily discharges, which are poor. Nearly all flow is the result of interbasin diversion from St. Mary River into Weston Lake 25 miles upstream. Environment Canada satellite telemeter at station.

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

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 2003  
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			e0.00	0.00	0.11	1.6	4.9	2.2	0.00	0.00		
2			e0.00	0.00	0.04	2.1	5.1	2.1	0.00	0.00		
3			e0.00	0.00	0.00	2.4	5.4	2.3	0.00	0.00		
4			e0.00	0.04	0.39	2.4	5.4	2.3	0.00	0.00		
5			e0.00	0.04	1.2	2.9	5.3	2.3	0.00	0.00		
6			e0.00	0.04	5.7	3.0	5.2	1.5	0.00	0.00		
7			e0.00	0.04	5.9	3.2	5.1	1.5	0.00	0.00		
8			e0.00	0.00	3.6	3.1	4.8	1.5	0.00	0.00		
9			e0.00	0.00	1.6	3.7	4.9	1.7	0.00	0.00		
10			e0.00	0.00	1.0	4.2	4.8	1.4	0.00	0.00		
11			e0.00	0.00	0.49	4.2	4.6	1.1	0.00	0.00		
12			e0.00	0.00	0.28	4.3	4.3	1.6	0.00	0.00		
13			e0.00	0.14	0.18	4.4	4.5	1.1	0.00	0.00		
14			e0.42	0.25	0.11	4.6	4.7	0.32	0.00	0.00		
15			e0.99	0.18	0.04	4.8	4.6	0.14	0.00	0.00		
16			e0.71	0.11	0.00	4.9	4.2	0.07	0.00	0.00		
17			0.53	0.07	0.00	4.8	4.0	0.04	0.00	0.00		
18			0.32	0.04	0.00	4.3	3.8	0.00	0.00	0.00		
19			0.11	0.04	0.00	3.7	3.6	0.00	0.00	0.00		
20			0.07	0.00	0.00	5.4	3.7	0.00	0.00	0.00		
21			0.04	0.00	0.00	5.9	3.5	0.00	0.00	0.00		
22			0.00	0.00	0.00	6.0	3.4	0.00	0.00	0.00		
23			0.00	0.00	0.00	6.0	3.0	0.00	0.00	0.00		
24			0.00	0.00	0.00	6.0	3.0	0.00	0.00	0.00		
25			0.00	0.00	0.00	5.9	3.2	0.00	0.00	0.00		
26			0.00	0.11	0.00	5.8	3.1	0.00	0.00	0.00		
27			0.00	0.07	0.00	5.8	2.8	0.00	0.00	0.00		
28			0.00	0.04	0.57	5.7	2.8	0.00	0.00	0.00		
29			0.00	0.46	1.1	5.5	2.6	0.00	0.00	e0.00		
30			0.00	1.2	1.5	5.0	2.3	0.00	0.00	e0.00		
31			0.00	---	1.4	---	1.9	0.00	---	e0.00		
TOTAL			3.19	2.87	25.21	131.6	124.5	23.17	0.00	0.00		
MEAN			0.10	0.096	0.81	4.39	4.02	0.75	0.000	0.000		
MAX			0.99	1.2	5.9	6.0	5.4	2.3	0.00	0.00		
MIN			0.00	0.00	0.00	1.6	1.9	0.00	0.00	0.00		
AC-FT			6.3	5.7	50	261	247	46	0.00	0.00		

STATISTICS OF MONTHLY MEAN DATA FOR SEASONS 1985 - 2003

MEAN	5.83	6.05	6.59	7.47	5.17	5.96	6.87	6.25
MAX	43.9	29.6	20.8	18.1	16.4	24.1	25.5	26.2
(WY)	1996	1996	1994	1989	1991	1993	1985	1986
MIN	0.000	0.048	0.000	0.000	0.000	0.000	0.000	0.000
(WY)	2001	2002	1998	2000	1999	1998	1999	2000

SUMMARY STATISTICS

FOR 2003 SEASON

SEASONS 1985 - 2003

HIGHEST DAILY MEAN	6.0	Jun 22	264	Mar 11 1996
LOWEST DAILY MEAN	0.00	many days	0.00	Nov 19 1985
MAXIMUM PEAK FLOW	15	May 6	a280	Mar 11 1996
MAXIMUM PEAK STAGE	4.04	May 6	6.51	Mar 2 1994

a--About, gage height not determined (backwater from ice).  
e--Estimated.

## MILK RIVER BASIN

## 06135000 MILK RIVER AT EASTERN CROSSING OF INTERNATIONAL BOUNDARY

(International gaging station)

LOCATION.--Lat 48°58'30", long 110°25'19" (NAD 27), in NW<sup>1</sup>/<sub>4</sub>SW<sup>1</sup>/<sub>4</sub>SE<sup>1</sup>/<sub>4</sub> sec.9, T.37 N., R.9 E., Hill County, Hydrologic Unit 10050002, on left bank 1.6 mi south of international boundary, 1.7 mi upstream from Lost River, 10 mi northwest of Simpson, 35.5 mi north of Rudyard, and at river mile 479.6.

DRAINAGE AREA.--2,506 mi<sup>2</sup>, revised.

PERIOD OF RECORD.--August 1909 to current season (seasonal records only). A few winter records were collected and are on file in the Helena District office. Monthly discharge only for April 1912, published in WSP 1309.

REVISED RECORDS.--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). WRD MT-94-1(M). W 1983: Drainage area. WRD MT-98-1: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 2,660 ft (NGVD 29). Prior to Mar. 1, 1998, water-stage recorder or nonrecording gages at several sites within 15 mi upstream at different elevation.

REMARKS.--Records good except those for Mar. 18 to Apr. 3, which are fair and estimated daily discharges, which are poor. Since 1917, flow increased during irrigation season by water from St. Mary Canal (station number 05018500). Many diversions for irrigation upstream from station. Bureau of Reclamation satellite telemeter at station.

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

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 2003  
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			e40	236	786	664	702	559	360	58		
2			e38	206	818	679	680	541	351	54		
3			e38	204	833	675	672	547	351	52		
4			e36	245	858	684	646	569	352	50		
5			e36	546	1020	697	614	583	351	48		
6			e34	477	810	705	608	576	347	46		
7			e34	343	746	680	611	570	337	43		
8			e32	293	707	659	617	560	311	40		
9			e30	274	682	661	616	546	301	37		
10			e32	243	666	774	609	542	298	34		
11			e36	213	602	659	581	542	263	32		
12			e40	197	543	686	567	554	245	31		
13			e45	373	500	685	565	551	255	30		
14			e50	750	490	697	548	520	247	30		
15			e100	898	479	739	531	506	264	33		
16			e700	821	481	716	517	503	279	32		
17			e4000	850	481	691	518	498	275	31		
18			2300	859	494	669	531	514	250	30		
19			1450	794	510	631	530	514	203	29		
20			920	742	538	705	525	522	182	27		
21			739	699	523	789	520	515	175	26		
22			606	680	519	648	528	527	166	25		
23			551	658	513	663	510	537	157	24		
24			495	648	519	705	517	545	152	23		
25			461	642	492	720	527	511	125	23		
26			449	676	480	733	538	480	104	23		
27			468	759	497	739	562	472	88	22		
28			451	834	585	752	576	473	75	e20		
29			384	804	622	732	578	479	68	e18		
30			333	777	624	715	578	448	62	e15		
31			268	---	658	---	576	399	---	e12		
TOTAL			15196	16741	19076	20952	17798	16203	6994	998		
MEAN			490	558	615	698	574	523	233	32.2		
MAX			4000	898	1020	789	702	583	360	58		
MIN			30	197	479	631	510	399	62	12		
AC-FT			30140	33210	37840	41560	35300	32140	13870	1980		

## STATISTICS OF MONTHLY MEAN DATA FOR SEASONS 1917 - 2003\*

MEAN	374	566	712	781	618	543	381	128
MAX	1522	1691	1943	2561	1046	886	740	566
(WY)	1978	1965	1927	2002	1951	1927	1972	1990
MIN	9.88	80.1	257	200	262	77.4	2.21	0.16
(WY)	2002	1945	1918	1952	1977	1982	2001	2002

## SUMMARY STATISTICS

## FOR THE 2003 SEASON

## SEASONS 1917 - 2003\*

HIGHEST DAILY MEAN	4000	Mar 17	12400	Jun 12 2002
LOWEST DAILY MEAN	12	Oct 31	0.00	Feb 1 1922
MAXIMUM PEAK FLOW	a5000	Mar 16	c14400	Jun 12 2002
MAXIMUM PEAK STAGE	b10.63	Mar 16	b15.03	Mar 13 1996

\*--Flow increased during irrigation season by water from St. Mary Canal since 1917.

a--About.

b--Backwater from ice.

c--Gage height, 10.78 ft, from floodmarks.

e--Estimated.



MILK RIVER BASIN

06137400 BIG SANDY CREEK AT RESERVATION BOUNDARY, NEAR ROCKY BOY, MT

LOCATION.--Lat 48°10'27", long 109°49'23" (NAD 27), in SW<sup>1</sup>/<sub>4</sub>NW<sup>1</sup>/<sub>4</sub>NE<sup>1</sup>/<sub>4</sub> sec. 20, T.28 N., R.15 E., Chouteau County, Hydrologic Unit 10050005, on left bank 0.9 mi downstream from Muddy Creek, 6.0 mi south of Rocky Boy Agency, and at river mile 90.6.

DRAINAGE AREA.--24.7 mi<sup>2</sup>.

PERIOD OF RECORD.--May 1982 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 3,830 ft (NGVD 29). Prior to Sept. 6, 2001, water-stage recorder at site 0.1 mi downstream at different elevation.

REMARKS.--Records good except those for estimated daily discharges, which are poor. No known regulation or diversions upstream from station. U.S. Geological Survey satellite telemeter at station. Several observations of water temperatures and specific conductance were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	4.0	e1.7	e2.4	e1.6	1.4	e1.0	11	6.0	5.8	3.6	1.3	0.73
2	3.2	e2.0	2.3	e1.7	e1.4	e1.1	7.1	5.7	5.9	3.4	1.2	0.77
3	3.0	e2.1	e2.0	e1.8	e1.3	e1.1	5.3	5.5	6.7	3.3	1.4	0.75
4	3.2	2.0	e1.4	2.0	e1.3	e1.0	4.6	7.3	6.6	3.2	1.3	0.82
5	3.3	e2.2	e1.5	1.8	e1.2	e1.0	4.5	8.5	7.3	3.1	1.2	0.76
6	3.1	2.2	e1.9	1.6	e1.3	e1.0	4.8	7.6	7.4	3.0	1.0	0.74
7	3.3	2.4	e2.1	1.7	e1.3	e1.0	4.0	8.0	6.7	3.0	1.2	0.77
8	5.3	3.0	e2.2	1.6	e1.2	e0.90	5.0	8.1	6.1	4.0	1.2	0.76
9	3.7	5.6	2.4	e1.3	e1.2	e0.90	7.6	9.9	7.2	4.4	1.2	0.75
10	3.1	3.6	2.3	e1.2	e1.2	e1.0	8.1	10	6.9	3.3	1.1	0.82
11	3.0	3.2	2.1	e1.3	e1.2	e1.2	7.3	8.6	7.0	3.0	0.94	0.91
12	3.0	2.9	e2.0	e1.3	e1.1	e1.6	7.7	8.1	6.8	2.6	0.95	1.4
13	3.1	3.0	2.0	e1.4	e1.1	e4.0	7.8	8.5	6.0	2.4	1.00	1.8
14	3.0	3.1	2.1	e1.4	e1.2	e50	11	8.0	6.0	2.4	0.92	1.5
15	3.0	2.9	2.3	e1.4	e1.2	e40	15	7.7	5.4	2.2	0.83	1.4
16	2.8	3.3	2.3	1.5	e1.2	e26	16	9.9	5.9	2.2	0.82	1.6
17	3.2	2.8	2.2	1.5	e1.3	e20	11	8.3	5.7	2.1	0.92	2.0
18	2.9	3.0	e2.1	1.5	e1.3	14	11	7.8	4.7	1.9	0.99	1.8
19	2.6	3.2	e1.6	1.5	e1.4	12	12	7.8	4.7	1.8	0.86	1.7
20	2.9	3.1	e1.3	1.6	e1.3	13	8.5	7.3	7.4	1.8	0.88	1.8
21	3.0	3.2	e1.1	e1.2	e1.1	11	8.1	7.2	6.1	1.7	0.86	1.7
22	2.5	4.0	e1.0	e1.1	e0.80	14	7.8	7.0	5.4	1.7	0.88	1.7
23	2.2	3.7	e1.1	e1.3	e0.60	16	7.6	6.8	5.4	1.6	0.78	1.5
24	2.1	e3.0	e1.2	1.5	e0.65	9.4	7.7	6.7	5.1	1.6	0.93	1.5
25	2.3	e2.8	e1.4	1.3	e0.70	7.3	7.4	6.4	4.8	1.7	0.77	1.5
26	2.2	e2.9	e1.9	1.4	e0.75	5.8	7.3	7.4	4.6	1.7	0.61	1.4
27	2.3	3.0	e1.7	1.8	e0.80	5.2	6.7	6.7	4.5	1.5	0.76	1.4
28	2.3	3.0	e1.7	1.7	e0.90	5.0	6.3	6.2	5.5	1.4	0.76	1.5
29	2.2	2.7	e1.6	1.6	---	5.3	6.1	5.9	4.8	1.5	0.80	1.6
30	e1.8	2.5	e1.5	1.5	---	8.5	6.1	5.7	4.0	1.4	0.86	1.6
31	e1.6	---	e1.6	1.4	---	15	---	5.7	---	1.3	0.89	---
TOTAL	89.2	88.1	56.3	46.5	31.40	294.30	240.4	230.3	176.4	73.8	30.11	38.98
MEAN	2.88	2.94	1.82	1.50	1.12	9.49	8.01	7.43	5.88	2.38	0.97	1.30
MAX	5.3	5.6	2.4	2.0	1.4	50	16	10	7.4	4.4	1.4	2.0
MIN	1.6	1.7	1.0	1.1	0.60	0.90	4.0	5.5	4.0	1.3	0.61	0.73
AC-FT	177	175	112	92	62	584	477	457	350	146	60	77

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1982 - 2003, BY WATER YEAR (WY)

	1982	1986	1994	1996	1996	1996	1994	1986	1982	1993	1993	1993
MEAN	5.33	4.68	4.17	3.54	4.30	6.51	10.6	13.7	16.5	12.7	6.36	5.28
MAX	14.0	11.1	11.8	9.44	21.7	28.0	32.6	68.3	50.0	53.7	29.3	18.8
(WY)	1986	1994	1996	1996	1996	1996	1994	1986	1982	1993	1993	1993
MIN	0.66	0.92	0.81	0.71	0.76	0.90	3.67	1.84	1.42	1.01	0.50	0.65
(WY)	2002	2002	2002	2002	2002	2002	2002	1988	1988	2001	1988	2001

SUMMARY STATISTICS FOR 2002 CALENDAR YEAR FOR 2003 WATER YEAR WATER YEARS 1982 - 2003

ANNUAL TOTAL	1406.09	1395.79										
ANNUAL MEAN	3.85	3.82								7.67		
HIGHEST ANNUAL MEAN										18.1		1986
LOWEST ANNUAL MEAN										1.79		2001
HIGHEST DAILY MEAN				31	Jun 11		50	Mar 14		298	Jun 27	1998
LOWEST DAILY MEAN				0.58	Jan 31		0.60	Feb 23		0.42	Aug 10	1988
ANNUAL SEVEN-DAY MINIMUM				0.62	Jan 27		0.74	Feb 22		0.45	Aug 9	1988
MAXIMUM PEAK FLOW							a75	Mar 14		c510	Jun 27	1998
MAXIMUM PEAK STAGE							b3.12	Mar 14		6.07	Jun 27	1998
INSTANTANEOUS LOW FLOW										d0.03	Jun 26	1992
ANNUAL RUNOFF (AC-FT)	2790	2770								5560		
10 PERCENT EXCEEDS		8.7						7.8		16		
50 PERCENT EXCEEDS		2.6						2.2		4.5		
90 PERCENT EXCEEDS		0.73						0.93		1.4		

a--About.  
b--Backwater from ice.  
c--On basis of slope-area measurement of peak flow.  
d--Gage height, 2.32 ft, site and datum then in use.  
e--Estimated.

## MILK RIVER BASIN

## 06139500 BIG SANDY CREEK NEAR HAVRE, MT

LOCATION.--Lat 48°31'36", long 109°50'27" (NAD 27), in SW<sup>1</sup>/<sub>4</sub>SW<sup>1</sup>/<sub>4</sub>SW<sup>1</sup>/<sub>4</sub> sec.18, T.32 N., R.15 E., Hill County, Hydrologic Unit 10050005, on right bank, 6 mi upstream from mouth, 7.7 mi west southwest of Havre post office, and 22 mi downstream from Sage Creek.

DRAINAGE AREA.--1,805 mi<sup>2</sup>.

PERIOD OF RECORD.--February 1946 to November 1953 (monthly discharge only for February 1946, published in WSP 1309 as "Big Sandy Creek near Assinniboine"), annual maximum, water years 1955-67 (published as "Big Sandy Creek near Assinniboine"), and May 1984 to current year (seasonal records only).

REVISED RECORDS.--WSP 1729: Drainage area.

GAGE.--Water-stage recorder and concrete control. Elevation of gage is 2,510 ft (NGVD 29).

REMARKS.--Records good. Diversions for irrigation of about 1,000 acres upstream from station. Bureau of Reclamation satellite telemeter at station.

Several observations of water temperature and specific conductance were made during the year.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Mar. 30, 1978, reached a stage of 15.15 ft, from floodmarks, discharge, about 6,000 ft<sup>3</sup>/s.

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 2003  
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1				14	0.46	7.0	0.17	0.00	0.00			
2				15	0.35	7.6	0.12	0.00	0.00			
3				16	0.24	8.4	0.09	0.00	0.00			
4				14	0.32	8.9	0.08	0.00	0.00			
5				14	0.97	9.3	0.02	0.00	0.00			
6				13	1.4	10	0.00	0.00	0.00			
7				12	1.8	11	0.00	0.00	0.00			
8				11	1.9	15	0.00	0.00	0.00			
9				10	1.8	12	0.02	0.00	0.00			
10				9.1	2.7	5.9	0.00	0.00	0.00			
11				8.4	1.9	4.6	0.00	0.00	0.00			
12				6.8	1.0	3.3	0.00	0.00	0.00			
13				4.2	0.93	2.3	0.00	0.00	0.00			
14				3.9	0.50	2.2	0.00	0.00	0.00			
15				4.9	0.41	2.0	0.00	0.00	0.00			
16				5.1	7.0	1.8	0.00	0.00	0.00			
17				3.8	6.6	1.4	0.00	0.00	0.00			
18				3.6	7.1	1.1	0.00	0.00	0.00			
19				3.2	8.2	0.84	0.00	0.00	0.00			
20				2.4	9.5	0.78	0.00	0.00	0.00			
21				1.8	9.6	0.79	0.00	0.00	0.00			
22				1.3	9.2	0.47	0.00	0.00	0.00			
23				0.86	9.1	0.33	0.00	0.00	0.00			
24				0.64	8.9	0.24	0.00	0.00	0.00			
25				0.59	8.9	0.18	0.00	0.00	0.00			
26				0.67	8.7	0.34	0.00	0.00	0.00			
27				0.52	8.2	0.41	0.00	0.00	0.00			
28				0.48	7.9	0.43	0.00	0.00	0.00			
29				0.36	7.7	0.33	0.00	0.00	0.00			
30				0.47	6.9	0.26	0.00	0.00	0.00			
31				---	6.8	---	0.00	0.00	---			
TOTAL				182.09	146.98	119.20	0.50	0.00	0.00			
MEAN				6.07	4.74	3.97	0.016	0.000	0.000			
MAX				16	9.6	15	0.17	0.00	0.00			
MIN				0.36	0.24	0.18	0.00	0.00	0.00			
AC-FT				361	292	236	1.0	0.00	0.00			

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1946 - 1953 AND SEASONS 1954 - 2003\*

	0.48	6.68	61.3	62.6	14.3	26.2	18.0	5.60	4.27	7.96	0.045	0.020
MEAN	0.48	6.68	61.3	62.6	14.3	26.2	18.0	5.60	4.27	7.96	0.045	0.020
MAX	3.39	19.5	343	1218	108	222	137	85.9	54.4	54.5	0.31	0.14
(WY)	1947	1947	1947	1952	1986	1953	1993	1993	1993	1987	1953	1953
MIN	0.000	0.000	0.63	0.16	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
(WY)	1948	1948	1949	2002	1949	1949	1946	1946	1946	1947	1947	1947

SUMMARY STATISTICS

FOR THE 2003 SEASON

SEASONS 1946 - 2003\*

HIGHEST DAILY MEAN	16	Apr 3	5100	Apr 3 1952
LOWEST DAILY MEAN	0.00	many days	0.00	Feb 1 1946
MAXIMUM PEAK FLOW	140	Mar 16	5570	Apr 3 1952
MAXIMUM PEAK STAGE	a4.73	Mar 16	a14.70	Apr 3 1952

\*--During period of operation.

a--From floodmarks.

MILK RIVER BASIN

06139900 BEAVER CREEK AT RESERVATION BOUNDARY, NEAR ROCKY BOY, MT

LOCATION.--Lat 48°13'17", long 109°39'01" (NAD 27), in NW 1/4NW 1/4NE 1/4 sec. 3, T.28 N., R.16 E., Hill County, Hydrologic Unit 10050004, in Rocky Boy's Indian Reservation, on left bank, 20 ft upstream from reservation boundary, 0.4 mi upstream from Blackie Coulee, 6.7 mi southeast of Rocky Boy, 25 mi south of Havre, and at river mile 39.9.

DRAINAGE AREA.--16.1 mi<sup>2</sup>.

PERIOD OF RECORD.--July 2001 to current year. Miscellaneous measurements and water-quality samples were obtained at this site between 1982 and 1991.

GAGE.--Water-stage recorder. Elevation of gage is 4,200 ft (NGVD 29).

REMARKS.--Records good except those for estimated daily discharges, which are poor. U.S. Geological Survey satellite telemeter at station. Several observations of water temperature and specific conductance were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003 DAILY MEAN VALUES

Table with 13 columns: DAY, OCT, NOV, DEC, JAN, FEB, MAR, APR, MAY, JUN, JUL, AUG, SEP. Rows include daily discharge values from day 1 to 31, and summary statistics (TOTAL, MEAN, MAX, MIN, AC-FT) for the period.

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 2001 - 2003, BY WATER YEAR (WY)

Table with 13 columns: MEAN, MAX, (WY), MIN, (WY). Rows show monthly mean statistics for water years 2001, 2002, and 2003.

SUMMARY STATISTICS FOR 2002 CALENDAR YEAR FOR 2003 WATER YEAR WATER YEARS 2001 - 2003

Table with 4 columns: 2002 CALENDAR YEAR, 2003 WATER YEAR, WATER YEARS 2001 - 2003. Rows include ANNUAL TOTAL, ANNUAL MEAN, HIGHEST ANNUAL MEAN, LOWEST ANNUAL MEAN, HIGHEST DAILY MEAN, LOWEST DAILY MEAN, ANNUAL SEVEN-DAY MINIMUM, MAXIMUM PEAK FLOW, MAXIMUM PEAK STAGE, INSTANTANEOUS LOW FLOW, ANNUAL RUNOFF (AC-FT), 10 PERCENT EXCEEDS, 50 PERCENT EXCEEDS, 90 PERCENT EXCEEDS.

e--Estimated.

MILK RIVER BASIN

06140500 MILK RIVER AT HAVRE, MT

LOCATION.--Lat 48°33'50", long 109°41'42" (NAD 27), in SE<sup>1</sup>/<sub>4</sub>NE<sup>1</sup>/<sub>4</sub>NE<sup>1</sup>/<sub>4</sub> sec.6, T.32 N., R.16 E., Hill County, Hydrologic Unit 10050004, on left bank, 1.25 mi upstream from Bullhook Creek and 7th Avenue East highway bridge in Havre, 8.2 mi downstream from Big Sandy Creek, 15.8 mi downstream from Fresno Dam, and at river mile 419.2.

DRAINAGE AREA.--5,785 mi<sup>2</sup>, of which 670 mi<sup>2</sup> 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), September 1954 to current year. Monthly discharge only for some periods, published in WSP 1309.

REVISED RECORDS.--WSP 1309: 1899-1900, 1902-4, 1907-8, 1909(M), 1912, 1917(M), 1920(M). WSP 1729: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 2,465.24 ft (NGVD 29). Prior to Nov. 4, 1902, nonrecording gage at site 0.75 mi downstream at different elevation. Nov. 4, 1902, to Aug. 6, 1980, nonrecording gages 1.25 mi downstream on 7th Avenue East highway bridges, all at elevations then in use.

REMARKS.--Records fair except those for estimated daily discharges, which are poor. Diversions for irrigation of about 6,000 acres upstream from station. Since 1917, flow increased during irrigation season by water from St. Mary Canal (station number 05018500). Since 1939, flow regulated by Fresno Reservoir (station number 06136500). U.S. Geological Survey satellite telemeter at station. Several observations of water temperature and specific conductance were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	410	48	e50	e45	e50	e60	71	410	1230	626	972	210
2	411	49	e50	e45	e50	e60	73	405	1200	618	902	203
3	410	51	e40	e45	e50	e60	74	405	1090	628	873	207
4	413	49	e15	e45	e50	e60	79	413	1070	766	843	233
5	413	51	e45	e45	e50	e60	68	430	1060	776	830	233
6	412	50	e50	e45	e50	e60	67	432	1060	773	787	235
7	407	47	46	e45	e50	e60	64	435	1060	777	767	236
8	372	49	44	e45	e50	e60	61	495	1040	1050	720	237
9	367	52	47	e45	e50	e60	57	567	1040	1080	688	218
10	366	48	46	e45	e50	e60	59	607	1030	1070	678	203
11	363	45	49	e45	e50	e60	138	632	1020	1070	668	91
12	341	52	46	e45	e50	e60	376	639	909	1090	647	72
13	329	50	54	e45	e50	e60	411	642	889	1100	652	64
14	328	52	52	e45	e50	e60	419	619	885	1080	626	59
15	327	54	e45	e45	e50	e120	439	579	877	1190	618	58
16	263	55	e50	e45	e50	e200	442	580	869	1210	630	81
17	186	55	e50	e45	e50	e190	423	540	857	1170	628	66
18	120	55	e50	e45	e50	e150	421	506	862	1170	634	55
19	103	53	42	e45	e50	e120	422	493	865	1150	646	55
20	102	54	48	e45	e50	e130	411	467	881	1010	646	59
21	97	56	46	e45	e50	e170	412	466	710	991	660	55
22	93	55	41	e45	e50	190	414	466	682	1030	666	55
23	95	54	42	e45	e55	153	412	608	679	1030	701	59
24	93	30	45	e45	e60	121	413	701	680	1020	684	59
25	93	46	e40	e45	e60	108	420	692	682	1070	652	60
26	72	e50	e45	e50	e60	96	419	688	679	1070	631	60
27	53	e50	e45	e50	e60	83	411	685	679	1090	621	61
28	52	e50	e45	e50	e60	78	409	809	684	1070	614	63
29	49	e50	e45	e50	---	71	410	869	679	1020	570	63
30	38	e50	e45	e50	---	62	412	1210	678	1040	392	63
31	41	---	e45	e50	---	63	---	1240	---	994	222	---
TOTAL	7219	1510	1403	1425	1455	2945	8707	18730	26626	30829	20868	3473
MEAN	233	50.3	45.3	46.0	52.0	95.0	290	604	888	994	673	116
MAX	413	56	54	50	60	200	442	1240	1230	1210	972	237
MIN	38	30	15	45	50	60	57	405	678	618	222	55
AC-FT	14320	3000	2780	2830	2890	5840	17270	37150	52810	61150	41390	6890

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1898 - 2003, BY WATER YEAR (WY)\*

	1898	1899	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
MEAN	146	76.1	53.2	57.0	90.7	31.7	520	809	826	774	564	323																																																																																														
MAX	628	325	160	780	1400	2106	2700	2191	2188	2045	1303	956																																																																																														
(WY)	1994	1976	1900	1918	1916	1918	1899	1967	1908	1902	1978	1993																																																																																														
MIN	0.000	0.000	0.000	0.000	0.000	5.00	25.0	61.4	35.2	15.3	0.000	0.000																																																																																														
(WY)	1906	1906	1906	1906	1922	1919	1983	1905	1905	1910	1910	1905																																																																																														

SUMMARY STATISTICS FOR 2002 CALENDAR YEAR FOR 2003 WATER YEAR WATER YEARS 1898 - 2003\*

ANNUAL TOTAL	145980	125190	
ANNUAL MEAN	400	344	381
HIGHEST ANNUAL MEAN			727
LOWEST ANNUAL MEAN			39.2
HIGHEST DAILY MEAN	2200	Jun 19	1240
LOWEST DAILY MEAN	15	Dec 4	15
ANNUAL SEVEN-DAY MINIMUM	22	Mar 27	41
MAXIMUM PEAK FLOW			1270
MAXIMUM PEAK STAGE			4.75
ANNUAL RUNOFF (AC-FT)	289600	248300	275800
10 PERCENT EXCEEDS	1180	992	1050
50 PERCENT EXCEEDS	120	103	135
90 PERCENT EXCEEDS	24	45	27

MILK RIVER BASIN

06140500 MILK RIVER AT HAVRE, MT--Continued

SUMMARY STATISTICS	WATER YEARS 1900 - 1916**		WATER YEARS 1917 - 2003***	
ANNUAL TOTAL				
ANNUAL MEAN	273.7		414	
HIGHEST ANNUAL MEAN	571	1916	727	1965
LOWEST ANNUAL MEAN	39.2	1905	160	1919
HIGHEST DAILY MEAN	9600	Jun 9 1908	9150	Mar 20 1918
LOWEST DAILY MEAN	a0.00	Aug 16 1904	0.00	Jan 1 1922
ANNUAL SEVEN-DAY MINIMUM	0.00	Aug 15 1905	0.00	Jan 1 1922
MAXIMUM PEAK FLOW	11000	Jun 9 1908	f11400	Apr 3 1952
MAXIMUM PEAK STAGE	16.5	Jun 9 1908	18.60	Apr 3 1952
ANNUAL RUNOFF (AC-FT)	198300		299700	
10 PERCENT EXCEEDS	640		1080	
50 PERCENT EXCEEDS	110		164	
90 PERCENT EXCEEDS	5.0		30	

\*--During periods of operation (May 1898 to November 1898, April 1899 to November 1922, March 1923 to April 1923, September 1954 to current year.

\*\*--Prior to Operation of St. Mary Canal.

\*\*\*--Post operation of St. Mary Canal.

a--Observed.

b--Observed, no flow at times in several years.

c--Observed from rating curve extended above 5,200 ft<sup>3</sup>/s.

d--Site and datum then in use, from floodmarks.

e--Estimated.

f--Observed, about.

MILK RIVER BASIN

06142400 CLEAR CREEK NEAR CHINOOK, MT

LOCATION.--Lat 48°34'44", long 109°23'26" (NAD 27), in SE<sup>1</sup>/<sub>4</sub>NW<sup>1</sup>/<sub>4</sub>NW<sup>1</sup>/<sub>4</sub> sec.33, T.33 N., R.18 E., Blaine County, Hydrologic Unit 10050004, on right bank, 7 mi west of Chinook, and at river mile 2.5.

DRAINAGE AREA.--135 mi<sup>2</sup>.

PERIOD OF RECORD.--June 1984 to current year (seasonal records only).

GAGE.--Water-stage recorder. Elevation of gage is 2,470 ft (NGVD 29).

REMARKS.--Records good except those for periods of flow over 5 ft<sup>3</sup>/s, which are poor. Diversions for irrigation of about 2,000 acres upstream from station. Bureau of Reclamation satellite telemeter at station. Several observations of water temperatures and specific conductance were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 2003  
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1				8.6	7.0	1.1	0.00	0.00	0.00			
2				10	6.5	1.4	0.00	0.00	0.00			
3				13	7.3	3.2	0.00	0.00	0.00			
4				13	14	4.1	0.00	0.00	0.00			
5				11	25	4.6	0.00	0.00	0.00			
6				8.0	37	2.8	0.00	0.00	0.00			
7				5.9	37	3.2	0.00	0.00	0.00			
8				4.3	32	2.9	0.00	0.00	0.00			
9				4.5	27	4.6	0.00	0.00	0.00			
10				4.0	27	5.5	0.00	0.00	0.00			
11				4.0	27	8.3	0.00	0.00	0.00			
12				4.5	24	9.0	0.00	0.00	0.00			
13				7.5	22	7.5	0.00	0.00	0.00			
14				5.2	17	5.9	0.00	0.00	0.00			
15				9.8	13	3.8	0.00	0.00	0.00			
16				27	13	4.1	0.00	0.00	0.00			
17				35	12	2.9	0.00	0.00	0.00			
18				22	10	1.4	0.00	0.00	0.00			
19				16	11	0.99	0.00	0.00	0.00			
20				12	12	1.4	0.00	0.00	0.00			
21				10	11	0.67	0.00	0.00	0.00			
22				7.6	6.6	0.53	0.00	0.00	0.00			
23				6.4	5.3	0.52	0.00	0.00	0.00			
24				5.7	4.8	0.42	0.00	0.00	0.00			
25				6.7	3.4	0.23	0.00	0.00	0.00			
26				6.1	2.8	0.08	0.00	0.00	0.00			
27				5.5	2.6	0.05	0.00	0.00	0.00			
28				4.6	2.1	0.12	0.00	0.00	0.00			
29				6.3	1.4	0.04	0.00	0.00	0.00			
30				6.9	1.0	0.01	0.00	0.00	0.00			
31				---	1.0	---	0.00	0.00	---			
TOTAL				291.1	422.8	81.36	0.00	0.00	0.00			
MEAN				9.70	13.6	2.71	0.000	0.000	0.000			
MAX				35	37	9.0	0.00	0.00	0.00			
MIN				4.0	1.0	0.01	0.00	0.00	0.00			
AC-FT				577	839	161	0.00	0.00	0.00			

STATISTICS OF MONTHLY MEAN DATA FOR SEASONS 1984 - 2003

MEAN	11.3	19.6	15.6	8.83	2.78	4.05
MAX	46.0	137	74.0	51.4	34.9	47.4
(WY)	1994	1986	1986	1993	1993	1986
MIN	00.000	0.000	0.000	0.000	0.000	0.000
(WY)	2002	2001	2001	1985	1984	1984

SUMMARY STATISTICS

FOR 2003 SEASON

SEASONS 1984 - 2003

HIGHEST DAILY MEAN	37	May 6	360	Sep 25 1986
LOWEST DAILY MEAN	0.00	Jul 1	b0.00	Jul 5 1984
MAXIMUM PEAK FLOW	39	aApr 17	571	Sep 25 1986
MAXIMUM PEAK STAGE	2.05	Apr 17	8.23	Sep 25 1986

a--Also occurred May 6, 7.

b--No flow at times most years.

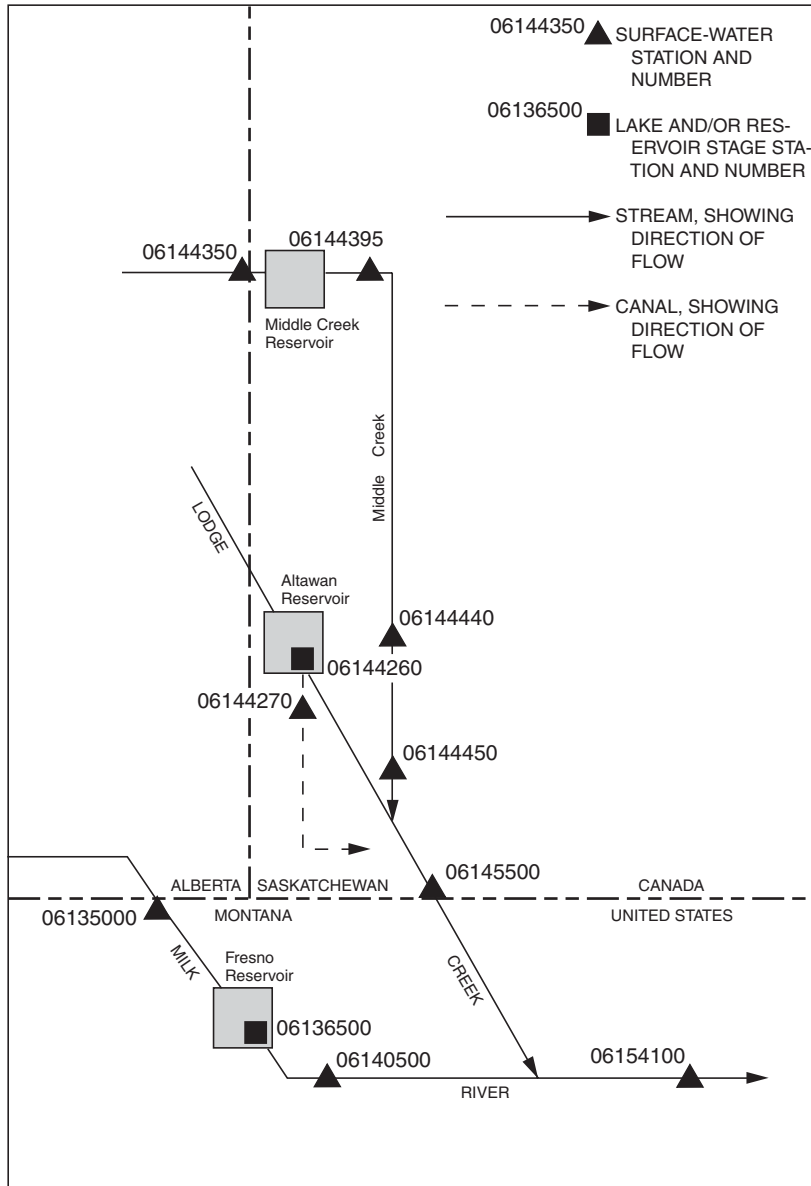


Figure 11. Schematic diagram showing diversions and storage in Lodge Creek Basin.

## MILK RIVER BASIN

## 06144260 ALTAWAN RESERVOIR NEAR GOVENLOCK, SASKATCHEWAN

(International gaging station)

LOCATION.--Lat 49°10'00", long 109°55'00" (NAD 27), in SW<sup>1</sup>/<sub>4</sub> sec.35, T.2, R.30 W., third meridian, Hydrologic Unit 10050007, at dam on Lodge Creek, 6.3 mi southwest of Govenlock, and at river mile 113.5.

DRAINAGE AREA.-- 373 mi<sup>2</sup>.

PERIOD OF RECORD.--February 1966 to current season (seasonal records only). February 1966 to current season in reports of Department of the Environment, Canada. Water-stage recorder. Elevation of gage is 2,918.0 (Geodetic Survey of Canada datum). Prior to July 7, 1967, nonrecording gage in gate read every ten days during irrigation season.

REMARKS.--Reservoir is formed by earthfill dam with concrete spillway and control works as well as an emergency earthen spillway, completed in 1959. The following capacity figures are from revised capacity table effective Jan. 1, 1983. All elevations are referenced to the Geodetic Survey of Canada datum. Usable capacity is 5,440 acre-ft between elevation 2,918.0 ft, bottom of outlet works, and 2,952.0 ft, maximum design level. No dead storage. Water is used for irrigation. Water Survey of Canada satellite telemeter at station. This is one of a number of stations which are maintained jointly by Canada and the United States.

REVISED RECORDS.--W 1983, drainage area.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 8,300 acre-ft, Sept. 26, 1986, elevation, 2,958.10 ft; no contents Mar. 1, 1960, Oct. 6-31, 1984, Mar. 1-18, and Oct. 3-31, 1985.

EXTREMES FOR CURRENT SEASON.--Maximum contents, 6,200 acre-ft, Mar. 23, elevation, 2,953.72 ft; minimum, 924 acre-ft, Feb. 28, elevation, 2,936.56 ft.

## SEASONAL MONTHEND CONTENTS, IN ACRE-FT, FEBRUARY 2003 TO OCTOBER 2003

Date	Contents
Feb. 28	924
Mar. 31	5,680
Apr. 30	5,610
May 31	4,660
June 30	4,030
July 31	2,900
Aug. 31	2,600
Sept. 30	2,530
Oct. 31	2,470



MILK RIVER BASIN

06144270 SPANGLER DITCH NEAR GOVENLOCK, SASKATCHEWAN

(International gaging station)

LOCATION.--Lat 49°09'16", long 109°54'58" (NAD 27), in NW<sup>1</sup>/<sub>4</sub> sec.26, T.2, R.30 W., third meridian, Hydrologic Unit 10050007, on right bank 0.9 mi south of Altawan Dam, and 6.8 mi southwest of Govenlock.

PERIOD OF RECORD.--March 1966 to current season (seasonal records only). March 1950 to current season, in reports of Department of the Environment, Canada. Some estimates of monthly diversion in several years prior to 1932.

GAGE.--Water-stage recorder. Elevation of gage is 2,920 ft (NGVD 29). Prior to March 1950, nonrecording gages at several sites within 2 mi of present site at different elevations. March 1950 to July 8, 1960, water-stage recorder at site 350 ft downstream at different elevation.

REMARKS.--Records good. Canal diverts water from right bank of Lodge Creek in SW<sup>1</sup>/<sub>4</sub> sec.35, T.2, R.30 W., third meridian, for irrigation of 1,320 acres in Spangler irrigation project. Water Survey of Canada satellite telemeter at station.

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

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 65 ft<sup>3</sup>/s, Apr. 22, 1950, July 9, 1985; no flow most of each season.

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 2003  
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			0.00	0.00	0.00	43	0.00	22	0.00	0.00		
2			0.00	0.00	0.00	43	0.00	19	0.00	0.00		
3			0.00	0.00	0.00	44	0.00	8.0	0.00	0.00		
4			0.00	0.00	0.00	43	0.00	8.5	0.00	0.00		
5			0.00	0.00	0.00	44	0.00	6.7	0.00	0.00		
6			0.00	0.00	0.00	44	0.00	0.00	0.00	0.00		
7			0.00	0.00	0.00	42	0.00	0.00	0.00	0.00		
8			0.00	0.00	0.00	36	0.00	0.00	0.00	0.00		
9			0.00	0.00	0.00	26	0.00	0.00	0.00	0.00		
10			0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00		
11			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
12			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
13			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
14			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
15			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
16			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
17			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
18			0.74	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
19			0.71	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
20			0.28	0.00	17	0.00	0.00	0.00	0.00	0.00		
21			0.07	0.00	41	0.00	18	0.00	0.00	0.00		
22			0.00	0.00	43	0.00	37	0.00	0.00	0.00		
23			0.00	0.00	43	0.00	37	0.00	0.00	0.00		
24			0.00	0.00	43	0.00	37	0.00	0.00	0.00		
25			0.00	0.00	43	0.00	36	0.00	0.00	0.00		
26			0.00	0.00	43	0.00	36	0.00	0.00	0.00		
27			0.00	0.00	43	0.00	36	0.00	0.00	0.00		
28			0.00	0.00	43	0.00	36	0.00	0.00	0.00		
29			0.00	0.00	43	0.00	35	0.00	0.00	0.00		
30			0.00	0.00	43	0.00	35	0.00	0.00	0.00		
31			0.00	---	43	---	32	0.00	---	0.00		
TOTAL			1.80	0.00	488.00	365.04	375.00	64.20	0.00	0.00		
MEAN			0.058	0.000	15.7	12.2	12.1	2.07	0.000	0.000		
MAX			0.74	0.00	43	44	37	22	0.00	0.00		
MIN			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
AC-FT			3.6	0.00	968	724	744	127	0.00	0.00		

## MILK RIVER BASIN

## 06144350 MIDDLE CREEK NEAR SASKATCHEWAN BOUNDARY

(International gaging station)

LOCATION.--Lat 49°25'30", long 110°03'08" (NAD 27), in SW<sup>1</sup>/<sub>4</sub> sec.34, T.5, R.1 W., fourth meridian, in Alberta, Hydrologic Unit 10050007, on left bank 2 mi upstream from Middle Creek Reservoir, 2 mi west of Saskatchewan boundary, 18 mi northwest of Govenlock, Saskatchewan, and at river mile 65.7.

DRAINAGE AREA.--118 mi<sup>2</sup>.

PERIOD OF RECORD.--March 1963 to current season (seasonal records only). Prior to March 1982, published as "Middle Creek near Alberta boundary". June 1910 to April 1915, published as "at McKinnon's Ranch" and September 1949 to current season in reports of Department of the Environment, Canada.

REVISED RECORDS.--W 1983: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 3,381.13 ft (Geodetic Survey 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 mi downstream at different elevations. Water Survey of Canada satellite telemeter at station.

REMARKS.--Records fair. Minor diversions for irrigation upstream from station. Water Survey of Canada telemeter at station.

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

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 2003  
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			e0.07	36	0.57	0.39	e0.07	0.14	0.11	0.11		
2			e0.07	34	0.60	0.39	e0.07	0.14	0.11	0.11		
3			e0.07	9.5	0.57	0.32	e0.07	0.14	0.11	0.11		
4			e0.07	3.0	0.74	0.32	e0.04	0.14	0.11	0.11		
5			e0.07	6.0	2.1	0.25	e0.04	0.14	0.11	0.11		
6			e0.07	8.4	2.1	0.14	e0.04	0.14	0.11	0.07		
7			e0.07	1.8	20	0.14	e0.04	0.14	0.11	0.07		
8			e0.07	1.2	16	0.14	e0.04	0.14	0.11	0.07		
9			e0.07	1.1	7.7	0.14	0.04	0.14	0.11	0.04		
10			e0.07	0.95	4.5	0.14	0.04	0.14	0.11	0.04		
11			e0.07	0.78	5.8	0.11	0.07	0.11	0.11	0.04		
12			e0.07	1.0	8.9	0.14	0.07	0.11	0.11	0.04		
13			e0.07	3.1	4.1	0.11	0.07	0.11	0.11	0.04		
14			e0.07	3.9	3.7	0.11	0.07	0.11	0.11	0.04		
15			e0.57	15	5.6	0.11	0.07	0.11	0.11	0.04		
16			e1.4	16	2.4	0.07	0.07	0.11	0.14	0.04		
17			e2.3	9.7	1.3	0.07	0.07	0.11	0.11	0.04		
18			44	5.7	0.85	0.04	0.07	0.11	0.07	0.04		
19			48	2.5	0.60	0.04	0.07	0.11	0.07	0.04		
20			43	1.6	0.46	0.07	0.07	0.11	0.11	0.04		
21			55	1.2	0.39	0.04	0.11	0.11	0.11	0.04		
22			70	0.88	0.39	0.04	0.11	0.11	0.11	0.04		
23			82	0.74	0.39	0.04	0.11	0.11	0.11	0.04		
24			78	0.71	0.53	0.04	0.11	0.11	0.11	0.04		
25			34	0.67	0.46	0.04	0.11	0.11	0.11	0.04		
26			22	0.67	0.28	0.07	0.11	0.11	0.11	0.04		
27			12	0.60	0.28	0.11	0.11	0.11	0.11	0.04		
28			7.1	0.53	0.28	0.14	0.14	0.14	0.11	e0.04		
29			4.2	0.53	0.39	0.11	0.14	0.11	0.11	e0.04		
30			3.4	0.57	0.49	e0.07	0.14	0.11	0.11	e0.04		
31			3.4	---	0.42	---	0.14	0.11	---	e0.04		
TOTAL			511.35	168.33	92.89	3.94	2.52	3.74	3.25	1.68		
MEAN			16.5	5.61	3.00	0.13	0.081	0.12	0.11	0.054		
MAX			82	36	20	0.39	0.14	0.14	0.14	0.11		
MIN			0.07	0.53	0.28	0.04	0.04	0.11	0.07	0.04		
AC-FT			1010	334	184	7.8	5.0	7.4	6.4	3.3		

## STATISTICS OF MONTHLY MEAN DATA FOR SEASONS 1910 - 2003\*

MEAN	14.1	37.3	11.3	3.90	1.83	0.73	0.99	0.45
MAX	74.2	330	136	45.1	20.0	6.99	24.8	2.38
(WY)	1960	1952	1967	1953	1963	1993	1986	1966
MIN	0.000	0.043	0.079	0.078	0.023	0.003	0.000	0.048
(WY)	1950	2001	2001	2000	2001	2001	1962	1999

## SUMMARY STATISTICS

## FOR 2003 SEASON

## SEASONS 1910 - 2003\*

HIGHEST DAILY MEAN	82	Mar 23	2560	Apr 15 1952
LOWEST DAILY MEAN	0.04	Jun 18	0.00	Mar 1 1950
MAXIMUM PEAK FLOW	118	Mar 23	a4980	Apr 15 1952
MAXIMUM PEAK STAGE	5.93	Mar 23	b10.27	Apr 15 1952

\*--For periods of operation.

a--From rating curve extended above 600 ft<sup>3</sup>/s on basis of slope-area measurement of peak flow.

b--Previous site and datum.

e--Estimated.

MILK RIVER BASIN

06144395 MIDDLE CREEK BELOW MIDDLE CREEK RESERVOIR, NEAR GOVENLOCK, SASKATCHEWAN

(International gaging station)

LOCATION.--Lat 49°24'44", long 109°55'06" (NAD 27), in SW<sup>1</sup>/<sub>4</sub> sec.25, T.5, R.30 W., third meridian, Hydrologic Unit 10050007, on right bank 9.1 mi downstream from Middle Creek Reservoir, 14 mi northwest of Govenlock, and at river mile 57.6.

DRAINAGE AREA.--149 mi<sup>2</sup>.

PERIOD OF RECORD.--April 1972 to current season (seasonal records only). July 1909 to May 1931, September 1935 to October 1936, and April 1972 to current season in reports of Department of the Environment, Canada. Published as "at Ross Ranch" 1909-20, "at Downes and Robert's Ranch" 1920-23, and "at Wright's Ranch" 1920-31, 1935-36. Discharge measurements only during 1928 season.

REVISED RECORDS.--W 1983: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 3,300 ft (NGVD 29). Prior to April 1972, non recording gages at two sites within 2 mi of present site, at different elevations.

REMARKS.--Records good. Flow completely regulated by Middle Creek Reservoir (station number 06144360). Many diversions for irrigation upstream from station. At high reservoir levels flow may be diverted to Lodge Creek through Middle Creek Reservoir. Diversions for irrigation of 920 acres between Middle Creek Reservoir and station. Water Survey of Canada satellite telemeter at station.

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

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 77 ft<sup>3</sup>/s, May 3, 1985; no flow at times most seasons.

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 2003  
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			0.00	1.7	0.00	6.1	0.00	0.00	0.00	0.00		
2			0.00	0.21	0.00	2.3	0.00	0.00	0.00	0.00		
3			0.00	0.07	0.00	2.9	0.00	0.00	0.00	0.00		
4			0.00	0.07	0.00	4.3	0.00	0.00	0.00	0.00		
5			0.00	0.04	0.00	3.3	0.00	0.00	0.00	0.00		
6			0.00	0.04	0.04	3.7	0.00	0.00	0.00	0.00		
7			0.00	0.04	0.49	5.0	0.00	0.00	0.00	0.00		
8			0.00	0.00	0.07	3.0	0.00	0.00	0.00	0.00		
9			0.00	0.04	0.04	1.9	0.00	0.00	0.00	0.00		
10			0.00	0.07	0.00	1.2	0.00	0.00	0.00	0.00		
11			0.00	0.04	0.00	1.0	0.00	0.00	0.00	0.00		
12			0.00	0.00	0.00	1.1	0.00	0.00	0.00	0.00		
13			0.00	0.00	0.00	1.3	0.00	0.00	0.00	0.00		
14			0.00	0.00	0.00	0.28	0.00	0.00	0.00	0.00		
15			0.00	0.00	0.00	0.07	0.00	0.00	0.00	0.00		
16			0.00	1.6	0.00	0.00	0.00	0.00	0.00	0.00		
17			0.00	0.25	0.00	0.00	0.00	0.00	0.00	0.00		
18			0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00		
19			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
20			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
21			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
22			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
23			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
24			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
25			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
26			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
27			0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
28			0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
29			0.04	0.00	31	0.00	0.00	0.00	0.00	0.00		
30			6.2	0.00	53	0.00	0.00	0.00	0.00	0.00		
31			23	---	30	---	0.00	0.00	---	0.00		
TOTAL			29.32	4.21	114.64	37.45	0.00	0.00	0.00	0.00		
MEAN			0.95	0.14	3.70	1.25	0.000	0.000	0.000	0.000		
MAX			23	1.7	53	6.1	0.00	0.00	0.00	0.00		
MIN			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
AC-FT			58	8.4	227	74	0.00	0.00	0.00	0.00		

## MILK RIVER BASIN

06144440 MIDDLE CREEK NEAR GOVENLOCK, SASKATCHEWAN

(International gaging station)

LOCATION.--Lat 49°13'42", long 109°48'57" (NAD 27), in NW<sup>1</sup>/<sub>4</sub> sec.23, T.3, R.29 W., third meridian, Hydrologic Unit 10050007, on left bank 43.9 mi downstream from Middle Creek Reservoir, 0.3 mi northwest of Govenlock, and at river mile 22.8.

DRAINAGE AREA.--253 mi<sup>2</sup>.

PERIOD OF RECORD.--February 1986 to current season (seasonal records only). March 1968 to current season in reports of Department of the Environment, Canada.

GAGE.--Water-stage recorder. Elevation of gage is 3,010 ft (NGVD 29).

REMARKS.--Records fair. Natural flow of stream is affected by Middle Creek Reservoir (station 06144360), several smaller reservoirs, diversions for irrigation, and return flow from irrigated areas. At high reservoir levels flow may be diverted to Lodge Creek through Middle Creek Reservoir. Water Survey of Canada satellite telemeter at station.

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

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 2003  
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			e0.00	3.2	1.9	5.9	0.25	0.00	0.00	0.00		
2			e0.00	22	1.9	25	0.18	0.00	0.00	0.00		
3			e0.00	13	1.8	13	0.11	0.00	0.00	0.00		
4			e0.00	16	2.1	8.3	0.07	0.00	0.00	0.00		
5			e0.00	13	3.5	5.9	0.04	0.00	0.00	0.00		
6			e0.00	8.5	5.0	4.0	0.04	0.00	0.00	0.00		
7			e0.00	6.5	5.5	6.0	0.04	0.00	0.00	0.00		
8			e0.00	5.4	5.4	4.0	0.04	0.00	0.00	0.00		
9			e0.00	5.4	4.9	3.1	0.00	0.00	0.00	0.00		
10			e0.00	5.1	4.7	2.8	0.00	0.00	0.00	0.00		
11			e0.00	4.7	4.5	3.2	0.00	0.00	0.00	0.00		
12			e0.00	6.5	3.8	3.1	0.00	0.00	0.00	0.00		
13			e0.00	4.6	3.4	3.4	0.00	0.00	0.00	0.00		
14			0.00	5.1	2.9	3.7	0.00	0.00	0.00	0.00		
15			0.00	9.5	2.5	3.0	0.00	0.00	0.00	0.00		
16			1.9	13	2.3	2.3	0.00	0.00	0.00	0.00		
17			30	8.5	2.3	1.7	0.00	0.00	0.00	0.00		
18			102	6.9	1.9	1.3	0.00	0.00	0.00	0.00		
19			107	7.9	1.2	1.1	0.00	0.00	0.00	0.00		
20			75	6.2	0.88	1.2	0.00	0.00	0.00	0.00		
21			47	5.0	0.74	1.2	0.00	0.00	0.00	0.00		
22			26	4.3	0.60	1.8	0.00	0.00	0.00	0.00		
23			21	3.8	0.49	1.7	0.00	0.00	0.00	0.00		
24			9.3	3.4	0.39	1.2	0.00	0.00	0.00	0.00		
25			9.1	3.0	0.28	0.85	0.00	0.00	0.00	0.00		
26			8.4	2.9	0.25	0.64	0.00	0.00	0.00	0.00		
27			5.0	2.5	0.18	0.49	0.00	0.00	0.00	0.00		
28			3.7	2.3	0.14	0.49	0.00	0.00	0.00	0.00		
29			6.5	2.2	0.14	0.39	0.00	0.00	0.00	0.00		
30			6.1	2.0	0.07	0.32	0.00	0.00	0.00	0.00		
31			3.1	---	0.07	---	0.00	0.00	---	0.00		
TOTAL			461.10	202.4	65.73	111.08	0.77	0.00	0.00	0.00		
MEAN			14.9	6.75	2.12	3.70	0.025	0.000	0.000	0.000		
MAX			107	22	5.5	25	0.25	0.00	0.00	0.00		
MIN			0.00	2.0	0.07	0.32	0.00	0.00	0.00	0.00		
AC-FT			915	401	130	220	1.5	0.00	0.00	0.00		

## STATISTICS OF MONTHLY MEAN DATA FOR SEASONS 1986 - 2003\*

MEAN	11.6	5.34	2.61	3.60	0.66	0.14	3.24	0.58
MAX	53.2	36.4	6.79	14.3	5.45	2.20	56.9	4.04
(WY)	1997	1996	1997	1988	1993	1993	1986	1987
MIN	0.000	0.83	0.27	0.001	0.000	0.000	0.000	0.000
(WY)	2002	1992	1992	1992	1990	1986	1987	1991

## SUMMARY STATISTICS

## FOR 2003 SEASON

## SEASONS 1986 - 2003\*

HIGHEST DAILY MEAN	107	Mar 19	724	Sep 26 1986
LOWEST DAILY MEAN	0.00	Jul 9	0.00	Feb 19 1986
MAXIMUM PEAK FLOW	151	Mar 19	1190	Sep 25 1986
MAXIMUM PEAK STAGE	5.90	Mar 19	9.81	Sep 25 1986

\*--During periods of operation.

e--Estimated.

MILK RIVER BASIN

06144450 MIDDLE CREEK ABOVE LODGE CREEK, NEAR GOVENLOCK, SASKATCHEWAN

(International gaging station)

LOCATION.--Lat 49°06'01", long 109°49'02" (NAD 27), in NE<sup>1</sup>/<sub>4</sub> sec.4, T.2, R.29 W., third meridian, Hydrologic Unit 10050007, on left bank, 0.7 mi upstream from Lodge Creek, and 9 mi south of Govenlock.

DRAINAGE AREA.--276 mi<sup>2</sup>.

PERIOD OF RECORD.--March 1962 to October 1966 and February 1986 to current season. Seasonal records only. March 1911 to May 1931 and March 1962 to current season in reports of Department of the Environment, Canada. Published as "at Hammond's Ranch" 1911-31.

GAGE.--Water-stage recorder. Elevation of gage is 2,830 ft (NGVD 29). Prior to Mar. 1, 1962, nonrecording gage at site 1,000 ft downstream at different elevation.

REMARKS.--Records good. Natural flow of stream affected by Middle Creek Reservoir (station 06144360), several smaller reservoirs, diversions for irrigation, and return flow from irrigated areas. At high reservoir levels flow may be diverted to Lodge Creek through Middle Creek Reservoir. Water Survey of Canada satellite telemeter at station.

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

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 2003  
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			e0.00	1.2	3.8	1.4	0.04	0.00	0.00	0.00		
2			e0.00	0.46	3.6	0.60	0.00	0.00	0.00	0.00		
3			e0.00	0.28	3.0	0.21	0.00	0.00	0.00	0.00		
4			e0.00	0.18	2.7	0.18	0.00	0.00	0.00	0.00		
5			e0.00	0.11	3.0	0.18	0.00	0.00	0.00	0.00		
6			e0.00	0.11	19	2.2	0.00	0.00	0.00	0.00		
7			e0.00	4.0	29	0.85	0.04	0.00	0.00	0.00		
8			e0.00	11	15	0.25	0.04	0.00	0.00	0.00		
9			e0.00	8.9	4.0	0.11	0.04	0.00	0.00	0.00		
10			e0.00	6.7	2.1	0.04	0.00	0.00	0.00	0.00		
11			e0.00	5.2	1.1	0.04	0.00	0.00	0.00	0.00		
12			e0.00	3.5	0.53	0.00	0.00	0.00	0.00	0.00		
13			e0.00	2.3	0.21	0.00	0.00	0.00	0.00	0.00		
14			e0.00	1.9	0.07	1.4	0.00	0.00	0.00	0.00		
15			e0.00	4.9	0.04	1.7	0.00	0.00	0.00	0.00		
16			e0.85	17	0.04	1.7	0.00	0.00	0.00	0.00		
17			e13	16	0.04	1.6	0.00	0.00	0.00	0.00		
18			20	9.8	0.85	2.0	0.00	0.00	0.00	0.00		
19			23	11	2.1	2.2	0.00	0.00	0.00	0.00		
20			29	12	2.1	2.6	0.00	0.00	0.00	0.00		
21			29	13	2.2	2.9	0.00	0.00	0.00	0.00		
22			78	13	2.2	2.5	0.00	0.00	0.00	0.00		
23			70	13	2.0	2.4	0.00	0.00	0.00	0.00		
24			54	11	1.8	2.4	0.00	0.00	0.00	0.00		
25			18	7.5	1.7	1.6	0.00	0.00	0.00	0.00		
26			11	5.7	1.8	0.57	0.00	0.00	0.00	0.00		
27			10	4.2	1.7	0.25	0.00	0.00	0.00	0.00		
28			10	3.9	0.81	0.14	0.00	0.00	0.00	0.00		
29			9.7	4.0	0.39	0.11	0.00	0.00	0.00	0.00		
30			9.5	4.0	1.6	0.04	0.00	0.00	0.00	0.00		
31			4.3	---	0.81	---	0.00	0.00	---	0.00		
TOTAL			389.35	195.84	109.29	32.17	0.16	0.00	0.00	0.00		
MEAN			12.6	6.53	3.53	1.07	0.005	0.000	0.000	0.000		
MAX			78	17	29	2.9	0.04	0.00	0.00	0.00		
MIN			0.00	0.11	0.04	0.00	0.00	0.00	0.00	0.00		
AC-FT			772	388	217	64	0.3	0.00	0.00	0.00		

STATISTICS OF MONTHLY MEAN DATA FOR SEASONS 1911 - 2003\*

MEAN	13.0	53.1	13.2	6.72	3.92	0.53	2.60	0.58
MAX	71.8	457	222	61.1	35.1	9.76	63.3	8.35
(WY)	1997	1917	1927	1965	1923	1915	1986	1987
MIN	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
(WY)	1919	1991	1989	1926	1914	1911	1912	1913

SUMMARY STATISTICS

FOR 2003 SEASON

SEASONS 1911 - 2003\*

HIGHEST DAILY MEAN	78	Mar 22	all170	Apr 24 1922
LOWEST DAILY MEAN	0.00	Jun 12	0.00	Mar 13 1911
MAXIMUM PEAK FLOW	111	Mar 22	738	Sep 26 1986
MAXIMUM PEAK STAGE	6.33	Mar 22	13.84	Sep 26 1986

\*--During periods of operation.  
a--Maximum peak flow not determined.  
e--Estimated.

## MILK RIVER BASIN

## 06145500 LODGE CREEK BELOW MCRAE CREEK, AT INTERNATIONAL BOUNDARY

(International gaging station)

LOCATION.--Lat 49°00'19", long 109°43'02" (NAD 27), in SW<sup>1</sup>/<sub>4</sub> sec.5, T.1, R.28 W., third meridian, in Saskatchewan, Hydrologic Unit 10050007, on right bank 0.3 mi downstream from McRae Creek, 0.4 mi north of international boundary, 0.8 mi northeast of Willow Creek Port of Entry, 31 mi north of Havre, MT, and at river mile 84.3.

DRAINAGE AREA.--825 mi<sup>2</sup>, of which 88 mi<sup>2</sup> are noncontributing.

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."

REVISED RECORDS.--W 1983: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 2,731.0 ft (International Boundary Survey datum).

REMARKS.--Records good. Natural flow affected by numerous storage reservoirs, diversions for irrigation of about 3,000 acres, and return flow from irrigated areas. Water Survey of Canada satellite telemeter at station. Several observations of water temperature and specific conductance were made during the year.

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

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 2003  
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			0.04	35	11	2.2	0.49	0.04	0.04	0.07		
2			0.04	27	9.9	2.2	0.32	0.04	0.04	0.07		
3			0.04	82	9.7	2.3	0.18	0.04	0.04	0.07		
4			0.04	92	9.4	2.1	0.11	0.04	0.04	0.07		
5			0.04	68	13	1.9	0.07	0.04	0.04	0.07		
6			0.04	49	41	1.4	0.04	0.04	0.04	0.11		
7			e0.04	35	53	0.99	0.04	0.04	0.04	0.07		
8			e0.04	32	36	0.78	0.04	0.04	0.04	0.04		
9			e0.04	32	25	0.74	0.04	0.04	0.04	0.04		
10			e0.04	26	35	0.60	0.04	0.04	0.04	0.04		
11			0.04	25	45	0.88	0.04	0.04	0.04	0.04		
12			0.04	18	40	0.95	0.04	0.04	0.04	0.04		
13			0.04	15	38	0.71	0.04	0.04	0.04	0.07		
14			0.04	18	42	1.0	0.04	0.04	0.04	0.07		
15			0.04	25	38	0.78	0.04	0.04	0.04	0.07		
16			0.14	47	39	0.42	0.04	0.04	0.04	0.07		
17			16	116	52	0.28	0.04	0.04	0.04	0.07		
18			121	118	47	0.14	0.04	0.04	0.04	0.07		
19			290	95	40	0.11	0.04	0.04	0.04	0.07		
20			388	75	34	0.11	0.04	0.04	0.04	0.07		
21			249	58	26	0.18	0.04	0.04	0.04	0.07		
22			326	48	21	0.39	0.04	0.04	0.04	0.07		
23			413	40	14	1.8	0.04	0.04	0.04	0.07		
24			357	33	11	1.5	0.04	0.04	0.04	0.07		
25			299	27	7.8	1.3	0.04	0.04	0.07	0.07		
26			203	26	5.3	1.2	0.04	0.04	0.07	0.07		
27			129	17	4.5	1.0	0.04	0.04	0.11	0.07		
28			93	15	4.1	1.1	0.04	0.04	0.07	0.07		
29			69	15	3.7	1.0	0.04	0.07	0.07	0.11		
30			55	13	3.1	0.74	0.04	0.07	0.07	0.07		
31			46	---	2.5	---	0.04	0.07	---	0.07		
TOTAL			3054.74	1322	761.0	30.80	2.21	1.33	1.42	2.10		
MEAN			98.5	44.1	24.5	1.03	0.071	0.043	0.047	0.068		
MAX			413	118	53	2.3	0.49	0.07	0.11	0.11		
MIN			0.04	13	2.5	0.11	0.04	0.04	0.04	0.04		
AC-FT			6060	2620	1510	61	4.4	2.6	2.8	4.2		

## STATISTICS OF MONTHLY MEAN DATA FOR SEASONS 1952 - 2003

MEAN	55.3	137	39.8	24.3	9.86	2.27	13.7	1.45
MAX	374	1899	500	294	174	33.1	678	52.3
(WY)	1997	1952	1967	1965	1955	1993	1986	1987
MIN	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
(WY)	1953	1992	1992	1963	1958	1954	1952	1953

## SUMMARY STATISTICS

## FOR 2002 SEASON

## SEASONS 1952 - 2003

HIGHEST DAILY MEAN	413	Mar 23	7770	Sep 26 1986
LOWEST DAILY MEAN	0.04	Mar 1	0.00	Mar 1 1952
MAXIMUM PEAK FLOW	487	Mar 23	a9890	Sep 25 1986
MAXIMUM PEAK STAGE	5.76	Mar 23	16.36	Sep 25 1986

a--From rating curve extended above 4,000 ft<sup>3</sup>/s on basis of slope-area measurement of peak flow.  
e--Estimated.

WATER RESOURCES DATA FOR MONTANA, 2003

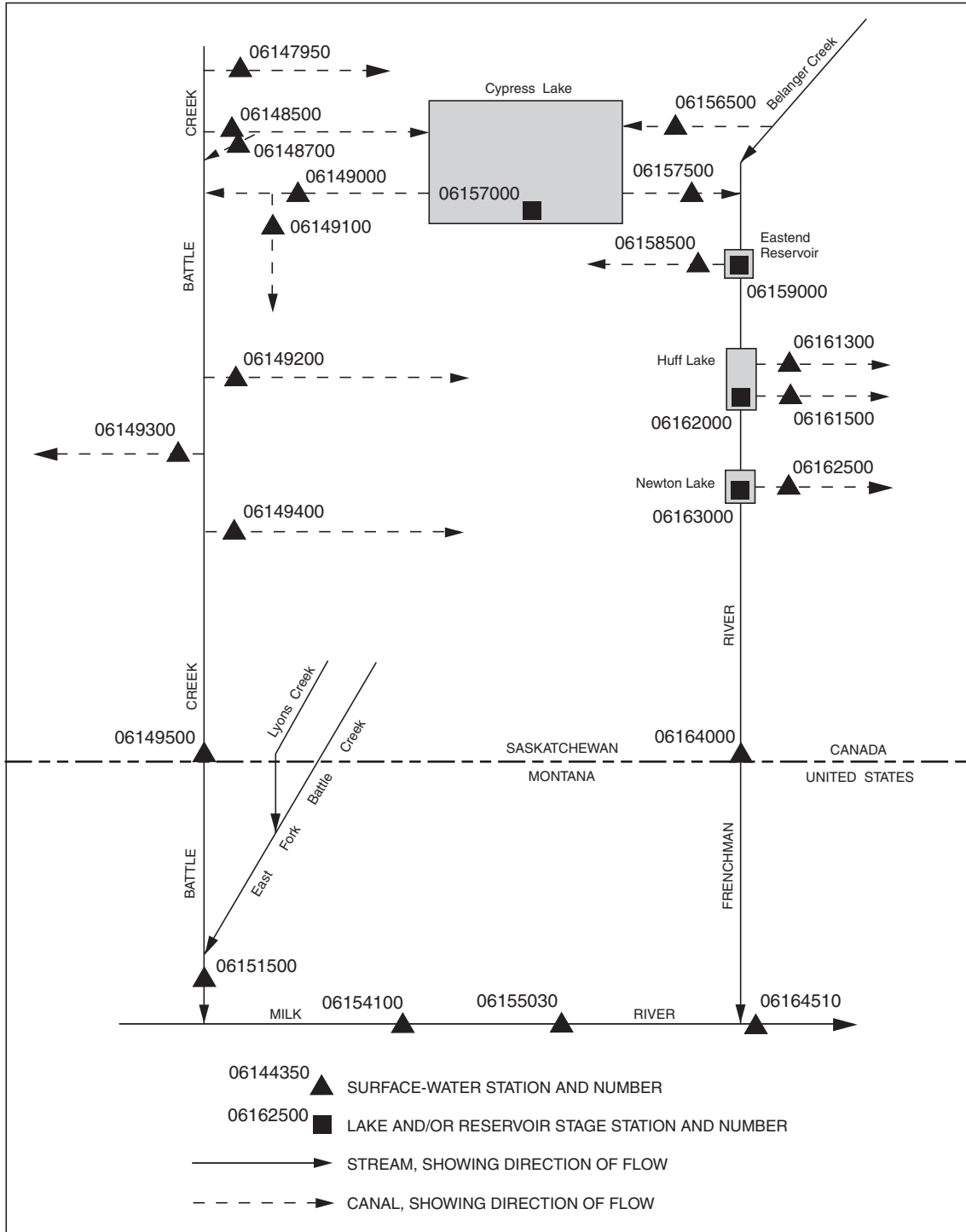


Figure 12. Schematic diagram showing diversions and storage in Battle Creek and Frenchman River Basins.

## MILK RIVER BASIN

06147950 GAFF DITCH NEAR MERRYFLAT, SASKATCHEWAN

(International gaging station)

LOCATION.--Lat 49°26'05", long 109°50'07" (NAD 27), in NW<sup>1</sup>/<sub>4</sub> sec.34, T.5, R.29 W., third meridian, Hydrologic Unit 10050008, on left bank about 200 ft downstream from headgates, and 4 mi southwest of Merryflat.

PERIOD OF RECORD.--March 1972 to current season (seasonal record only). March 1964 to current season in reports of Department of the Environment, Canada.

GAGE.--Water-stage recorder. Elevation of gage is 3,350 ft (NGVD 29).

REMARKS.--Records poor. Water is diverted from left bank of Battle Creek in NW<sup>1</sup>/<sub>4</sub> sec.34, T.5, R.29 W., third meridian, for irrigation of about 890 acres along Battle Creek. Water Survey of Canada satellite telemeter at station.

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

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 42 ft<sup>3</sup>/s, Apr. 22, 1971; no flows at times each season.

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 2003  
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			e0.00	e23	23	0.00	0.00	0.00	0.04	0.00		
2			e0.00	e9.4	17	0.00	0.00	0.00	0.00	0.00		
3			e0.00	e0.88	1.1	0.00	0.00	0.00	0.00	0.00		
4			e0.00	e0.88	0.92	0.00	0.04	0.00	0.00	0.00		
5			e0.00	e0.85	0.85	0.00	0.04	0.04	0.00	0.00		
6			e0.00	e0.64	0.81	0.00	0.04	0.04	0.00	0.00		
7			e0.00	e0.35	0.74	0.00	0.04	0.04	0.00	0.00		
8			e0.00	e3.1	0.67	0.00	0.04	0.04	0.00	0.00		
9			e0.00	15	0.60	0.00	0.04	0.04	0.00	0.00		
10			e0.00	30	0.60	0.00	0.04	0.00	0.00	0.00		
11			e0.00	31	0.57	0.00	0.04	0.00	0.00	0.00		
12			e0.00	30	0.60	0.00	0.00	0.00	0.00	0.00		
13			e0.00	32	0.71	0.00	0.00	0.00	0.00	0.00		
14			e0.00	35	0.71	0.00	0.00	0.00	0.00	0.00		
15			e0.00	33	0.71	0.00	0.00	0.00	0.00	0.00		
16			e0.00	36	0.64	0.00	0.00	0.00	0.00	0.00		
17			e0.00	37	0.49	0.00	0.00	0.00	0.00	0.00		
18			e0.00	32	0.39	0.00	0.00	0.00	0.00	0.00		
19			e0.18	27	0.32	0.00	0.00	0.00	0.00	0.00		
20			e0.35	25	0.25	0.00	0.00	0.00	0.00	0.00		
21			e0.25	24	0.21	0.00	0.00	0.00	0.00	0.00		
22			e0.88	24	0.18	0.00	0.00	0.00	0.00	0.00		
23			e1.4	24	0.14	0.00	0.00	0.00	0.00	0.00		
24			e1.8	23	0.07	0.00	0.00	0.00	0.00	0.00		
25			e7.3	24	0.04	0.04	0.00	0.00	0.00	0.00		
26			e8.9	23	0.00	0.00	0.00	0.00	0.00	0.00		
27			e8.2	19	0.00	0.00	0.00	0.00	0.00	0.00		
28			e8.2	20	0.00	0.00	0.00	0.00	0.00	0.00		
29			e8.5	22	0.00	0.00	0.00	0.00	0.00	0.00		
30			e8.1	23	0.00	0.00	0.00	0.00	0.00	0.00		
31			e19	---	0.00	---	0.00	0.04	---	0.00		
TOTAL			73.06	628.10	52.32	0.04	0.32	0.24	0.04	0.00		
MEAN			2.36	20.9	1.69	0.001	0.010	0.008	0.001	0.000		
MAX			19	37	23	0.04	0.04	0.04	0.04	0.00		
MIN			0.00	0.35	0.00	0.00	0.00	0.00	0.00	0.00		
AC-FT			145	1250	104	0.08	0.6	0.5	0.08	0.00		

e--Estimated.



MILK RIVER BASIN

06148500 CYPRESS LAKE WEST INFLOW CANAL NEAR WEST PLAINS, SASKATCHEWAN

(International gaging station)

LOCATION.--Lat 49°28'18", long 109°37'08" (NAD 27), in SE<sup>1</sup>/<sub>4</sub> sec.18, T.6, R.27 W., third meridian, Hydrologic Unit 10050008, on left bank 2.5 mi downstream from canal headgates, 5.5 mi northeast of West Plains, and 13 mi 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. Elevation of gage is 3,210 ft (NGVD 29). Prior to Oct. 16, 1956, at site 2.3 mi upstream at different elevation.

REMARKS.--Records good. Canal diverts water from Battle Creek in NW<sup>1</sup>/<sub>4</sub> 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 Cypress Lake West Inflow Canal Drain (station 06148700) 0.4 mi downstream. Water Survey of Canada satellite telemeter at station.

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

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 884 ft<sup>3</sup>/s, Apr. 27, 1965; no flow at times each season.

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 2003  
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			e0.00	e82	0.14	19	0.21	0.00	0.00	0.00		
2			e0.00	e129	0.07	19	0.18	0.00	0.00	0.00		
3			e0.00	e90	0.04	19	0.14	0.00	0.00	0.00		
4			e0.00	e17	0.04	20	0.14	0.00	0.00	0.00		
5			e0.00	e9.0	2.9	19	0.14	0.00	0.00	0.00		
6			e0.00	e15	5.4	19	0.14	0.00	0.00	0.00		
7			e0.00	e17	5.9	19	0.14	0.00	0.00	0.00		
8			e0.00	e25	3.2	19	0.18	0.00	0.00	0.00		
9			e0.00	e23	1.9	19	0.18	0.00	0.00	0.00		
10			e0.00	e19	1.1	19	0.14	0.00	0.00	0.00		
11			e0.00	19	0.53	19	0.14	0.00	0.00	0.00		
12			e0.00	18	0.21	19	0.18	0.00	0.00	0.00		
13			e0.00	20	0.25	20	0.14	0.00	0.00	0.00		
14			e0.00	27	0.21	19	0.14	0.00	0.00	0.00		
15			e0.00	37	0.07	19	0.14	0.00	0.00	0.00		
16			e0.00	46	0.07	20	0.14	0.00	0.00	0.00		
17			e0.00	52	0.04	20	0.11	0.00	0.00	0.00		
18			e0.07	49	0.04	20	0.11	0.00	0.00	0.00		
19			e101	48	0.04	20	0.07	0.00	0.00	0.00		
20			e155	45	0.04	20	0.07	0.00	0.00	0.00		
21			e161	23	0.04	18	0.07	0.00	0.00	0.00		
22			e143	2.3	14	18	0.04	0.00	0.00	0.00		
23			e130	1.7	17	19	0.00	0.00	0.00	0.00		
24			e119	1.6	16	16	0.00	0.00	0.00	0.00		
25			e109	1.5	17	2.5	0.00	0.00	0.00	0.00		
26			e91	2.0	17	1.0	0.00	0.00	0.00	0.00		
27			e33	0.92	17	0.71	0.00	0.00	0.00	0.00		
28			e28	0.46	18	0.53	0.00	0.00	0.00	0.00		
29			e20	0.21	18	0.39	0.00	0.00	0.00	0.00		
30			e12	0.14	19	0.28	0.00	0.00	0.00	0.00		
31			e38	---	19	---	0.00	0.00	---	0.00		
TOTAL			1140.07	820.83	194.23	463.41	2.94	0.00	0.00	0.00		
MEAN			36.8	27.4	6.27	15.4	0.095	0.000	0.000	0.000		
MAX			161	129	19	20	0.21	0.00	0.00	0.00		
MIN			0.00	0.14	0.04	0.28	0.00	0.00	0.00	0.00		
AC-FT			2260	1630	385	919	5.8	0.00	0.00	0.00		

e--Estimated.

## MILK RIVER BASIN

06148700 CYPRESS LAKE WEST INFLOW CANAL DRAIN NEAR OXARAT, SASKATCHEWAN

(International gaging station)

LOCATION.--Lat 49°28'25", long 109°36'38" (NAD 27), in NW<sup>1</sup>/<sub>4</sub> sec.17, T.6, R.27 W., third meridian, Hydrologic Unit 10050008, on left bank about 500 ft downstream from drain gate on Cypress Lake west inflow canal, 0.5 mi upstream from Battle Creek, and 4 mi northwest of Oxarat.

PERIOD OF RECORD.--March 1963 to current season (seasonal records only). March 1955 to current season in reports of Department of the Environment, Canada.

GAGE.--Water-stage recorder. Elevation of gage is 3,200 ft (NGVD 29).

REMARKS.--Records poor. 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.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 450 ft<sup>3</sup>/s, Apr. 20, 1955; no flow at times each season.

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 2003  
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			e0.00	e0.04	e0.00	0.04	0.00	0.00	0.00	0.00		
2			e0.00	e0.04	e0.00	0.00	0.00	0.00	0.00	0.00		
3			e0.00	e0.00	e0.00	0.00	0.00	0.00	0.00	0.00		
4			e0.00	e0.00	e0.00	0.00	0.00	0.00	0.00	0.00		
5			e0.00	e0.00	e0.00	0.00	0.00	0.00	0.00	0.00		
6			e0.00	e0.00	e0.00	0.00	0.00	0.00	0.00	0.00		
7			e0.00	e0.00	e0.00	0.04	0.00	0.00	0.00	0.00		
8			e0.00	e0.00	e0.00	0.04	0.00	0.04	0.00	0.00		
9			e0.00	e0.00	e0.00	0.04	0.00	0.04	0.00	0.00		
10			e0.00	e0.00	e0.00	0.04	0.00	0.00	0.00	0.00		
11			e0.00	e0.00	e0.00	0.07	0.00	0.00	0.00	0.00		
12			e0.00	e0.00	e0.00	0.07	0.00	0.00	0.00	0.00		
13			e0.00	e0.00	e0.00	0.07	0.00	0.00	0.00	0.00		
14			e0.00	e0.00	e0.00	0.07	0.00	0.00	0.00	0.00		
15			e0.00	e0.00	e0.00	0.07	0.00	0.00	0.00	0.00		
16			e0.00	e0.00	e0.00	0.07	0.00	0.00	0.00	0.00		
17			e0.04	e0.00	e0.04	0.07	0.00	0.00	0.00	0.00		
18			e0.04	e0.00	e0.04	0.04	0.00	0.00	0.00	0.00		
19			e0.35	e0.00	e0.04	0.04	0.00	0.00	0.00	0.00		
20			e0.25	e0.00	e0.04	0.04	0.00	0.00	0.00	0.00		
21			e0.18	e0.00	e0.04	0.04	0.00	0.00	0.00	0.00		
22			e0.14	e0.00	e0.04	0.04	0.00	0.00	0.00	0.00		
23			e0.11	e0.00	0.04	0.04	0.00	0.00	0.00	0.00		
24			e0.07	e0.00	0.04	0.04	0.00	0.00	0.00	0.00		
25			e0.04	e0.00	0.00	0.04	0.00	0.00	0.00	0.00		
26			e0.00	e0.00	0.00	0.04	0.00	0.00	0.00	0.00		
27			e0.00	e0.00	0.00	0.00	0.00	0.00	0.00	0.00		
28			e0.00	e0.00	0.00	0.00	0.00	0.00	0.00	0.00		
29			e0.00	e0.00	0.00	0.00	0.00	0.00	0.00	0.00		
30			e0.04	e0.00	0.00	0.00	0.00	0.00	0.00	0.00		
31			e0.04	---	0.00	---	0.00	0.00	---	0.00		
TOTAL			1.30	0.08	0.32	1.05	0.00	0.08	0.00	0.00		
MEAN			0.042	0.003	0.010	0.035	0.000	0.003	0.000	0.000		
MAX			0.35	0.04	0.04	0.07	0.00	0.04	0.00	0.00		
MIN			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
AC-FT			2.6	0.2	0.6	2.1	0.00	0.2	0.00	0.00		

e--Estimated.

MILK RIVER BASIN

06149000 CYPRESS LAKE WEST OUTFLOW CANAL NEAR WEST PLAINS, SASKATCHEWAN

(International gaging station)

LOCATION.--Lat 49°28'14", long 109°35'18" (NAD 27), in SW<sup>1</sup>/<sub>4</sub> sec.16, T.6, R.27 W., third meridian, Hydrologic Unit 10050008, on left bank 1.1 mi downstream from Cypress Lake West Dam, 6 mi northeast of West Plains, and 13 mi 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. Elevation of gage is 3,180 ft (NGVD 29). Prior to Sept. 18, 1952, at site 1 mi upstream and 300 ft downstream from Cypress Lake West Dam at different elevation.

REMARKS.--Records fair except for estimated daily discharges, which are poor. Canal diverts water from Cypress Lake in NW<sup>1</sup>/<sub>4</sub> sec.15, T.6, R.27 W., third meridian, for irrigation of 5,500 acres 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. Water Survey of Canada satellite telemeter at station.

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

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 304 ft<sup>3</sup>/s, May 4, 1951; no flow at times each season.

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 2003  
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			e0.00	e10	0.32	57	0.32	0.00	0.00	0.00		
2			e0.00	e16	0.32	29	0.32	0.00	0.00	0.00		
3			e0.00	e13	0.32	0.14	0.32	0.00	0.00	0.00		
4			e0.00	e5.9	0.25	0.07	4.4	0.00	0.00	0.00		
5			e0.00	e5.8	0.28	0.04	7.1	0.00	0.00	0.00		
6			e0.00	e4.1	0.25	0.07	7.0	0.00	0.00	0.00		
7			e0.00	2.0	0.25	0.07	6.9	0.00	0.00	0.00		
8			e0.00	2.2	48	0.07	6.5	0.00	0.00	0.00		
9			e0.00	2.0	79	0.18	3.7	0.00	0.00	0.00		
10			e0.00	1.7	81	0.28	0.14	0.00	0.00	0.00		
11			e0.00	3.6	87	0.32	0.00	0.00	0.00	0.00		
12			e0.00	4.8	87	0.28	0.00	0.00	0.00	0.00		
13			e0.00	6.8	91	0.28	0.00	0.00	0.00	0.00		
14			e0.00	15	93	0.25	0.00	0.00	0.00	0.00		
15			e0.00	15	98	0.21	0.00	0.00	0.00	0.00		
16			e0.00	8.5	96	0.25	0.00	0.00	0.00	0.00		
17			e0.00	3.3	99	0.28	0.00	0.00	0.00	0.00		
18			e0.32	3.3	103	0.28	0.00	0.00	0.00	0.00		
19			e0.28	3.2	89	0.32	0.00	0.00	0.00	0.00		
20			e0.21	3.0	54	0.35	0.00	0.00	0.00	0.00		
21			e0.18	0.49	53	0.39	0.00	0.00	0.00	0.00		
22			e0.14	0.39	53	0.39	0.00	0.00	0.00	0.00		
23			e0.25	0.39	53	0.39	0.00	0.00	0.00	0.00		
24			e23	0.39	51	0.39	0.00	0.00	0.00	0.00		
25			e17	0.39	49	0.35	0.00	0.00	0.00	0.00		
26			e9.1	0.35	49	0.35	0.00	0.00	0.00	0.00		
27			e6.6	0.35	50	0.35	0.00	0.00	0.00	0.00		
28			e6.4	0.39	50	0.35	0.00	0.00	0.00	0.00		
29			e4.3	0.35	51	0.32	0.00	0.00	0.00	0.00		
30			e1.7	0.32	53	0.32	0.00	0.00	0.00	0.00		
31			e1.7	---	56	---	0.00	0.00	---	e0.00		
TOTAL			71.18	133.01	1674.99	93.34	36.70	0.00	0.00	0.00		
MEAN			2.30	4.43	54.0	3.11	1.18	0.000	0.000	0.000		
MAX			23	16	103	57	7.1	0.00	0.00	0.00		
MIN			0.00	0.32	0.25	0.04	0.00	0.00	0.00	0.00		
AC-FT			141	264	3320	185	73	0.00	0.00	0.00		

e--Estimated.

## MILK RIVER BASIN

06149100 VIDORA DITCH NEAR CONSUL, SASKATCHEWAN

(International gaging station)

LOCATION.--Lat 49°27'27", long 109°35'30" (NAD 27), in SW<sup>1</sup>/<sub>4</sub> sec.9, T.6, R.27 W., third meridian, Hydrologic Unit 10050008, on left bank 0.5 mi downstream from headgate near lower end of Cypress Lake west outflow canal, 12 mi north of Consul.

PERIOD OF RECORD.--March 1963 to current season (seasonal records only). March 1952 to current season in reports of Department of the Environment, Canada.

GAGE.--Water-stage recorder. Elevation of gage is 3,200 ft (NGVD 29). Prior to Aug. 1, 1963, at elevation 1.0 ft higher.

REMARKS.--Records fair. Canal diverts water from Cypress Lake west outflow canal in NE<sup>1</sup>/<sub>4</sub> sec.8, T.6, R.27 W., third meridian, for irrigation of about 2,140 acres in the Battle Creek basin. Water may be delivered either to this canal or returned to Battle Creek from Cypress Lake. Water Survey of Canada satellite telemeter at station.

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

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 101 ft<sup>3</sup>/s, May 26, 1988; no flow at times each season.

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 2003  
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			0.00	0.00	0.00	53	e0.04	0.00	0.00	0.00		
2			0.00	0.00	0.00	31	e0.04	0.00	0.00	0.00		
3			0.00	0.00	0.00	0.11	e0.04	0.00	0.00	0.00		
4			0.00	0.00	0.00	e0.07	e0.04	0.00	0.00	0.00		
5			0.00	0.00	0.00	e0.07	e0.04	0.00	0.00	0.00		
6			0.00	0.00	0.00	e0.07	e0.04	0.00	0.00	0.00		
7			0.00	0.00	0.00	e0.07	e0.04	0.00	0.00	0.00		
8			0.00	0.00	18	e0.07	e0.04	0.00	0.00	0.00		
9			0.00	0.00	34	e0.07	e0.04	0.00	0.00	0.00		
10			0.00	0.00	35	e0.07	e0.04	0.00	0.00	0.00		
11			0.00	0.00	38	e0.07	e0.04	0.00	0.00	0.00		
12			0.00	0.00	39	e0.07	e0.04	0.00	0.00	0.00		
13			0.00	0.00	44	e0.07	e0.04	0.00	0.00	0.00		
14			0.00	0.00	49	e0.07	0.00	0.00	0.00	0.00		
15			0.00	0.00	58	e0.07	0.00	0.00	0.00	0.00		
16			0.00	0.00	56	e0.07	0.00	0.00	0.00	0.00		
17			0.00	0.00	58	e0.07	0.00	0.00	0.00	0.00		
18			0.00	0.00	62	e0.07	0.00	0.00	0.00	0.00		
19			0.00	0.00	68	e0.07	0.00	0.00	0.00	0.00		
20			0.00	0.00	52	e0.07	0.00	0.00	0.00	0.00		
21			0.00	0.00	53	e0.07	0.00	0.00	0.00	0.00		
22			0.00	0.00	54	e0.07	0.00	0.00	0.00	0.00		
23			0.00	0.00	55	e0.07	0.00	0.00	0.00	0.00		
24			0.00	0.00	54	e0.07	0.00	0.00	0.00	0.00		
25			0.00	0.00	52	e0.07	0.00	0.00	0.00	0.00		
26			0.00	0.00	52	e0.07	0.00	0.00	0.00	0.00		
27			0.00	0.00	52	e0.07	0.00	0.00	0.00	0.00		
28			0.00	0.00	50	e0.04	0.00	0.00	0.00	0.00		
29			0.00	0.00	50	e0.04	0.00	0.00	0.00	0.00		
30			0.00	0.00	51	e0.04	0.00	0.00	0.00	0.00		
31			0.00	---	52	---	0.00	0.00	---	0.00		
TOTAL			0.00	0.00	1186.00	85.91	0.52	0.00	0.00	0.00		
MEAN			0.000	0.000	38.3	2.86	0.017	0.000	0.000	0.000		
MAX			0.00	0.00	68	53	0.04	0.00	0.00	0.00		
MIN			0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00		
AC-FT			0.00	0.00	2350	170	1.0	0.00	0.00	0.00		

e--Estimated.





MILK RIVER BASIN

06149400 NASHLYN CANAL NEAR CONSUL, SASKATCHEWAN

(International gaging station)

LOCATION.--Lat 49°13'57", long 109°33'27" (NAD 27), in NE<sup>1</sup>/<sub>4</sub> sec.22, T.3, T.27 W., third meridian, Hydrologic Unit 10050008, on left bank 0.8 mi downstream from headgate on Battle Creek, and 5.9 mi south of Consul.

PERIOD OF RECORD.--March 1963 to current season (seasonal records only); 1912, 1914-35, 1938 to current season in reports of Department of the Environment, Canada. Prior to March 1950, estimates of seasonal diversions only in many seasons. 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 mi downstream at different elevations.

REMARKS.--Records good. Ditch diverts water from left bank of Battle Creek in SW<sup>1</sup>/<sub>4</sub> sec.27, T.3, R.27 W., third meridian, for irrigation of about 1,880 acres along Battle Creek. Water Survey of Canada satellite telemeter at station.

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

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 85 ft<sup>3</sup>/s, Apr. 14, 1952; no flow at times each season.

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 2003  
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			0.00	38	0.00	0.00	0.00	0.00	0.00	0.00		
2			0.00	e33	10	0.00	0.00	0.00	0.00	0.00		
3			0.00	e23	18	0.00	0.00	0.00	0.00	0.00		
4			0.00	e22	19	0.00	0.00	0.00	0.00	0.00		
5			0.00	22	21	0.00	0.00	0.00	0.00	0.00		
6			0.00	19	19	0.00	0.00	0.00	0.00	0.00		
7			0.00	16	0.74	0.00	0.00	0.00	0.00	0.00		
8			0.00	13	0.21	0.00	0.00	0.00	0.00	0.00		
9			0.00	5.8	0.07	0.00	0.00	0.00	0.00	0.00		
10			0.00	0.32	0.00	0.00	0.00	0.00	0.00	0.00		
11			0.00	0.11	0.00	0.00	0.00	0.00	0.00	0.00		
12			0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00		
13			0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00		
14			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
15			0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.00		
16			0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.00		
17			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
18			0.74	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
19			22	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
20			35	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
21			42	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
22			42	0.00	31	0.00	0.00	0.00	0.00	0.00		
23			44	0.00	36	0.00	0.00	0.00	0.00	0.00		
24			41	0.00	21	0.00	0.00	0.00	0.00	0.00		
25			41	0.00	0.95	0.00	0.00	0.00	0.00	0.00		
26			e35	0.00	0.35	0.00	0.00	0.00	0.00	0.00		
27			e31	0.00	0.11	0.00	0.00	0.00	0.00	0.00		
28			e32	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
29			e34	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
30			41	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
31			40	---	0.00	---	0.00	0.00	---	0.00		
TOTAL			480.74	192.45	177.43	0.00	0.00	0.00	0.00	0.00		
MEAN			15.5	6.42	5.72	0.000	0.000	0.000	0.000	0.000		
MAX			44	38	36	0.00	0.00	0.00	0.00	0.00		
MIN			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
AC-FT			954	382	352	0.00	0.00	0.00	0.00	0.00		

e--Estimated.

## MILK RIVER BASIN

## 06149500 BATTLE CREEK AT INTERNATIONAL BOUNDARY

(International gaging station)

LOCATION.--Lat 49°00'07", long 109°25'18" (NAD 27), in SE<sup>1</sup>/<sub>4</sub> sec.4, T.1, R.26 W., third meridian, Hydrologic Unit 10050008, on left bank 600 ft north of international boundary, in Saskatchewan, 8 mi upstream from Woodpile Coulee, 30 mi north of Chinook, MT, and at mile 69.8.

DRAINAGE AREA.--997 mi<sup>2</sup>, of which 378 mi<sup>2</sup> is probably noncontributing.

PERIOD OF RECORD.--April 1917 to current season (seasonal records only most seasons). Monthly discharge only for March 1918 and March 1928, published in WSP 1309.

REVISED RECORDS.--WSP 1389: 1935(M), 1936, 1937-38(M). WSP 1729: 1924, 1926, 1932 (monthly discharge only). W 1983: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 2,729.8 ft (International Boundary Commission Survey Datum).

REMARKS.--Records good except those for estimated daily discharges, which are poor. Natural flow of stream affected by storage reservoirs, diversions for irrigation of about 9,500 acres, and return flow from irrigated areas. Water may be diverted into or from Frenchman River basin through Cypress Lake. Water Survey of Canada satellite telemeter at station. Several observations of water temperature and specific conductance were made during the year.

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

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 2003  
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			e4.2	73	37	32	15	0.49	0.04	10		
2			e3.9	54	37	31	14	0.39	0.04	9.3		
3			e3.5	29	32	30	12	0.32	0.04	8.5		
4			e3.5	19	22	25	9.5	0.28	0.00	8.2		
5			e3.5	33	12	25	9.1	0.28	0.00	7.6		
6			e3.5	39	8.8	22	9.7	0.25	0.00	7.4		
7			e3.2	57	8.7	16	9.6	0.21	0.00	7.0		
8			e2.8	67	36	13	9.7	0.18	0.00	6.5		
9			e2.5	69	36	13	10	0.14	0.00	6.6		
10			e3.2	54	23	11	12	0.11	0.00	7.0		
11			e3.5	61	20	20	12	0.07	0.00	7.1		
12			e3.9	60	43	17	11	0.04	0.00	7.3		
13			e4.2	46	41	13	11	0.04	0.00	7.3		
14			e4.6	60	64	13	8.9	0.04	0.00	7.7		
15			e6.4	71	66	11	7.8	0.00	0.00	7.7		
16			e11	98	48	11	6.3	0.00	0.00	7.8		
17			e18	104	91	10	4.6	0.00	0.00	7.9		
18			e53	107	66	17	3.7	0.00	0.00	8.3		
19			e212	88	59	24	3.3	0.00	0.00	8.6		
20			e530	80	75	21	3.7	0.92	0.00	8.6		
21			e353	72	79	16	3.2	1.1	0.00	9.2		
22			e283	46	70	13	2.7	0.92	0.00	9.6		
23			e212	29	43	10	2.1	0.71	4.3	8.7		
24			168	22	22	9.5	1.5	0.57	8.2	8.9		
25			125	19	25	8.3	1.2	0.42	8.6	9.6		
26			105	23	45	7.1	0.92	0.32	9.5	9.2		
27			67	29	60	6.3	0.92	0.18	10	9.0		
28			83	28	49	5.9	0.95	0.14	11	9.1		
29			67	28	48	5.4	0.92	0.11	11	e8.5		
30			47	32	35	9.2	0.81	0.07	11	e7.8		
31			61	---	30	---	0.64	0.07	---	e6.7		
TOTAL			2451.4	1597	1331.5	465.7	198.76	8.37	73.72	252.7		
MEAN			79.1	53.2	43.0	15.5	6.41	0.27	2.46	8.15		
MAX			530	107	91	32	15	1.1	11	10		
MIN			2.5	19	8.7	5.4	0.64	0.00	0.00	6.5		
AC-FT			4860	3170	2640	924	394	17	146	501		

## STATISTICS OF MONTHLY MEAN DATA FOR SEASONS 1917 - 2003

MEAN	49.9	126	57.7	32.5	16.7	6.95	7.98	7.95
MAX	353	1526	538	261	250	50.7	332	57.7
(WY)	1997	1952	1927	1927	1955	1975	1986	1987
MIN	0.000	4.34	0.77	0.000	0.000	0.000	0.000	0.000
(WY)	1936	1981	1937	1937	1919	1919	1919	1920

## SUMMARY STATISTICS

FOR THE 2003 SEASON

SEASONS 1917 - 2003

HIGHEST DAILY MEAN	530	Mar 20	5590	Apr 15 1952
LOWEST DAILY MEAN	0.00	Aug 15	0.00	Mar 1 1918
MAXIMUM PEAK FLOW	a700	Mar 20	c9780	Sep 25 1986
MAXIMUM PEAK STAGE	b6.83	Mar 20	11.57	Sep 25 1986

a--About, occurred during period affected by backwater from ice.

b--Backwater from ice.

c--From rating table extended above 4,400 ft<sup>3</sup>/s on basis of slope-area measurement of peak flow.

e--Estimated.



MILK RIVER BASIN

06151500 BATTLE CREEK NEAR CHINOOK, MT

LOCATION.--Lat 48°39'05", long 109°13'47" (NAD 27), in NW<sup>1</sup>/<sub>4</sub>SW<sup>1</sup>/<sub>4</sub>NE<sup>1</sup>/<sub>4</sub> sec.3, T.33 N., R.19 E., Blaine County, Hydrologic Unit 10050008, on left bank, 4 mi north of Chinook, and at river mile 14.

DRAINAGE AREA.--1,539 mi<sup>2</sup>.

PERIOD OF RECORD.--April 1905 to September 1921 (monthly discharge only, published in WSP 1309), June 1984 to current year (seasonal records only). Published as North Fork Milk River near Chinook prior to 1913.

GAGE.--Water-stage recorder. Elevation of gage is 2,410 ft (NGVD 29). Apr. 22, 1905 to Apr. 8, 1918, chain gage 100 ft downstream, and Apr. 9, 1918 to Sept. 30, 1921, chain gage on bridge 600 ft downstream at same elevation but different from present elevation.

REMARKS.--Records fair. Diversions for irrigation of about 11,000 acres upstream from station. Bureau of Reclamation satellite telemeter at station. Several observations of water temperature and specific conductance were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 2003  
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1				55	28	27	15	4.2	3.1			
2				66	31	24	6.9	3.8	1.6			
3				66	34	23	13	1.8	1.6			
4				52	36	23	17	1.7	3.0			
5				39	41	25	19	0.34	3.3			
6				29	38	18	14	0.21	3.1			
7				33	29	14	17	0.20	3.2			
8				42	23	14	14	0.18	1.8			
9				51	19	15	11	0.16	3.3			
10				56	21	14	11	0.14	1.8			
11				54	36	12	7.9	0.13	0.99			
12				46	27	12	7.7	0.48	0.42			
13				48	22	11	9.5	0.69	0.40			
14				48	28	10	9.5	0.65	0.39			
15				42	36	10	9.9	0.44	0.45			
16				53	50	8.0	9.5	0.46	0.94			
17				65	51	2.5	9.0	0.26	0.80			
18				84	44	4.1	8.8	0.16	0.66			
19				102	67	9.5	11	0.14	0.65			
20				89	53	9.2	12	0.12	0.78			
21				72	48	6.5	11	0.11	0.66			
22				67	57	20	9.0	0.10	0.59			
23				56	56	19	9.0	0.56	0.56			
24				43	53	16	8.9	8.4	0.53			
25				34	38	14	8.8	0.88	0.42			
26				29	27	18	8.8	0.12	0.37			
27				24	21	20	8.8	2.8	0.34			
28				22	27	14	9.0	1.4	0.38			
29				28	40	12	9.0	0.39	0.34			
30				27	34	16	9.0	0.13	0.35			
31				---	33	---	8.5	0.89	---			
TOTAL				1522	1148	440.8	332.5	32.04	36.82			
MEAN				50.7	37.0	14.7	10.7	1.03	1.23			
MAX				102	67	27	19	8.4	3.3			
MIN				22	19	2.5	6.9	0.10	0.34			
AC-FT				3020	2280	874	660	64	73			

STATISTICS OF MONTHLY MEAN DATA FOR SEASONS 1984 - 2003

MEAN	59.9	24.6	20.9	12.9	2.58	49.3
MAX	539	101	48.3	57.6	15.3	910
(WY)	1996	1986	2002	2000	2002	1986
MIN	0.031	0.000	0.085	0.016	0.000	0.000
(WY)	2002	2002	1984	1984	1984	1984

SUMMARY STATISTICS

FOR 2003 SEASON

SEASONS 1984 - 2003

HIGHEST DAILY MEAN	102	Apr 19	12000	Sep 26 1986
LOWEST DAILY MEAN	0.10	Aug 22	0.00	Jul 12 1984
MAXIMUM PEAK FLOW	107	Apr 19	19400	Sep 26 1986
MAXIMUM PEAK STAGE	2.71	Apr 19	22.91	Sep 26 1986



MILK RIVER BASIN

06154100 MILK RIVER NEAR HARLEM, MT--Continued

SUMMARY STATISTICS	FOR 2003 SEASON		WATER YEARS 1960 - 1993*		SEASONS 1994 - 2003*	
ANNUAL MEAN			349.5			
HIGHEST ANNUAL MEAN			857	1965		
LOWEST ANNUAL MEAN			139	1984		
HIGHEST DAILY MEAN	2000	Mar 17	12900	Sep 29 1986	6190	Mar 18 1996
LOWEST DAILY MEAN	37	Sep 15	c0.00	Aug 10 1988	2.5	Apr 6 2001
ANNUAL SEVEN-DAY MINIMUM			0.00	Aug 24 1988		
MAXIMUM PEAK FLOW	a2350	Mar 23	13900	Sep 29 1986	6450	Mar 18 1996
MAXIMUM PEAK STAGE	b17.44	Mar 17	25.73	Sep 29 1986	23.88	Mar 18 1996
INSTANTANEOUS LOW FLOW			0.00	Aug 1 1988		
ANNUAL RUNOFF (AC-FT)			253200			
10 PERCENT EXCEEDS			682			
50 PERCENT EXCEEDS			180			
90 PERCENT EXCEEDS			39			

\*--During period of operation (1960-69, 1983 to current year. Seasonal record station beginning 1994 water year).  
a--Gage height, 15.17 ft.  
b--Backwater from ice.  
c--No flow on many days in August and September 1988.  
e--Estimated.

## MILK RIVER BASIN

06154400 PEOPLES CREEK NEAR HAYS, MT

LOCATION.--Lat 48°13'25", long 108°42'48" (NAD 27), in SW<sup>1</sup>/<sub>4</sub> sec.35, T.29 N., R.23 E., Blaine County, Hydrologic Unit 10050009, on right bank 45 ft downstream from bridge on State Highway 66, 2.5 mi downstream from Myrtle Creek, 16.4 mi north of Hays, and at river mile 47.2.

DRAINAGE AREA.--220 mi<sup>2</sup>.

PERIOD OF RECORD.--December 1966 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 2,714.10 ft (NGVD 29).

REMARKS.--Records poor. Some storage in numerous stock and beaver ponds and diversions for irrigation of about 1,300 acres upstream from station. U.S. Geological Survey satellite telemeter at station. Several observations of water temperature and specific conductance were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e0.00	e0.00	e0.10	e0.10	e0.10	e0.10	1.1	0.99	0.04	0.17	0.12	0.00
2	e0.00	e0.00	e0.10	e0.10	e0.10	e0.10	1.1	0.74	0.03	0.20	0.11	0.00
3	e0.00	0.04	e0.10	e0.10	e0.10	e0.10	1.4	0.64	0.04	0.21	0.11	0.00
4	e0.00	0.02	e0.10	e0.10	e0.10	e0.10	1.5	0.74	0.03	0.24	0.05	0.00
5	e0.00	0.01	e0.10	e0.10	e0.10	e0.10	1.3	2.2	0.05	0.22	0.01	0.00
6	e0.00	0.04	e0.10	e0.10	e0.10	e0.05	1.3	2.4	0.04	0.22	0.00	0.00
7	e0.00	0.07	e0.10	e0.10	e0.10	e0.05	1.6	2.3	0.04	0.20	0.01	0.00
8	e0.00	0.08	e0.10	e0.10	e0.10	e0.05	1.2	3.0	0.06	0.26	0.02	0.00
9	e0.00	0.11	e0.10	e0.10	e0.10	e0.05	0.73	3.5	0.08	0.19	0.00	0.00
10	e0.00	e0.10	e0.10	e0.05	e0.10	e0.05	0.75	3.5	0.05	0.13	0.00	0.00
11	e0.00	e0.10	e0.10	e0.05	e0.10	e0.05	0.64	2.4	0.09	0.08	0.00	0.02
12	e0.00	e0.10	e0.10	e0.05	e0.10	e0.10	0.72	1.9	0.10	0.08	0.00	0.03
13	e0.00	e0.10	e0.10	e0.05	e0.10	185	0.45	1.3	0.12	0.09	0.00	0.03
14	e0.00	e0.10	e0.10	e0.05	e0.10	309	0.45	0.88	0.16	0.13	0.00	0.07
15	e0.00	e0.10	e0.10	e0.05	e0.10	141	0.86	0.59	0.20	0.10	0.00	0.03
16	e0.00	e0.10	e0.10	e0.05	e0.10	117	5.3	0.45	0.23	0.09	0.00	0.00
17	e0.00	e0.10	e0.10	e0.05	e0.10	87	9.7	0.29	0.17	0.09	0.00	0.00
18	e0.00	e0.10	e0.10	e0.05	e0.10	43	9.9	0.20	0.23	0.09	0.00	0.00
19	e0.00	e0.10	e0.05	e0.05	e0.10	19	9.3	0.22	0.26	0.10	0.00	0.00
20	e0.00	e0.10	e0.05	e0.05	e0.05	16	7.6	0.17	0.31	0.11	0.00	0.00
21	e0.00	e0.10	e0.05	e0.05	e0.05	12	5.6	0.22	0.30	0.11	0.00	0.00
22	e0.00	e0.10	e0.05	e0.05	e0.05	9.3	3.0	0.22	0.30	0.13	0.00	0.00
23	e0.00	e0.10	e0.05	e0.05	e0.05	6.7	1.7	0.12	0.29	0.14	0.00	0.00
24	e0.00	e0.10	e0.05	e0.05	e0.05	5.2	0.91	0.16	0.28	0.15	0.00	0.00
25	e0.00	e0.10	e0.05	e0.05	e0.10	3.6	1.0	0.13	0.25	0.18	0.00	0.00
26	e0.00	e0.10	e0.10	e0.05	e0.10	3.0	0.56	0.10	0.28	0.16	0.00	0.00
27	e0.00	e0.10	e0.10	e0.05	e0.10	2.9	0.42	0.08	0.30	0.13	0.00	0.00
28	e0.00	e0.10	e0.10	e0.05	e0.10	2.5	0.63	0.07	0.31	0.10	0.00	0.00
29	e0.00	e0.10	e0.10	e0.05	---	2.0	0.82	0.03	0.23	0.11	0.00	0.00
30	e0.00	e0.10	e0.05	e0.05	---	1.8	1.1	0.04	0.17	0.12	0.00	0.00
31	e0.00	---	e0.05	e0.05	---	1.4	---	0.05	---	0.11	0.00	---
TOTAL	0.00	2.47	2.65	2.00	2.55	968.30	72.64	29.63	5.04	4.44	0.43	0.18
MEAN	0.000	0.082	0.085	0.065	0.091	31.2	2.42	0.96	0.17	0.14	0.014	0.006
MAX	0.00	0.11	0.10	0.10	0.10	309	9.9	3.5	0.31	0.26	0.12	0.07
MIN	0.00	0.00	0.05	0.05	0.05	0.05	0.42	0.03	0.03	0.08	0.00	0.00
AC-FT	0.00	4.9	5.3	4.0	5.1	1920	144	59	10	8.8	0.9	0.4

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1967 - 2003, BY WATER YEAR (WY)

	3.43	3.32	2.71	3.47	9.03	28.9	17.5	29.8	20.7	8.22	2.36	3.60
MAX	37.1	20.5	12.9	30.0	74.9	285	122	190	123	51.5	21.3	57.6
(WY)	1987	1987	1987	1971	1971	1979	1979	1975	1982	1975	1975	1986
MIN	0.000	0.000	0.000	0.000	0.000	0.000	0.048	0.007	0.034	0.000	0.000	0.000
(WY)	1972	1972	1972	1972	1998	2002	2002	2001	2001	1972	1967	1969

## SUMMARY STATISTICS

## FOR 2002 CALENDAR YEAR

## FOR 2003 WATER YEAR

## WATER YEARS 1967 - 2003

ANNUAL TOTAL	48.66	1090.33	
ANNUAL MEAN	0.13	2.99	
HIGHEST ANNUAL MEAN			10.9*
LOWEST ANNUAL MEAN			47.8
HIGHEST DAILY MEAN	5.0 Jun 14	309 Mar 14	0.10
LOWEST DAILY MEAN	0.00 Jan 18	0.00 Oct 1	1979
ANNUAL SEVEN-DAY MINIMUM	0.00 Jan 18	0.00 Oct 1	2001
MAXIMUM PEAK FLOW		391 Mar 14	1000 Mar 7 1979
MAXIMUM PEAK STAGE		7.72 Mar 14	a0.00 Dec 1 1966
INSTANTANEOUS LOW FLOW		0.00 Oct 1	0.00 Dec 1 1966
ANNUAL RUNOFF (AC-FT)	97	2160	b8460 Jun 8 1972
10 PERCENT EXCEEDS	0.10	1.4	15.03 Jun 8 1972
50 PERCENT EXCEEDS	0.00	0.10	0.00 Jan 2 1995
90 PERCENT EXCEEDS	0.00	0.00	7910
			21
			1.0
			0.00

\*--Median of yearly mean discharge, 4.92 ft<sup>3</sup>/s, 3,560 ac-ft/yr.

a--No flow at times most years.

b--From floodmark, from rating curve extended above 490 ft<sup>3</sup>/s on basis of slope-area measurement of peak flow.

e--Estimated.

MILK RIVER BASIN

06154410 LITTLE PEOPLES CREEK NEAR HAYS, MT

LOCATION.--Lat 47°57'58", long 108°39'36" (NAD 27), in SE<sup>1</sup>/<sub>4</sub>SE<sup>1</sup>/<sub>4</sub>NW<sup>1</sup>/<sub>4</sub> sec.32, T.26 N., R.24 E., Blaine County, Hydrologic Unit 10050009, on right bank 0.5 mi upstream from west entrance to Mission Canyon, 2 mi southeast of Hays, and at river mile 23.1.  
 DRAINAGE AREA.--13.0 mi<sup>2</sup>.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--August 1972 to current year.

REVISED RECORDS.--WDR MT-81-1: Drainage area.

GAGE.--Water-stage recorder and crest-stage gage. Elevation of gage is 3,769.72 ft (NGVD 29). August 1972 to June 24, 1976, gage at former site at elevation 10.00 ft higher. Prior to Apr. 22, 1987, gage located 330 ft downstream.

REMARKS.--Water-discharge records fair. No known regulation or diversion upstream from station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003  
 DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.5	1.4	1.3	1.1	1.0	1.0	1.3	2.4	3.4	1.8	1.1	1.2
2	1.5	1.4	1.3	1.1	1.0	1.0	1.3	2.4	3.2	1.7	1.1	1.1
3	1.5	1.4	1.3	1.1	1.0	1.0	1.3	2.4	3.2	1.6	1.1	1.1
4	1.5	1.5	1.3	1.1	1.0	1.0	1.3	2.6	3.0	1.6	1.2	1.1
5	1.5	1.4	1.2	1.2	1.0	0.96	1.4	2.8	2.9	1.6	1.2	1.1
6	1.5	1.4	1.2	1.1	1.0	1.0	1.4	3.0	2.9	1.6	1.2	1.1
7	1.6	1.5	1.2	1.1	1.0	1.0	1.4	2.9	2.8	1.4	1.3	1.2
8	1.5	1.5	1.2	1.1	1.0	0.98	1.4	2.8	2.7	1.5	1.2	1.2
9	1.5	1.5	1.2	1.1	1.0	0.97	1.5	3.1	2.8	1.4	1.2	1.2
10	1.5	1.4	1.2	1.1	1.0	0.96	1.5	6.2	2.9	1.4	1.2	1.2
11	1.5	1.4	1.2	1.1	1.0	0.95	1.7	8.4	2.9	1.4	1.2	1.1
12	1.5	1.3	1.2	1.1	1.0	0.97	1.7	8.2	2.8	1.4	1.2	1.1
13	1.5	1.3	1.2	1.1	1.0	1.0	1.8	8.2	2.8	1.4	1.2	1.1
14	1.5	1.3	1.2	1.1	1.0	1.0	2.0	8.1	2.8	1.4	1.2	1.1
15	1.5	1.3	1.2	1.1	1.0	1.1	2.0	7.2	2.8	1.3	1.2	1.1
16	1.5	1.3	1.2	1.1	1.0	1.5	1.9	6.4	2.8	1.3	1.2	1.1
17	1.5	1.3	1.2	1.1	1.0	1.1	1.9	5.9	2.8	1.3	1.2	1.1
18	1.5	1.3	1.2	1.0	1.0	1.0	2.2	5.3	2.7	1.3	1.2	1.1
19	1.5	1.3	1.2	1.1	1.0	0.97	2.3	4.9	2.6	1.3	1.2	1.1
20	1.5	1.3	1.2	1.1	1.0	0.97	2.2	4.7	2.5	1.3	1.2	1.1
21	1.5	1.3	1.2	1.0	1.0	1.1	2.1	4.5	2.3	1.3	1.2	1.1
22	1.4	1.3	1.2	0.99	0.99	1.1	2.1	4.0	2.3	1.3	1.2	1.1
23	1.4	1.3	1.2	1.0	1.0	1.1	2.1	3.8	2.3	1.3	1.2	1.1
24	1.4	1.3	1.2	1.0	1.3	1.1	2.2	3.8	2.2	1.3	1.2	1.1
25	1.4	1.3	1.2	1.0	1.1	1.1	2.3	3.7	2.1	1.3	1.2	1.1
26	1.4	1.3	1.2	1.0	1.0	1.2	2.4	3.5	2.1	1.3	1.2	1.1
27	1.4	1.3	1.2	1.0	1.0	1.2	2.5	3.1	2.1	1.3	1.2	1.1
28	1.4	1.3	1.2	1.0	1.0	1.2	2.4	3.2	2.1	1.2	1.2	1.2
29	1.4	1.3	1.2	1.0	---	1.2	2.4	3.5	1.9	1.2	1.2	1.2
30	1.4	1.3	1.1	1.0	---	1.2	2.4	3.4	1.8	1.2	1.2	1.2
31	1.4	---	1.1	1.0	---	1.3	---	3.4	---	1.2	1.2	---
TOTAL	45.6	40.5	37.4	32.99	28.39	33.23	56.4	137.8	78.5	42.9	37.0	33.8
MEAN	1.47	1.35	1.21	1.06	1.01	1.07	1.88	4.45	2.62	1.38	1.19	1.13
MAX	1.6	1.5	1.3	1.2	1.3	1.5	2.5	8.4	3.4	1.8	1.3	1.2
MIN	1.4	1.3	1.1	0.99	0.99	0.95	1.3	2.4	1.8	1.2	1.1	1.1
AC-FT	90	80	74	65	56	66	112	273	156	85	73	67

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1972 - 2003, BY WATER YEAR (WY)

	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003				
MEAN	2.35	2.16	2.00	1.89	1.78	2.29	4.47	11.9	8.18	5.31	2.90	2.55																								
MAX	6.92	4.60	3.75	3.84	3.51	5.52	21.5	75.6	26.6	32.9	8.11	8.42																								
(WY)	1987	1987	1986	1976	1986	1996	1979	1974	1975	1993	1993	1978																								
MIN	1.11	1.07	0.93	0.90	0.95	1.07	1.20	1.45	1.98	1.38	1.19	1.13																								
(WY)	2002	2002	2002	2002	1997	2003	2002	2002	2000	2003	2003	2003																								

SUMMARY STATISTICS FOR 2002 CALENDAR YEAR FOR 2003 WATER YEAR WATER YEARS 1972 - 2003

ANNUAL TOTAL	807.07	604.51	
ANNUAL MEAN	2.21	1.66	3.99*
HIGHEST ANNUAL MEAN			11.6 1974
LOWEST ANNUAL MEAN			1.46 2001
HIGHEST DAILY MEAN	43 Jun 23	8.4 May 11	500 May 25 1974
LOWEST DAILY MEAN	0.85 Jan 4	0.95 Mar 11	0.67 May 21 1997
ANNUAL SEVEN-DAY MINIMUM	0.87 Jan 3	0.97 Mar 5	0.76 May 18 1997
MAXIMUM PEAK FLOW		9.8 May 10	a576 May 25 1974
MAXIMUM PEAK STAGE		.80 May 10	b4.57 May 25 1974
INSTANTANEOUS LOW FLOW		.90 Jan 22	0.67 May 21 1997
ANNUAL RUNOFF (AC-FT)	1600	1200	2890
10 PERCENT EXCEEDS	3.9	2.8	6.6
50 PERCENT EXCEEDS	1.3	1.3	2.2
90 PERCENT EXCEEDS	1.0	1.0	1.3

\*--Median of yearly mean discharge, 3.10 ft<sup>3</sup>/s.

a--From rating curve extended above 44 ft<sup>3</sup>/s, on basis of slope-area measurement of peak flow.

b--From floodmark, at site and datum then in use.

## MILK RIVER BASIN

06154410 LITTLE PEOPLES CREEK NEAR HAYS, MT--Continued

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1977 to June 2003, discontinued.

REMARKS.--Unpublished records of instantaneous water temperature and specific conductance for many days are available in files of the District office.

## WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

Date	Time	Instan- taneous dis- charge, cfs (00061)	pH, water, unfltrd field, std units (00400)	Specif. conduc- tance, wat unfltrd uS/cm 25 degC (00095)	Temper- ature, air, deg C (00020)	Temper- ature, water, deg C (00010)	Hard- ness, water, unfltrd mg/L as CaCO3 (00900)	Calcium water, fltrd, mg/L (00915)	Magnes- ium, water, fltrd, mg/L (00925)	Potas- sium, water, fltrd, mg/L (00935)	Sodium adsorp- tion ratio (00931)	
MAY 2003												
07...	1030	3.0	8.3	534	.0	6.0	280	76.2	22.0	2.02	.1	
JUN												
25...	1015	2.1	8.3	532	15.5	10.5	280	73.3	22.7	1.90	.1	
Date		Sodium, water, fltrd, mg/L (00930)	Alka- linity, wat flt fxd end lab, mg/L as CaCO3 (29801)	Chlor- ide, water, fltrd, mg/L (00940)	Fluor- ide, water, fltrd, mg/L (00950)	Silica, water, fltrd, mg/L (00955)	Sulfate water, fltrd, mg/L (00945)	Residue water, fltrd, sum of consti- tuents mg/L (70301)	Residue water, fltrd, tons/ acre-ft (70303)	Residue water, fltrd, tons/d (70302)	Ammonia water, fltrd, mg/L as N (00608)	Nitrite + nitrate water fltrd, mg/L as N (00631)
MAY 2003												
07...	4.74	187	.98	.31	11.3	81.5	311	.42	2.52	<.04	<.06	
JUN												
25...	4.81	214	1.13	.3	11.7	75.7	320	.44	1.81	<.04	<.06	
Date		Nitrite water, fltrd, mg/L as N (00613)	Ortho- phos- phate, water, fltrd, mg/L as P (00671)	Arsenic water, unfltrd ug/L (01002)	Cadmium water, unfltrd ug/L (01027)	Chrom- ium, water, unfltrd recover -able, ug/L (01034)	Copper, water, unfltrd recover -able, ug/L (01042)	Iron, water, unfltrd recover -able, ug/L (01045)				
MAY 2003												
07...		<.008	<.02	E2	<.04	<.8	1.9	40				
JUN												
25...		<.008	<.02	<2	<.04	<.8	.9	30				
Date		Lead, water, unfltrd recover -able, ug/L (01051)	Nickel, water, unfltrd recover -able, ug/L (01067)	Zinc, water, unfltrd recover -able, ug/L (01092)	Suspnd. sedi- ment, sieve diametr percent <.063mm (70331)	Sus- pended sedi- ment concen- tration mg/L (80154)	Sus- pended sedi- ment load, tons/d (80155)					
MAY 2003												
07...		.14	2.00	3	47	45	.36					
JUN												
25...		.10	2.31	E1	51	54	.31					

E--Estimated.

MILK RIVER BASIN

06154550 PEOPLES CREEK BELOW KUHR COULEE, NEAR DODSON, MT

LOCATION.--Lat 48°21'49", long 108°21'16" (NAD 27), in NW¼NW¼NE¼ sec.16, T.30 N., R.26 E., Phillips County, Hydrologic Unit 10050009, on right bank 10 ft downstream from bridge on county highway, 2.4 mi downstream from Kuhr Coulee, 5.5 mi southwest of Dodson, and at river mile 7.8.

DRAINAGE AREA.--675 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--April 1918 to November 1921 (fragmentary), June 1951 to September 1973, October 1981 to September 1988 (published as "near Dodson"), October 1988 to current year. Monthly discharge only for some periods, published in WSP 1309.

GAGE.--Water-stage recorder. Elevation of gage is 2,309.18 ft (NGVD 29) (levels by Bureau of Indian Affairs). Prior to June 1951, nonrecording gage at site 0.5 mi upstream at different elevation. June 1, 1951 to Sept. 30, 1988, water-stage recorder at sites 2.5 mi upstream at different elevation.

REMARKS.--Water-discharge records fair. Diversions for irrigation of about 3,300 acres upstream from station. U. S. Geological Survey satellite telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003 DAILY MEAN VALUES

Table with 13 columns (DAY, OCT, NOV, DEC, JAN, FEB, MAR, APR, MAY, JUN, JUL, AUG, SEP) and 31 rows of daily mean discharge data. Includes summary rows for TOTAL, MEAN, MAX, MIN, and AC-FT.

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1918 - 2003, BY WATER YEAR (WY)\*

Table with 13 columns (MEAN, MAX, (WY), MIN, (WY)) and 13 rows of monthly mean data statistics for water years 1918-2003.

SUMMARY STATISTICS FOR 2002 CALENDAR YEAR FOR 2003 WATER YEAR WATER YEARS 1918 - 2003\*

Table with 4 columns (SUMMARY STATISTICS, FOR 2002 CALENDAR YEAR, FOR 2003 WATER YEAR, WATER YEARS 1918 - 2003\*) and 13 rows of summary statistics including annual total, mean, highest/lowest annual/daily means, peak flow, and runoff/exceedance data.

\*--During period of operation (1918-21 (fragmentary), 1951-73, 1982 to current year. a--Backwater from ice. b--Gage height, 15.91 ft, from floodmark, at different site and datum. c--Backwater from ice, from floodmark in gage house, at different site and datum. e--Estimated.

## MILK RIVER BASIN

06154550 PEOPLES CREEK BELOW KUHR COULEE, NEAR DODSON, MT--Continued

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1989-92, 1994, May 1999 to current year.

REMARKS.--Due to no flow for July through September, a fourth sample was not collected this year. Unpublished records of instantaneous water temperature and specific conductance are available in files of the District office.

## WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

Date	Time	Instantaneous discharge, cfs (00061)	pH, water, unfltrd field, std units (00400)	Specific conductance, wat unfltrd uS/cm 25 degC (00095)	Temperature, air, deg C (00020)	Temperature, water, deg C (00010)	Ammonia + org-N, water, unfltrd mg/L as N (00625)	Nitrite + nitrate, water, fltrd, mg/L as N (00631)	Nitrite water, fltrd, mg/L as N (00613)		
MAR 2003											
19...	1230	19	8.3	583	--	1.5	2.2	.313	.024		
MAY											
07...	1215	8.0	8.6	1420	0.0	7.0	.52	<.022	<.002		
JUN											
25...	1215	.03	9.3	1330	22.5	19.0	.78	<.022	<.002		
Date			Ortho-phosphate, water, fltrd, mg/L as P (00671)	Phosphorus, water, unfltrd mg/L (00665)	Suspnd. sedi-ment, sieve diametr <.063mm percent (70331)	Suspended sedi-ment concentration mg/L (80154)	Suspended sedi-ment load, tons/d (80155)				
MAR 2003											
19...			.038	.32	56	199	10				
MAY											
07...			<.007	.026	89	54	1.2				
JUN											
25...			<.007	.033	76	5	.00				
Date	Time	Hardness, water, unfltrd mg/L as CaCO3 (00900)	Calcium, water, fltrd, mg/L (00915)	Magnesium, water, fltrd, mg/L (00925)	Potassium, water, fltrd, mg/L (00935)	Sodium adsorption ratio (00931)	Sodium, water, fltrd, mg/L (00930)	Alkalinity, wat flt lab, mg/L as CaCO3 (29801)	Chloride, water, fltrd, mg/L (00940)	Fluoride, water, fltrd, mg/L (00950)	Silica, water, fltrd, mg/L (00955)
MAY 2003											
07...	1215	390	68.5	53.8	7.74	4	174	261	12.1	.46	3.68
Date		Residue water, fltrd, sum of constituents mg/L (70301)	Residue water, fltrd, tons/acre-ft (70303)	Residue water, fltrd, tons/d (70302)	Arsenic, water, unfltrd ug/L (01002)	Cadmium, water, unfltrd ug/L (01027)	Chromium, water, unfltrd recoverable, ug/L (01034)	Copper, water, unfltrd recoverable, ug/L (01042)	Lead, water, unfltrd recoverable, ug/L (01051)	Nickel, water, unfltrd recoverable, ug/L (01067)	Zinc, water, unfltrd recoverable, ug/L (01092)
MAY 2003											
07...	484	961	1.31	20.8	E2	<.2	<.8	3.8	.28	4.52	4

E--Estimated.



MILK RIVER BASIN

06155030 MILK RIVER NEAR DODSON, MT

LOCATION.--Lat 48°24'11", long 108°17'35" (NAD 27), in NE<sup>1</sup>/<sub>4</sub>SE<sup>1</sup>/<sub>4</sub>NW<sup>1</sup>/<sub>4</sub> sec.36, T.31 N., R.26 E., Phillips County, Hydrologic Unit 10050004, on left bank 30 ft downstream from U.S. Highway 2 bridge, 0.95 mi downstream from Dodson Dam, 1.9 mi west of Dodson, and at river mile 273.2.

DRAINAGE AREA.--11,192 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1982 to current year (seasonal record beginning water year 1994).

GAGE.--Water-stage recorder. Elevation of gage is 2,250 ft (NGVD 29).

REMARKS.--Records good except those for estimated daily discharges, which are poor. Numerous diversions for irrigation upstream from station. Bureau of Reclamation satellite telemeter at station. Several observations of water temperature and specific conductance were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 2003  
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			e50	139	6.8	5.1	56	6.5	0.14	0.41		
2			e50	124	6.0	4.8	58	4.5	0.20	0.32		
3			e50	116	6.2	5.1	17	5.2	0.26	0.39		
4			e50	103	7.8	5.0	8.4	3.9	0.10	0.53		
5			e60	100	9.3	4.7	5.7	5.6	0.00	0.58		
6			e50	102	9.2	e5.0	5.7	10	0.00	131		
7			e50	231	10	e5.0	7.4	8.9	0.00	205		
8			e50	188	12	e5.0	9.8	3.8	0.00	116		
9			e50	11	11	e5.0	13	3.7	0.00	113		
10			e60	10	9.8	5.4	9.5	4.2	0.00	107		
11			e60	9.7	13	9.0	8.4	3.3	0.00	101		
12			e60	10	16	16	13	1.4	0.00	93		
13			e70	10	43	19	13	0.35	0.00	82		
14			e200	9.7	72	33	10	0.07	0.00	74		
15			e400	8.9	106	64	4.3	0.00	0.00	79		
16			e950	8.7	117	54	3.5	0.32	0.06	76		
17			e1500	9.6	55	71	3.5	0.00	0.06	84		
18			2320	9.3	56	52	3.8	0.00	0.00	64		
19			1980	10	50	35	4.8	0.00	0.00	73		
20			1410	12	29	21	4.7	0.00	0.07	80		
21			986	18	16	22	4.3	0.00	0.00	79		
22			1130	35	9.5	43	3.7	0.07	0.24	79		
23			1140	76	8.3	78	3.4	0.12	0.06	79		
24			1070	74	8.5	65	3.4	0.00	0.00	73		
25			786	75	6.1	71	3.3	0.00	0.00	74		
26			664	73	4.9	69	3.2	0.54	0.00	75		
27			591	51	4.9	57	3.5	0.70	0.00	74		
28			492	25	6.1	61	4.5	0.00	0.07	77		
29			320	11	5.8	57	6.4	0.00	0.25	86		
30			232	8.1	6.4	55	9.3	0.00	0.36	87		
31			174	---	6.6	---	9.4	0.00	---	e90		
TOTAL			17055	1668.0	728.2	1002.1	313.9	63.17	1.87	2353.23		
MEAN			550	55.6	23.5	33.4	10.1	2.04	0.062	75.9		
MAX			2320	231	117	78	58	10	0.36	205		
MIN			50	8.1	4.9	4.7	3.2	0.00	0.00	0.32		
AC-FT			33830	3310	1440	1990	623	125	3.7	4670		

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1982 - 1993 AND SEASONS 1994 - 2003\*

	83.2	129	454	190	182	234	173	64.3	128	194	106	77.8
MEAN	83.2	129	454	190	182	234	173	64.3	128	194	106	77.8
MAX	230	526	2252	1691	1685	655	599	362	1727	2688	421	275
(WY)	1990	1986	1996	1996	1986	1995	1991	1993	1986	1987	1987	1987
MIN	18.2	20.3	15.9	2.35	3.41	16.4	8.72	2.04	0.062	5.07	25.3	17.3
(WY)	1985	1985	1985	1999	2001	1983	2001	2003	2003	1991	1985	1985

SUMMARY STATISTICS	FOR 2003 SEASON		SEASONS 1994 - 2003*		WATER YEARS 1982 - 1993	
ANNUAL MEAN						181
HIGHEST ANNUAL MEAN						590
LOWEST ANNUAL MEAN						36.6
HIGHEST DAILY MEAN	2320	Mar 18	5000	Mar 20 1996	11500	Sep 26 1986
LOWEST DAILY MEAN	0.00	Aug 15	0.18	May 6 2001	c0.00	Sep 16 1983
ANNUAL SEVEN-DAY MINIMUM					0.00	Sep 16 1983
MAXIMUM PEAK FLOW	2560	Mar 18	a5200	Mar 17 1994	13200	Sep 26 1986
MAXIMUM PEAK STAGE	15.75	Mar 18	b24.51	Mar 14 1996	29.79	Sep 26 1986
INSTANTANEOUS LOW FLOW					0.00	Oct 6 1990
ANNUAL RUNOFF (AC-FT)					131300	
10 PERCENT EXCEEDS					386	
50 PERCENT EXCEEDS					47	
90 PERCENT EXCEEDS					5.2	

\*--Seasonal record beginning water year 1994.  
a--Gage height, 22.71 ft.  
b--Backwater from ice.  
c--No flow at times most years.  
e--Estimated.

MILK RIVER BASIN

06155900 MILK RIVER AT CREE CROSSING, NEAR SACO, MT

LOCATION (REVISED).--Lat 48°32'25", long 107°31'10" (NAD 27), in NW<sup>1</sup>/<sub>4</sub>SE<sup>1</sup>/<sub>4</sub>SE<sup>1</sup>/<sub>4</sub> sec.11, T.32 N., R.32 E., Phillips County, Hydrologic Unit 10050004, on right bank 25 ft upstream from bridge on Phillips County road, 500 ft upstream from Nelson Canal, 9.9 mi northwest of Saco, and at river mile 176.4.

DRAINAGE AREA.--13,118 mi<sup>2</sup>.

PERIOD OF RECORD.--May 2000 to current year (seasonal records only).

GAGE.--Water-stage recorder. Elevation of gage is 2,188 ft (NGVD 29).

REMARKS.--Seasonal records good except those for estimated daily discharges, which are poor. U.S. Geological Survey satellite telemeter at station. Several observations of water temperature and specific conductance were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 2003  
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			e100	338	72	121	115	118	111	20		
2			e100	284	91	127	111	119	117	20		
3			e100	234	64	139	111	119	125	21		
4			e100	199	50	135	115	122	121	21		
5			e100	176	72	134	122	150	103	21		
6			e100	169	151	146	121	149	79	21		
7			e100	168	197	168	108	141	58	22		
8			e100	163	217	173	120	155	45	22		
9			e100	210	213	164	120	142	38	116		
10			e100	312	206	150	133	141	32	207		
11			e100	169	188	153	151	129	29	145		
12			e100	97	175	145	169	111	28	138		
13			e100	69	175	143	160	107	26	136		
14			e100	60	168	146	166	120	25	133		
15			e100	65	172	179	130	117	27	128		
16			e240	66	211	199	133	104	27	120		
17			e500	59	277	228	131	100	27	115		
18			e1000	56	306	235	120	89	27	112		
19			e1500	52	259	218	100	90	27	108		
20			e2000	54	221	205	97	90	29	113		
21			e2600	52	221	182	94	81	29	104		
22			e2300	47	212	170	114	54	27	100		
23			e1800	44	189	149	142	50	26	112		
24			e1600	43	169	147	132	52	24	112		
25			e1300	45	148	187	126	60	23	107		
26			e900	92	137	213	141	59	23	110		
27			796	119	131	176	136	58	22	107		
28			657	109	110	148	135	63	21	106		
29			598	103	113	121	130	91	21	124		
30			527	89	115	113	122	85	21	124		
31			430	---	116	---	116	88	---	e120		
TOTAL			20248	3743	5146	4914	3921	3154	1338	2965		
MEAN			653	125	166	164	126	102	44.6	95.6		
MAX			2600	338	306	235	169	155	125	207		
MIN			100	43	50	113	94	50	21	20		
AC-FT			40160	7420	10210	9750	7780	6260	2650	5880		

STATISTICS OF MONTHLY MEAN DATA FOR SEASONS 2000 - 2003

MEAN	252	56.1	74.8	218	140	109	48.2	42.4
MAX	653	125	166	517	244	225	108	91.3
(WY)	2003	2003	2003	2002	2002	2002	2002	2004
MIN	38.3	20.5	9.44	68.1	28.3	16.7	18.6	12.6
(WY)	2002	2002	2001	2001	2001	2001	2000	2002

SUMMARY STATISTICS

FOR 2003 SEASON

SEASONS 2000 - 2003

HIGHEST DAILY MEAN	2600	Mar 21	2600	Mar 21 2003
LOWEST DAILY MEAN	20	Oct 1	2.6	May 28 2001
MAXIMUM PEAK FLOW	unknown		c2600	Mar 21 2003
MAXIMUM PEAK STAGE	a11.16	Mar 21	a11.16	Mar 21 2003
INSTANTANEOUS LOW FLOW	b19	Oct 1	2.6	May 28 2001

a--Backwater from ice.  
b--Gage height, 2.37 ft.  
c--Daily mean discharge.  
e--Estimated.

MILK RIVER BASIN

06156500 BELANGER CREEK DIVERSION CANAL NEAR VIDORA, SASKATCHEWAN

(International gaging station)

LOCATION.--Lat 49°29'39", long 109°21'54" (NAD 27), in NW<sup>1</sup>/<sub>4</sub> sec.19, T.6, R.25 W., third meridian, Hydrologic Unit 10050013, on left bank 0.3 mi downstream from diversion weir and 12 mi 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. Elevation of gage is 3,200 ft (NGVD 29), from Cypress Lake elevation.

REMARKS.--Records fair. Canal diverts water from right bank of Belanger Creek in SW<sup>1</sup>/<sub>4</sub> sec.30, T.6, R.25 W., third meridian, for storage in Cypress Lake. Water Survey of Canada satellite telemeter at station.

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

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 696 ft<sup>3</sup>/s, June 28, 1998; no flow at times each season.

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 2003  
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			e0.00	92	10	0.00	0.00	0.00	0.00	0.00		
2			e0.00	36	10	0.00	0.00	0.00	0.00	0.00		
3			e0.00	1.4	5.9	0.00	0.00	0.00	0.00	0.00		
4			e0.00	5.0	0.00	0.00	0.00	0.00	0.00	0.00		
5			e0.00	2.1	0.00	0.00	0.00	0.00	0.00	0.00		
6			e0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.00		
7			e0.00	0.00	0.07	0.00	0.00	0.00	0.00	0.00		
8			e0.00	0.07	0.04	0.00	0.00	0.00	0.00	0.00		
9			e0.00	26	0.00	0.00	0.00	0.00	0.00	0.00		
10			e0.00	53	0.00	0.00	0.00	0.00	0.00	0.00		
11			e0.00	25	0.00	0.00	0.00	0.00	0.00	0.00		
12			e0.00	18	0.00	0.00	0.00	0.00	0.00	0.00		
13			e0.00	15	0.00	0.00	0.00	0.00	0.00	0.00		
14			e0.00	24	0.00	0.00	0.00	0.00	0.00	0.00		
15			e0.00	33	0.00	0.00	0.00	0.00	0.00	0.00		
16			e0.00	57	0.00	0.00	0.00	0.00	0.00	0.00		
17			e0.00	54	0.00	0.00	0.00	0.00	0.00	0.00		
18			e0.00	37	0.00	0.00	0.00	0.00	0.00	0.00		
19			e95	25	0.00	0.00	0.00	0.00	0.00	0.00		
20			e183	19	3.3	0.00	0.00	0.00	0.00	0.00		
21			e191	15	7.3	0.00	0.00	0.00	0.00	0.00		
22			e177	13	7.1	0.00	0.00	0.00	0.00	0.00		
23			e204	12	7.1	0.00	0.00	0.00	0.00	0.00		
24			e172	12	7.1	0.00	0.00	0.00	0.00	0.00		
25			e103	12	6.8	0.00	0.00	0.00	0.00	0.00		
26			e52	14	7.4	0.00	0.00	0.00	0.00	0.00		
27			29	15	7.3	0.00	0.00	0.00	0.00	0.00		
28			16	16	7.2	0.00	0.00	0.00	0.00	0.00		
29			7.5	12	7.3	0.00	0.00	0.00	0.00	0.00		
30			8.9	11	7.2	0.00	0.00	0.00	0.00	0.00		
31			48	---	4.0	---	0.00	0.00	---	0.00		
TOTAL			1286.40	654.64	105.11	0.00	0.00	0.00	0.00	0.00		
MEAN			41.5	21.8	3.39	0.000	0.000	0.000	0.000	0.000		
MAX			204	92	10	0.00	0.00	0.00	0.00	0.00		
MIN			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
AC-FT			2550	1300	208	0.00	0.00	0.00	0.00	0.00		

e--Estimated.

## MILK RIVER BASIN

06157500 CYPRESS LAKE EAST OUTFLOW CANAL NEAR VIDORA, SASKATCHEWAN

(International gaging station)

LOCATION.--Lat 49°29'12", long 109°21'08" (NAD 27), in SE<sup>1</sup>/<sub>4</sub> sec.19, T.6, R.25 W., third meridian, Hydrologic Unit 10050013, on right bank 500 ft upstream from Belanger Creek, and 12.3 mi 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. Elevation of gage is 3,180 ft (NGVD 29). Prior to Sept. 26, 1946, at elevation 2.24 ft higher and Sept. 26, 1946, to May 18, 1950, at elevation 1.54 ft higher.

REMARKS.--Records fair except those for estimated daily discharges, which are poor. Canal diverts water from Cypress Lake for irrigation in Frenchman River basin in Saskatchewan. Water Survey of Canada satellite telemeter at station.

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

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 202 ft<sup>3</sup>/s, Apr. 19, 1952; no flow at times most seasons.

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 2003  
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			e0.18	e0.60	11	0.81	3.8	0.00	0.00	0.00		
2			e0.18	e0.64	9.7	0.85	3.3	0.00	0.00	0.00		
3			e0.18	e0.67	8.8	0.85	2.9	0.00	0.00	0.00		
4			e0.18	e0.71	8.9	0.85	2.5	0.00	0.00	0.00		
5			e0.18	e1.3	9.3	0.81	2.2	0.00	0.00	0.00		
6			e0.18	e2.0	10	0.78	2.0	0.00	0.00	0.00		
7			e0.18	e2.7	8.8	0.78	1.7	0.00	0.00	0.04		
8			e0.18	e2.8	5.4	0.78	1.6	0.00	0.00	0.11		
9			e0.18	e2.8	4.4	0.74	1.4	0.00	0.00	0.11		
10			e0.18	e2.7	3.8	0.78	1.2	0.00	0.00	0.11		
11			e0.18	e2.8	3.3	0.78	1.1	0.00	0.00	0.18		
12			e0.18	e3.1	3.1	0.78	0.88	0.00	0.00	0.21		
13			e0.21	e3.3	3.2	0.74	0.74	0.00	0.00	0.21		
14			e0.21	e3.2	3.0	0.78	0.64	0.00	0.00	0.25		
15			e0.21	e3.2	2.8	0.71	0.53	0.00	0.00	0.28		
16			e0.21	4.0	2.8	0.67	0.46	0.00	0.00	0.32		
17			e0.42	3.2	2.6	0.64	0.35	0.00	0.00	0.35		
18			e2.6	2.7	2.6	0.57	0.21	0.00	0.00	0.39		
19			e8.1	4.4	2.5	0.74	0.11	0.00	0.00	0.39		
20			e8.8	3.7	2.4	6.6	0.07	0.00	0.00	0.35		
21			e7.1	3.2	1.5	10	0.04	0.00	0.00	0.42		
22			e5.8	3.7	1.1	10	0.00	0.00	0.00	0.39		
23			e4.5	11	0.85	9.6	0.00	0.00	0.00	0.42		
24			e3.2	11	0.78	9.1	0.00	0.00	0.00	0.57		
25			e1.9	9.8	0.74	8.3	0.00	0.00	0.00	0.57		
26			e0.67	8.5	0.78	7.4	0.00	0.00	0.00	0.64		
27			e0.53	7.5	0.78	6.5	0.00	0.00	0.00	0.67		
28			e0.42	10	0.71	5.7	0.00	0.00	0.00	0.78		
29			e0.35	14	0.71	4.9	0.00	0.00	0.00	e0.81		
30			e0.46	13	0.67	4.3	0.00	0.00	0.00	e0.85		
31			e0.57	---	0.71	---	0.00	0.00	---	e0.85		
TOTAL			48.42	142.22	117.73	96.84	27.73	0.00	0.00	10.27		
MEAN			1.56	4.74	3.80	3.23	0.89	0.000	0.000	0.33		
MAX			8.8	14	11	10	3.8	0.00	0.00	0.85		
MIN			0.18	0.60	0.67	0.57	0.00	0.00	0.00	0.00		
AC-FT			96	282	234	192	55	0.00	0.00	20		

e--Estimated.

MILK RIVER BASIN

06158500 EASTEND CANAL AT EASTEND, SASKATCHEWAN

(International gaging station)

LOCATION.--Lat 49°30'21", long 108°50'54" (NAD 27), in NW<sup>1</sup>/<sub>4</sub> sec.25, T.6, R.22 W., third meridian, Hydrologic Unit 10050013, on left bank 600 ft downstream from Eastend Reservoir headgate, 1.5 mi 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. Elevation of gage is 2,998.58 ft (Canadian Geodetic Vertical Datum 1928). Prior to June 1973, at sites within 1 mi, at different elevations.

REMARKS.--Records good. Canal diverts water from Eastend Reservoir in NW<sup>1</sup>/<sub>4</sub> sec.25, T.6, R.22 W., third meridian, on right bank for irrigation of about 3,100 acres in the Frenchman River basin in Saskatchewan. Water Survey of Canada satellite telemeter at station.

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

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 91 ft<sup>3</sup>/s, May 18, 1993; no flow at times each season.

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 2003  
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			0.00	0.00	0.00	77	0.00	0.00	0.00	0.00		
2			0.00	0.00	0.00	72	0.00	0.00	0.00	0.00		
3			0.00	0.00	0.00	65	0.00	0.00	0.00	0.00		
4			0.00	0.00	0.00	60	0.00	0.00	0.00	0.00		
5			0.00	0.00	0.00	59	0.00	0.00	0.00	0.00		
6			0.00	0.00	0.00	48	0.00	0.00	0.00	0.00		
7			0.00	0.00	0.00	34	0.00	0.00	0.00	0.00		
8			0.00	0.00	0.00	28	0.00	0.00	0.00	0.00		
9			0.00	0.00	0.00	20	0.00	0.00	0.00	0.00		
10			0.00	0.00	0.00	4.9	0.00	0.00	0.00	0.00		
11			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
12			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
13			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
14			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
15			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
16			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
17			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
18			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
19			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
20			0.00	0.00	59	0.00	0.00	0.00	0.00	0.00		
21			0.00	0.00	89	0.00	42	0.00	0.00	0.00		
22			0.00	0.00	88	0.00	65	0.00	0.00	0.00		
23			0.00	0.00	87	0.00	69	0.00	0.00	0.00		
24			0.00	0.00	85	0.00	69	0.00	0.00	0.00		
25			0.00	0.00	83	0.00	74	0.00	0.00	0.00		
26			0.00	0.00	81	0.00	74	0.00	0.00	0.00		
27			0.00	0.00	79	0.00	71	0.00	0.00	0.00		
28			0.00	0.00	78	0.00	66	0.00	0.00	0.00		
29			0.00	0.00	75	0.00	46	0.00	0.00	0.00		
30			0.00	0.00	77	0.00	17	0.00	0.00	0.00		
31			0.00	---	77	---	0.64	0.00	---	0.00		
TOTAL			0.00	0.00	958.00	467.90	593.64	0.00	0.00	0.00		
MEAN			0.000	0.000	30.9	15.6	19.1	0.000	0.000	0.000		
MAX			0.00	0.00	89	77	74	0.00	0.00	0.00		
MIN			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
AC-FT			0.00	0.00	1900	928	1180	0.00	0.00	0.00		

MILK RIVER BASIN

06161300 HUFF LAKE PUMPING CANAL NEAR VAL MARIE, SASKATCHEWAN

(International gaging station)

LOCATION.--Lat 49°22'20", long 107°53'05" (NAD 27), in NW<sup>1</sup>/<sub>4</sub> sec.7, T.5, R.14 W., third meridian, Hydrologic Unit 10050013, on right bank 50 ft downstream from pump discharge outlet, and 11 mi northwest of Val Marie.

PERIOD OF RECORD.--March 1963 to current season (seasonal records only). Published as Val Marie West Pumping Canal near Val Marie, Saskatchewan, March 1963 to October 1980. July 1950 to current season in reports of Department of the Environment, Canada.

GAGE.--Water-stage recorder. Prior to 1956 and subsequent to 1960, records obtained from occasional discharge measurements and records of pump operation.

REMARKS.--Records fair. Canal diverts water from Huff Lake in NW<sup>1</sup>/<sub>4</sub> sec.7, T.5, R.14 W., third meridian, on left bank for irrigation of about 2,100 acres 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.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 31 ft<sup>3</sup>/s, May 30 to June 2, 7-10, 1975, May 5, 6, 7, 9, 1977; no flow at times each season.

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 2003  
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			0.00	0.00	0.00	22	0.00	25	0.00	0.00		
2			0.00	0.00	0.00	22	0.00	25	0.00	0.00		
3			0.00	0.00	0.00	23	0.00	25	0.00	0.00		
4			0.00	0.00	0.00	23	0.00	24	0.00	0.00		
5			0.00	0.00	0.00	10	0.00	23	0.00	0.00		
6			0.00	0.00	0.00	0.00	0.00	24	0.00	0.00		
7			0.00	0.00	0.00	11	0.00	22	0.00	0.00		
8			0.00	0.00	0.00	5.7	0.00	13	0.00	0.00		
9			0.00	0.00	0.00	0.00	0.00	2.9	0.00	0.00		
10			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
11			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
12			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
13			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
14			0.00	0.00	18	0.00	0.00	0.00	0.00	0.00		
15			0.00	0.00	21	0.00	0.00	0.00	0.00	0.00		
16			0.00	0.00	21	0.00	0.00	0.00	0.00	0.00		
17			0.00	0.00	23	0.00	0.00	0.00	0.00	0.00		
18			0.00	0.00	22	0.00	0.00	0.00	0.00	0.00		
19			0.00	0.00	23	0.00	0.00	0.00	0.00	0.00		
20			0.00	0.00	23	0.00	0.00	0.00	0.00	0.00		
21			0.00	0.00	23	0.00	19	0.00	0.00	0.00		
22			0.00	0.00	23	0.00	25	0.00	0.00	0.00		
23			0.00	0.00	23	0.00	25	0.00	0.00	0.00		
24			0.00	0.00	23	0.00	25	0.00	0.00	0.00		
25			0.00	0.00	22	0.00	25	0.00	0.00	0.00		
26			0.00	0.00	21	0.00	25	0.00	0.00	0.00		
27			0.00	0.00	22	0.00	26	0.00	0.00	0.00		
28			0.00	0.00	22	0.00	26	0.00	0.00	0.00		
29			0.00	0.00	16	0.00	26	0.00	0.00	0.00		
30			0.00	0.00	22	0.00	25	0.00	0.00	0.00		
31			0.00	---	21	---	25	0.00	---	0.00		
TOTAL			0.00	0.00	389.00	116.70	272.00	183.90	0.00	0.00		
MEAN			0.000	0.000	12.5	3.89	8.77	5.93	0.000	0.000		
MAX			0.00	0.00	23	23	26	25	0.00	0.00		
MIN			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
AC-FT			0.00	0.00	772	231	540	365	0.00	0.00		

MILK RIVER BASIN

06161500 HUFF LAKE GRAVITY CANAL NEAR VAL MARIE, SASKATCHEWAN

(International gaging station)

LOCATION.--Lat 49°22'10", long 107°53'06" (NAD 27), in SW<sup>1</sup>/<sub>4</sub>, sec. 7, T. 5, R.14 W., third meridian, Hydrologic Unit 10050013, on right bank 100 ft downstream from Huff Lake headgate and 11 mi northwest of Val Marie.

PERIOD OF RECORD.--March 1946 to current season (seasonal records only). Published as Val MarieWest Gravity Canal near Val Marie, Saskatchewan, March 1946 to October 1980. Monthly figures only prior to March 1947, published in WSP 1309.

GAGE.--Water-stage recorder. Elevation of gage is 2,662.88 ft (Canadian Geodetic Vertical Datum 1928). Prior to Sept. 27, 1949, at site 0.5 mi downstream at different datum.

REMARKS.--Records fair. Canal diverts water from Huff Lake in SW<sup>1</sup>/<sub>4</sub>, sec. 7, T. 5, R.14 W., third meridian, on left bank for irrigation of about 1,900 acres in the Frenchman River basin in Saskatchewan. Since 1962, records have been based on gate openings in Huff Lake Dam.

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

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 68 ft<sup>3</sup>/s, July 24, 1996; no flow at times each season.

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 2003  
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			0.00	0.00	0.00	20	0.00	32	0.00	0.00		
2			0.00	0.00	0.00	26	0.00	26	0.00	0.00		
3			0.00	0.00	0.00	36	0.00	22	0.00	0.00		
4			0.00	0.00	0.00	34	0.00	20	0.00	0.00		
5			0.00	0.00	0.00	30	0.00	17	0.00	0.00		
6			0.00	0.00	0.00	29	0.00	e14	0.00	0.00		
7			0.00	0.00	0.00	25	0.00	e7.1	0.00	0.00		
8			0.00	0.00	0.00	17	0.00	e0.00	0.00	0.00		
9			0.00	0.00	0.00	14	0.00	e0.00	0.00	0.00		
10			0.00	0.00	0.00	7.9	0.00	e0.00	0.00	0.00		
11			0.00	0.00	0.00	0.00	0.00	e0.00	0.00	0.00		
12			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
13			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
14			0.00	0.00	30	0.00	0.00	0.00	0.00	0.00		
15			0.00	0.00	32	0.00	0.00	0.00	0.00	0.00		
16			0.00	0.00	26	0.00	0.00	0.00	0.00	0.00		
17			0.00	0.00	26	0.00	0.00	0.00	0.00	0.00		
18			0.00	0.00	30	0.00	0.00	0.00	0.00	0.00		
19			0.00	0.00	40	0.00	0.00	0.00	0.00	0.00		
20			0.00	0.00	28	0.00	0.00	0.00	0.00	0.00		
21			0.00	0.00	36	0.00	32	0.00	0.00	0.00		
22			0.00	0.00	39	0.00	44	0.00	0.00	0.00		
23			0.00	0.00	41	0.00	44	0.00	0.00	0.00		
24			0.00	0.00	42	0.00	37	0.00	0.00	0.00		
25			0.00	0.00	36	0.00	32	0.00	0.00	0.00		
26			0.00	0.00	32	0.00	34	0.00	0.00	0.00		
27			0.00	0.00	37	0.00	32	0.00	0.00	0.00		
28			0.00	0.00	43	0.00	32	0.00	0.00	0.00		
29			0.00	0.00	36	0.00	38	0.00	0.00	0.00		
30			0.00	0.00	26	0.00	39	0.00	0.00	0.00		
31			0.00	---	19	---	36	0.00	---	0.00		
TOTAL			0.00	0.00	599.00	238.90	400.00	138.10	0.00	0.00		
MEAN			0.000	0.000	19.3	7.96	12.9	4.45	0.000	0.000		
MAX			0.00	0.00	43	36	44	32	0.00	0.00		
MIN			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
AC-FT			0.00	0.00	1190	474	793	274	0.00	0.00		

e--Estimated.

## MILK RIVER BASIN

## 06162500 NEWTON LAKE MAIN CANAL NEAR VAL MARIE, SASKATCHEWAN

(International gaging station)

LOCATION.--Lat 49°18'18", long 107°48'05" (NAD 27), in NE<sup>1</sup>/<sub>4</sub> sec.15, T.4, R.14 W., third meridian, Hydrologic Unit 10050013, on right bank about 500 ft downstream from Newton Lake headgate, and 5.4 mi northwest of Val Marie.

PERIOD OF RECORD.--April 1937 to current season (seasonal records only). Published as Val Marie Main Canal near Val Marie, Saskatchewan, March 1962 to October 1980. 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. Elevation of gage is 2,622.03 ft (Canadian Geodetic Vertical Datum 1928). Prior to May 21, 1963, at several sites within 2 mi of present site at different elevations.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Canal diverts water from Newton Lake in SE<sup>1</sup>/<sub>4</sub> sec.22, T.4, R.14 W., third meridian, on left bank for irrigation of about 4,700 acres 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.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 131 ft<sup>3</sup>/s, May 23, 1997; no flow at times each season.

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 2003  
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			0.00	0.00	0.00	66	0.00	56	0.00	0.00		
2			0.00	0.00	0.00	48	0.00	35	0.00	0.00		
3			0.00	0.00	0.00	48	0.00	15	0.00	0.00		
4			0.00	0.00	0.00	47	0.00	8.1	0.00	0.00		
5			0.00	0.00	0.00	31	0.00	9.5	0.00	0.00		
6			0.00	0.00	0.00	6.0	0.00	11	0.00	0.00		
7			0.00	0.00	0.00	0.00	0.00	3.6	0.00	0.00		
8			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
9			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
10			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
11			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
12			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
13			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
14			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
15			0.00	0.00	0.64	0.00	0.00	0.00	0.00	0.00		
16			0.00	0.00	64	0.00	e71	0.00	0.00	0.00		
17			0.00	0.00	96	0.00	e88	0.00	0.00	0.00		
18			0.00	0.00	96	0.00	e83	0.00	0.00	0.00		
19			0.00	0.00	105	0.00	e97	0.00	0.00	0.00		
20			0.00	0.00	115	0.00	e100	0.00	0.00	0.00		
21			0.00	0.00	119	0.00	e98	0.00	0.00	0.00		
22			0.00	0.00	113	0.00	94	0.00	0.00	0.00		
23			0.00	0.00	105	0.00	92	0.00	0.00	0.00		
24			0.00	0.00	105	0.00	90	0.00	0.00	0.00		
25			0.00	0.00	105	0.00	89	0.00	0.00	0.00		
26			0.00	0.00	103	0.00	88	0.00	0.00	0.00		
27			0.00	0.00	101	0.00	89	0.00	0.00	0.00		
28			0.00	0.00	98	0.00	88	0.00	0.00	0.00		
29			0.00	0.00	90	0.00	97	0.00	0.00	0.00		
30			0.00	0.00	77	0.00	91	0.00	0.00	0.00		
31			0.00	---	66	---	79	0.00	---	0.00		
TOTAL			0.00	0.00	1558.64	246.00	1434.00	138.20	0.00	0.00		
MEAN			0.000	0.000	50.3	8.20	46.3	4.46	0.000	0.000		
MAX			0.00	0.00	119	66	100	56	0.00	0.00		
MIN			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
AC-FT			0.00	0.00	3090	488	2840	274	0.00	0.00		

e--Estimated.



MILK RIVER BASIN

06164000 FRENCHMAN RIVER AT INTERNATIONAL BOUNDARY

(International gaging station)

LOCATION.--Lat 49°00'00", long 107°18'06" (NAD 27), in SE<sup>1</sup>/<sub>4</sub> sec.5, T.1, R.10 W., third meridian, in Saskatchewan, Hydrologic Unit 10050013, on left bank 50 ft north of international boundary, 22 mi northeast of Whitewater, MT, and at river mile 76.4.

DRAINAGE AREA.--2,120 mi<sup>2</sup>, of which 343 mi<sup>2</sup> probably is noncontributing.

PERIOD OF RECORD.--April 1917 to current season (seasonal records only for most years).

REVISED RECORDS.--WSP 1389: 1938(M), 1939-41, 1942(M), 1943, 1950(M). W 1983: Drainage area.

GAGE.--Water-stage recorder and concrete control since August 1949. Elevation of gage is 2,420 ft (NGVD 29). Prior to June 23, 1937, water-stage recorder at site 0.5 mi upstream at different elevation. June 23, 1937, to October 1952, water-stage recorder at site 100 ft downstream at present elevation.

REMARKS.--Seasonal records fair. Natural flow of stream affected by several storage reservoirs, diversions for irrigation of about 14,500 acres, and return flow from irrigated areas. Water may be diverted into or from Battle Creek basin through Cypress Lake. Water Survey of Canada satellite telemeter at station. Several observations of water temperature and specific conductance were made during the year.

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

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 2003  
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			e3.5	319	62	42	0.81	19	0.00	0.00		
2			e3.5	262	57	44	0.78	17	0.00	0.00		
3			e3.5	142	56	41	0.74	28	0.00	0.00		
4			e5.3	102	55	37	0.71	23	0.00	0.00		
5			e7.1	121	69	35	0.49	19	0.00	0.00		
6			e7.1	132	115	32	0.32	17	0.00	0.00		
7			e3.5	197	158	31	0.25	13	0.00	0.00		
8			e1.8	228	175	31	0.18	8.0	0.00	0.00		
9			e1.8	243	151	30	0.18	5.5	0.00	0.00		
10			e3.5	240	141	24	0.14	3.0	0.00	0.00		
11			e3.5	190	150	17	0.11	1.5	0.00	0.00		
12			e5.3	187	142	13	0.11	0.92	0.00	0.00		
13			e8.8	178	137	12	19	0.67	0.00	0.00		
14			e18	100	133	12	65	0.46	0.00	0.00		
15			e26	61	121	11	46	0.32	0.00	0.00		
16			e177	53	80	9.3	38	0.21	0.00	0.00		
17			e883	63	47	7.5	32	0.14	0.00	0.00		
18			1460	77	29	6.0	31	0.11	0.00	0.00		
19			1320	91	22	3.7	32	0.07	0.00	0.00		
20			1270	144	40	3.4	24	0.07	0.00	0.00		
21			1350	178	42	3.4	17	0.07	0.00	0.00		
22			1130	190	45	3.2	14	0.04	0.00	0.00		
23			1160	190	48	3.2	13	0.04	0.00	0.00		
24			1080	188	65	3.2	10	0.04	0.00	0.00		
25			667	187	56	3.0	9.5	0.04	0.00	0.00		
26			643	185	52	2.8	14	0.04	0.00	0.00		
27			713	108	41	2.6	22	0.00	0.00	0.00		
28			791	76	40	2.4	17	0.00	0.00	0.00		
29			795	73	39	1.5	12	0.00	0.00	0.00		
30			727	72	39	0.99	20	0.00	0.00	0.00		
31			441	---	39	---	20	0.00	---	4.8		
TOTAL			14709.2	4577	2446	468.19	460.32	157.24	0.00	4.80		
MEAN			474	153	78.9	15.6	14.8	5.07	0.000	0.15		
MAX			1460	319	175	44	65	28	0.00	4.8		
MIN			1.8	53	22	0.99	0.11	0.00	0.00	0.00		
AC-FT			29180	9080	4850	929	913	312	0.00	9.5		

STATISTICS OF MONTHLY MEAN DATA FOR SEASONS 1917 - 2003\*

MEAN	181	402	138	84.7	53.0	17.1	7.21	10.4
MAX	1490	5313	1051	886	602	199	65.9	77.7
(WY)	1997	1952	1927	1923	1955	2002	1951	1966
MIN	0.000	0.35	2.54	0.39	0.021	0.000	0.000	0.000
(WY)	2002	2000	1937	1937	1984	1934	1919	1932

SUMMARY STATISTICS

FOR 2003 SEASON

SEASONS 1917 - 2003\*

HIGHEST DAILY MEAN	1460	Mar 18	19200	Apr 15 1952
LOWEST DAILY MEAN	0.00	Aug 27	0.00	Jul 28 1919
MAXIMUM PEAK FLOW	1550	Mar 18	a22700	Apr 15 1952
MAXIMUM PEAK STAGE	9.85	Mar 18	b19.90	Apr 15 1952

\*--Seasonal record most years.

a--From rating curve extended above 2,300 ft<sup>3</sup>/s on basis of slope-area measurement of peak flow.

b--From floodmark.

e--Estimated.

## MILK RIVER BASIN

## RESERVOIRS IN FRENCHMAN RIVER BASIN IN SASKATCHEWAN

(International gaging stations)

All elevations listed for the following reservoirs are referenced to the National Geodetic Vertical Datum of 1929.

06157000 CYPRESS LAKE.--Lat 49°27'30", long 109°30'25" (NAD 27), in SE<sup>1</sup>/<sub>4</sub> sec.12, T.6, R.27 W., third meridian, Hydrologic Unit 10050013, on south shore, and 12 mi north of Consul. DRAINAGE AREA, 107 mi<sup>2</sup>. 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. Elevation of gage is at mean sea level (Geodetic Survey of Canada 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, elevation obtained from average of nonrecording gage readings at west and east dams. Apr. 29, 1955, to Aug. 21, 1984, gage located at east dam. REMARKS, This is an offstream reservoir formed by two earthfill dams on a natural lake of the same name which is the head of the Frenchman River. There are concrete control works at both dams. The following capacity figures are from capacity table effective January 1971; see previous reports for superseded figures. Usable capacity, 79,500 acre-ft between elevation 3,187.0 ft, bottom of west outlet works, and 3,201.9 ft, maximum design level. Dead storage, 24,300 acre-ft. Water is diverted from Battle Creek on west, 12 mi northwest of Consul, and from Belanger Creek, in the Frenchman River basin, on the east, 12 mi north of Vidora. Water is released to the same streams for irrigation. Figures given herein represent total contents. Water Survey of Canada satellite telemeter at station. This is one of a number of stations which are maintained jointly by Canada and the United States. REVISED RECORDS, W 1983: Drainage area.

EXTREMES FOR PERIOD OF RECORD: Maximum contents, 117,300 acre-ft, Apr. 21, 1955, elevation, 3,203.36 ft; minimum observed since first filling, 8,190 acre-ft, Nov. 17, 1992, elevation, 3,183.17 ft.

EXTREMES FOR CURRENT SEASON: Maximum contents, 28,260 acre-ft, May 4, elevation, 3,187.84 ft; minimum, 14,180 acre-ft, Oct. 23, elevation, 3,184.68 ft.

06159000 EASTEND RESERVOIR.--Lat 49°30'26", long 108°51'08" (NAD 27), in NW<sup>1</sup>/<sub>4</sub> sec.25, T.6, R.22 W., third meridian Hydrologic Unit 10050013, at dam on Frenchman River, 1.6 mi west of Eastend, and at mile 300.5. DRAINAGE AREA, 619 mi<sup>2</sup>. 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 February 1937 to July 1979. Water-stage recorder. Elevation of gage is at mean sea level (Geodetic Survey of Canada datum). REMARKS, 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. The following capacity figures are from capacity table effective September 1982. Usable capacity, 1,690 acre-ft between elevation 2,993.5 ft, bottom of outlet works, and 3,012.0 ft, maximum design level. No dead storage. Water is used for irrigation. Water Survey of Canada satellite telemeter at station. This is one of a number of stations which are maintained jointly by Canada and the United States. REVISED RECORDS (SEASONS), WSP 1309: 1948(M). WSP 1729: Drainage area. WSP 2116: 1937-65. W 1983: Drainage area.

EXTREMES FOR PERIOD OF RECORD: Maximum contents, about 3,700 acre-ft, Apr. 15, 1952, elevation, about 3,015 ft, dam overtopped; no contents at times.

EXTREMES FOR CURRENT SEASON: Maximum contents, 2,370 acre-ft, May 7, elevation, 3,013.66 ft; minimum, 395 acre-ft, Sept. 11, elevation, 3,007.07 ft.

06162000 HUFF LAKE.--Lat 49°22'16", long 107°53'07" (NAD 27), in SW<sup>1</sup>/<sub>4</sub> sec.7, T.5, R.14 W., third meridian, Hydrologic Unit 10050013, near dam on Frenchman River, 11 mi northwest of Val Marie, and at mile 169.7. DRAINAGE AREA, 1,274 mi<sup>2</sup>. PERIOD OF RECORD, February 1940 to current season (seasonal records only). February 1940 to October 1979, published as Val Marie West Reservoir. 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. Elevation of gage is at mean sea level (Geodetic Survey of Canada datum). May 1952 to May 1954, reference point on control structure. May 1954 to May 10, 1966, nonrecording gages. May 11, 1966, to Oct. 31, 1979, recording gage on riparian gateway. REMARKS, Reservoir is formed by earthfill dam with concrete control works completed in 1939. The following capacity figures are from capacity table effective February 1983. Usable capacity, 3,610 acre-ft between elevation 2,663.2 ft, bottom of outlet works, and 2,676.5 ft, maximum design level. Dead storage, 11 acre-ft. Water is used for irrigation. Figures given herein represent total contents. Water Survey of Canada satellite telemeter at station. This is one of a number of stations which are maintained jointly by Canada and the United States. REVISED RECORDS (SEASONS), WSP 1309: 1947-50.

EXTREMES FOR PERIOD OF RECORD: Maximum contents, 5,160 acre-ft, Mar. 26, 1997, elevation, 2,678.91 ft; no contents Feb. 28, Mar. 31, 1950, Oct. 22-31, 1984, Mar. 1-7, Aug. 6 to Sept. 14, 1985 and Feb. 28 to Apr. 11, 2002.

EXTREMES FOR CURRENT SEASON: Maximum contents, 4,010 acre-ft, Mar. 23, elevation, 2,677.10 ft; minimum, 265 acre-ft, Sept. 26, elevation, 2,666.60 ft.

06163000 NEWTON LAKE.--Lat 49°18'12", long 107°48'20" (NAD 27), in NE<sup>1</sup>/<sub>4</sub> sec.15, T.4, R.14 W., third meridian, Hydrologic Unit 10050013, at dam on Frenchman River, 5.4 mi northwest of Val Marie, and at mile 156.2. DRAINAGE AREA, 1,349 mi<sup>2</sup>. PERIOD OF RECORD, February 1937 to current season (seasonal records only). February 1937 to October 1979, published as Val Marie Reservoir. Water-stage recorder. Elevation of gage is at mean sea level (Geodetic Survey of Canada datum). Prior to May 11, 1966, nonrecording gages. REMARKS, Reservoir is formed by earthfill dam with concrete control works; construction began in 1936; storage began in 1937; construction completed in 1938. The following capacity figures are from capacity table effective February 1983. Usable capacity, 9,950 acre-ft between elevation 2,616.1 ft, bottom of outlet works, and 2,635.4 ft maximum design level. No dead storage. Water is used for irrigation. Water Survey of Canada satellite telemeter at station. This is one of a number of stations which are maintained jointly by Canada and the United States. REVISED RECORDS (SEASONS), WSP 2116: 1937-65. WSP 1729: 1949.

EXTREMES FOR PERIOD OF RECORD: Maximum contents observed, 18,920 acre-ft, Apr. 19, 1952, elevation, 2,638.80 ft; no contents at times.

EXTREMES FOR CURRENT SEASON: Maximum contents, 12,750 acre-ft, Mar. 20, elevation, 2,637.19 ft; minimum, 3,130 acre-ft, Oct. 31, elevation, 2,629.08 ft.

## RESERVOIRS IN FRENCHMAN RIVER BASIN IN SASKATCHEWAN--Continued

SEASONAL MONTHEND CONTENTS, IN ACRE-FEET, FEBRUARY 2003 TO OCTOBER 2003

Date	Cypress Lake	Eastend Reservoir	Huff Lake	Newton Lake
Feb. 28	18,670	486	3,360	10,960
Mar. 31	24,390	1,780	3,350	10,420
Apr. 30	27,370	2,320	3,660	10,830
May 31	23,860	1,070	2,710	8,790
June 30	22,940	1,490	2,960	8,630
July 31	20,130	469	1,120	4,620
Aug. 31	18,120	419	298	4,110
Sept. 30	17,460	465	278	3,900
Oct. 31	17,140	480	572	3,130

MILK RIVER BASIN

06164510 MILK RIVER AT JUNEBOG BRIDGE, NEAR SACO, MT

LOCATION.--Lat 48°30'32", long 107°13'02" (NAD 27), in NE<sup>1</sup>/<sub>4</sub>NE<sup>1</sup>/<sub>4</sub> sec.30, T.32 N., R.35 E., Phillips County, Hydrologic Unit 10050014, on left bank 25 ft upstream from Juneberg bridge on Phillips County road, 1.5 mi downstream from Frenchman River, 6.9 mi northeast of Saco, and at river mile 152.3.

DRAINAGE AREA.--17,670 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1977 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 2,130 ft (NGVD 29).

REMARKS.--Records good except those for estimated daily discharges, which are poor. Flow increased during irrigation season by water from St. Mary Canal which diverts from the St. Mary River near Babb (station number 05017500). Flow regulated by Fresno Reservoir (station number 06136500), two reservoirs in Lodge Creek basin in Saskatchewan (station numbers 06144260 and 06144360 and four reservoirs in Frenchman River basin in Saskatchewan. There are many small dams for the diversion of irrigation canals upstream. U. S. Army Corps of Engineers satellite telemeter at station. Several observations of water temperature and specific conductance were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	140	90	e90	e90	e100	e100	1180	173	153	140	268	109
2	144	90	e90	e90	e90	e90	910	158	164	275	267	126
3	144	90	e70	e100	e80	e90	688	156	170	265	265	132
4	143	91	e70	e100	e80	e90	483	136	227	268	279	142
5	125	90	e70	e100	e80	e120	306	157	180	268	275	139
6	113	90	e90	e100	e80	e100	242	204	155	282	289	113
7	101	89	e90	e100	e80	e70	219	362	185	267	305	82
8	109	88	e90	e100	e80	e70	234	441	207	351	289	74
9	100	e70	e90	e80	e80	e70	293	606	199	411	253	62
10	98	e70	e90	e80	e80	e70	551	519	187	407	245	55
11	98	e80	e100	e70	e90	e80	502	433	178	340	232	54
12	100	e80	e120	e70	e90	e90	336	364	167	345	212	53
13	97	e100	e120	e70	e90	e100	264	357	151	194	174	44
14	97	e100	e120	e70	e80	e130	242	336	155	181	178	43
15	94	e100	e120	e70	e80	e130	240	323	169	245	186	43
16	93	e100	e120	e70	e80	e130	217	344	205	325	220	52
17	89	e100	e90	e80	e90	e600	173	377	224	338	222	55
18	89	e100	e90	e80	e100	e1100	160	423	246	252	213	53
19	91	e100	e90	e90	e100	e2000	156	374	246	217	205	53
20	91	e100	e70	e90	e90	e2500	158	283	232	207	202	57
21	93	e100	e70	e80	e80	e3000	165	239	214	209	187	59
22	94	e100	e70	e70	e70	e2700	172	224	196	263	166	57
23	91	e80	e70	e70	e70	e2500	194	206	183	304	147	55
24	91	e80	e70	e70	e70	e2200	224	185	180	385	148	53
25	91	e80	e70	e70	e70	e2100	231	168	200	329	157	52
26	90	e80	e70	e80	e100	e2000	239	152	236	335	160	51
27	89	e90	e70	e90	e100	1900	291	144	230	335	158	51
28	92	e90	e80	e100	e100	1590	292	138	172	345	160	50
29	93	e90	e90	e100	---	1520	256	128	138	338	168	51
30	84	e90	e80	e100	---	1430	208	123	126	282	114	51
31	93	---	e80	e100	---	1370	---	140	---	276	96	---
TOTAL	3157	2698	2700	2630	2380	30040	9826	8373	5675	8979	6440	2071
MEAN	102	89.9	87.1	84.8	85.0	969	328	270	189	290	208	69.0
MAX	144	100	120	100	100	3000	1180	606	246	411	305	142
MIN	84	70	70	70	70	70	156	123	126	140	96	43
AC-FT	6260	5350	5360	5220	4720	59580	19490	16610	11260	17810	12770	4110

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1978 - 2003, BY WATER YEAR (WY)

	289	152	120	118	219	1010	760	462	473	418	238	236
MEAN	289	152	120	118	219	1010	760	462	473	418	238	236
MAX	4043	597	406	271	1758	4075	6221	2545	2258	1844	693	1517
(WY)	1987	1987	1987	1987	1996	1979	1978	1986	1982	1991	1993	1986
MIN	24.9	60.1	44.8	33.1	49.1	47.4	38.4	56.4	103	29.6	9.35	22.7
(WY)	2002	1978	1986	1985	2002	2002	2002	1989	2001	1984	1984	1984

SUMMARY STATISTICS FOR 2002 CALENDAR YEAR FOR 2003 WATER YEAR WATER YEARS 1978 - 2003

ANNUAL TOTAL	65155	84969	
ANNUAL MEAN	179	233	375*
HIGHEST ANNUAL MEAN			1042 1978
LOWEST ANNUAL MEAN			70.1 2001
HIGHEST DAILY MEAN	1610	Jun 27	3000 Mar 21 12300 Apr 3 1978
LOWEST DAILY MEAN	22	May 11	43 Sep 14 2.1 Aug 20 1984
ANNUAL SEVEN-DAY MINIMUM	25	Apr 25	49 Sep 12 4.0 Jul 27 1984
MAXIMUM PEAK FLOW			a3000 Mar 21 c12400 Apr 3 1978
MAXIMUM PEAK STAGE			b13.10 Mar 21 b26.70 Mar 4 1986
ANNUAL RUNOFF (AC-FT)	129200	168500	271900
10 PERCENT EXCEEDS	324	345	693
50 PERCENT EXCEEDS	90	120	150
90 PERCENT EXCEEDS	42	70	50

\*--Median of yearly mean discharge 221 ft<sup>3</sup>/s.  
a--About.  
b--Backwater from ice.  
c--Gage height, 24.20 ft.  
e--Estimated.

MILK RIVER BASIN

06166000 BEAVER CREEK BELOW GUSTON COULEE, NEAR SACO, MT

LOCATION.--Lat 48°21'25", long 107°34'48" (NAD 27), in SE<sup>1</sup>/<sub>4</sub>SW<sup>1</sup>/<sub>4</sub>NW<sup>1</sup>/<sub>4</sub> sec. 16, T.30 N., R.32 E., Phillips County, Hydrologic Unit 10050014, on right bank, 25 ft upstream from bridge on county road, 13 mi southwest of Saco, 22.5 river miles downstream from Guston Coulee, and at mile 61.1.

DRAINAGE AREA. --1,208 mi<sup>2</sup>.

PERIOD OF RECORD.--April 1920 to September 1921, April 1981 to current year (seasonal records only).

GAGE.--Water-stage recorder. Elevation of gage is 2,215 ft (NGVD 29).

REMARKS.--Seasonal records fair. Some regulation by numerous small reservoirs on tributary streams. Diversions for irrigation upstream from gage. U.S. Geological Survey satellite telemetry at station. Several observations of water temperature and specific conductance were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 2003  
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			e0.00	12	3.7	2.2	0.38	1.1	0.00	0.0		
2			e0.00	25	2.7	22	0.28	0.64	0.00	0.0		
3			e0.00	17	3.4	28	0.16	0.45	0.00	0.00		
4			e0.00	6.5	6.6	26	0.06	0.39	0.00	0.00		
5			e0.00	4.6	33	24	0.01	0.40	0.00	0.00		
6			e0.00	3.3	39	20	0.00	0.45	0.00	0.00		
7			e0.00	2.4	38	15	0.00	0.59	0.00	0.00		
8			e0.00	1.8	46	8.8	0.63	0.75	0.00	0.00		
9			e0.00	1.5	38	14	6.7	1.7	0.00	0.00		
10			e0.00	1.3	79	28	5.8	8.3	0.00	0.00		
11			e0.00	1.6	84	16	5.3	11	0.00	0.00		
12			e0.00	3.3	93	7.9	6.2	11	0.00	0.00		
13			e0.00	4.2	154	5.2	11	6.3	0.00	0.00		
14			e0.00	4.1	150	4.6	11	4.4	0.00	0.00		
15			e1.0	4.3	108	5.9	8.1	4.8	0.00	0.00		
16		e10		3.3	90	9.4	5.7	2.1	0.00	0.00		
17		e50		2.8	73	12	2.1	2.1	0.00	0.00		
18		e100		2.9	56	7.0	1.2	1.4	0.00	0.00		
19		e200		2.7	52	5.4	3.9	1.2	0.00	0.00		
20		e300		2.1	45	6.7	24	1.3	0.00	0.00		
21		e250		1.6	39	5.2	18	1.2	0.00	0.00		
22		e200		1.2	30	3.0	3.7	0.98	0.00	0.00		
23		139		1.1	34	2.2	2.2	0.67	0.00	0.00		
24		105		4.3	33	2.7	13	0.51	0.00	0.00		
25		82		9.1	16	2.0	14	0.46	0.00	0.00		
26		58		15	13	1.1	15	0.42	0.00	0.00		
27		39		26	9.7	0.83	15	0.30	0.00	0.00		
28		25		25	8.0	0.65	8.5	0.17	0.00	0.00		
29		12		13	0.11	0.49	4.4	0.00	0.00	0.00		
30		14		8.4	0.00	0.43	2.9	0.00	0.0	0.00		
31		e10		---	0.00	---	1.8	0.00	---	0.00		
TOTAL			1595.00	211.4	1377.21	286.70	191.02	65.08	0.00	0.00		
MEAN			51.5	7.05	44.4	9.56	6.16	2.10	0.000	0.000		
MAX			300	26	154	28	24	11	0.00	0.00		
MIN			0.00	1.1	0.00	0.43	0.00	0.00	0.00	0.00		
AC-FT			3160	419	2730	569	379	129	0.00	0.00		

STATISTICS OF MONTHLY MEAN DATA FOR SEASONS 1981 - 2003\*

MEAN	53.6	20.2	60.2	35.9	46.1	7.44	61.2	22.9
MAX	204	140	718	315	223	40.7	1187	342
(WY)	1986	1987	1986	1982	1998	1993	1986	1987
MIN	0.000	0.000	0.000	0.000	0.021	0.000	0.000	0.000
(WY)	1995	1995	1984	2001	1985	2001	1984	1985

SUMMARY STATISTICS

FOR 2003 SEASON

SEASONS 1981 - 2003\*

HIGHEST DAILY MEAN	300	Mar 20	11900	Sep 27 1986
LOWEST DAILY MEAN	0.00	Mar 1	a0.00	Apr 5 1981
MAXIMUM PEAK FLOW	unknown		b23500	Sep 26 1986
MAXIMUM PEAK STAGE	7.14	Mar 20	14.68	Sep 26 1986

\*--During period of operation (1981 to current year).  
a--No flow at time each year.  
b--From slope-area measurement of peak flow.  
e--Estimated.



MILK RIVER BASIN

06169500 ROCK CREEK BELOW HORSE CREEK, NEAR INTERNATIONAL BOUNDARY--Continued

SUMMARY STATISTICS	FOR 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1956 - 2003*	
ANNUAL TOTAL	2822.24		3512.27			
ANNUAL MEAN	7.73		9.62		14.1**	
HIGHEST ANNUAL MEAN					37.4	1999
LOWEST ANNUAL MEAN					1.88	1998
HIGHEST DAILY MEAN	451	Jun 11	668	Mar 19	3460	Apr 7 1969
LOWEST DAILY MEAN	0.00	Jan 1	0.00	Aug 2	0.00	Mar 1 1957
ANNUAL SEVEN-DAY MINIMUM	0.00	Jan 1	0.00	Aug 11	0.00	Mar 1 1957
MAXIMUM PEAK FLOW			a764	Mar 19	c4420	Apr 7 1969
MAXIMUM PEAK STAGE			b7.87	Mar 17	b13.40	Mar 29 1978
INSTANTANEOUS LOW FLOW					d0.00	Mar 1 1957
ANNUAL RUNOFF (AC-FT)	5600		6970		10250	
10 PERCENT EXCEEDS	9.5		12		14	
50 PERCENT EXCEEDS	1.1		0.70		1.0	
90 PERCENT EXCEEDS	0.00		0.01		0.00	

\*--During period of operation (September 1956 to current year; seasonal records only prior to October 1978.)  
 \*\*--Median of yearly discharge, 9.62 ft<sup>3</sup>/s, 6,970 acre-ft/yr (October 1978 to current year).

- a--Gage height, 6.53 ft.
- b--Backwater from ice.
- c--Gage height, 12.03 ft.
- d--At times most years.
- e--Estimated.

## MILK RIVER BASIN

## 06172310 MILK RIVER AT TAMPICO, MT

LOCATION.--Lat 48°18'29", long 106°49'19" (NAD 27), in SW<sup>1</sup>/<sub>4</sub>SW<sup>1</sup>/<sub>4</sub>SW<sup>1</sup>/<sub>4</sub> sec.32, T.30 N., R.38 E., Valley County, Hydrologic Unit 10050012, on right bank, at county bridge 0.8 miles downstream from Buggy Creek and 0.3 miles northeast of Tampico, and at river mile 98.7.

DRAINAGE AREA.--21,078 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1973 to September 1977, May 1987 to current year (seasonal record beginning 1995 water year).

GAGE.--Water-stage recorder. Elevation of gage is 2,110 ft (NGVD 29).

REMARKS.--Records good except those for Mar. 1 to Sept. 16, which are poor. Flow increased during irrigation season by water from St. Mary Canal which diverts from the St. Mary River near Babb. Flow regulated by Fresno and Nelson Reservoirs, five reservoirs in Lodge Creek basin in Saskatchewan, and four reservoirs in Frenchman River basin in Saskatchewan. Many small dams for the diversion of irrigation canals upstream, the closest being Vandalia Dam 19 mi upstream. Diversions upstream from station for irrigation of about 126,000 acres of which about 17,000 acres lies downstream from station. Several observations of water temperature and specific conductance were made during the year.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Apr. 17, 1952 reached an observed stage of 38.67 ft at gage 200 ft downstream from Vandalia Dam, furnished by the U.S. Army Corps of Engineers; discharge about 45,000 ft<sup>3</sup>/s.

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 2003  
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			e130	1360	215	58	44	92	47	62		
2			e130	1170	194	55	40	95	115	63		
3			e130	965	180	54	37	88	456	64		
4			e120	769	154	52	37	82	354	66		
5			e130	618	144	55	38	83	358	69		
6			e120	503	186	70	37	79	167	69		
7			e100	435	405	76	37	83	141	68		
8			e100	395	972	103	41	87	113	69		
9			e100	390	1040	146	44	96	102	69		
10			e100	431	1080	153	42	97	92	68		
11			e100	637	1260	178	116	90	85	86		
12			e100	677	1490	211	144	89	76	190		
13			e120	548	1010	200	155	83	72	181		
14			e150	440	621	215	103	73	66	168		
15			e160	375	517	183	74	64	60	165		
16			e200	337	556	155	67	59	59	163		
17			e1500	299	540	153	69	58	61	157		
18			e3500	251	592	234	82	56	67	154		
19			e4300	224	557	364	85	58	68	149		
20			e4400	204	464	277	75	60	68	144		
21			4280	186	383	236	68	60	71	139		
22			4420	177	271	207	65	60	75	138		
23			5250	181	234	184	64	58	73	137		
24			4050	214	215	131	65	56	71	134		
25			3040	215	181	103	72	54	66	137		
26			3190	221	150	88	75	52	66	137		
27			2810	234	131	77	83	52	65	139		
28			2180	266	117	69	93	50	63	140		
29			1780	300	103	57	104	49	63	141		
30			1610	262	86	47	102	48	63	153		
31			1490	---	64	---	93	47	---	162		
TOTAL			49790	13284	14112	4191	2251	2158	3303	3781		
MEAN			1606	443	455	140	72.6	69.6	110	122		
MAX			5250	1360	1490	364	155	97	456	190		
MIN			100	177	64	47	37	47	47	62		
AC-FT			98760	26350	27990	8310	4460	4280	6550	7500		

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1974 - 1994, AND SEASONS 1995 - 2003\*

	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	
MEAN	211	178	1050	771	551	568	507	206	168	182	217	152																			
MAX	791	433	3809	3911	4555	1852	2515	769	903	906	710	363																			
(WY)	1974	1974	1994	1996	1975	1974	1991	1993	1993	1994	1976	1976																			
MIN	55.2	49.3	46.6	3.35	6.59	11.7	8.35	4.63	6.52	29.1	90.0	66.9																			
(WY)	1989	1989	2002	1992	2001	1977	1977	1988	1988	2002	1989	1989																			

SUMMARY STATISTICS

FOR 2003 SEASON

SEASONS 1995 - 2003\*

WATER YEARS 1974 - 1994\*

ANNUAL MEAN												400																						
HIGHEST ANNUAL MEAN												998																					1975	
LOWEST ANNUAL MEAN												84.6																					1988	
HIGHEST DAILY MEAN			5250		Mar 23		a11000		Mar 27 1997			8180		May 26 1974																				
LOWEST DAILY MEAN			37		Jul 3		1.8		Jun 7 2002			0.00		Aug 28 1988																				
ANNUAL SEVEN-DAY MINIMUM												0.00		Sep 7 1988																				
MAXIMUM PEAK FLOW			5490		Mar 23		a11000		Mar 27 1997			c8210		May 26 1974																				
MAXIMUM PEAK STAGE			18.20		Mar 23		b27.64		Mar 27 1997			25.40		Jul 4 1991																				
INSTANTANEOUS LOW FLOW												0.00		Aug 28 1988																				
ANNUAL RUNOFF (AC-FT)												308500																						
10 PERCENT EXCEEDS												920																						
50 PERCENT EXCEEDS												128																						
90 PERCENT EXCEEDS												13																						

\*--During period of operation (1974-1977, 1987 to current year. Seasonal records beginning 1995 water year).

a--Estimated daily discharge, ungaged bypass flow.

b--Backwater from ice.

c--Gage height, 23.65 ft.

e--Estimated.



MILK RIVER BASIN

06174500 MILK RIVER AT NASHUA, MT

LOCATION.--Lat 48°07'47", long 106°21'50" (NAD 27), in NE 1/4 NE 1/4 sec.1, T.27 N., R.41 E., Valley County, Hydrologic Unit 10050012, on right bank at downstream side of former highway bridge site, 0.6 mi southwest of Nashua, 2.0 mi upstream from Porcupine Creek, and at river mile 22.7. DRAINAGE AREA.--22,332 mi². PERIOD OF RECORD.--October 1939 to current year.

WATER-DISCHARGE RECORDS

REVISED RECORDS.--WSP 1729: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 2,027.75 ft (NGVD 29).

REMARKS.--Water-discharge records good except those for estimated daily discharges, which are poor. Flow increased during irrigation season by water from St. Mary Canal which diverts from the St. Mary River near Babb. Flow regulated by Fresno Reservoir (station number 06136500), two reservoirs in Lodge Creek basin in Saskatchewan, and four reservoirs in Frenchman River basin in Frenchman River basin in Saskatchewan. Diversions for irrigation of about 140,000 acres upstream from station. U.S. Army Corps of Engineers satellite telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003 DAILY MEAN VALUES

Table with 13 columns (DAY, OCT, NOV, DEC, JAN, FEB, MAR, APR, MAY, JUN, JUL, AUG, SEP) and 32 rows of daily discharge data. Includes summary statistics at the bottom: TOTAL, MEAN, MAX, MIN, AC-FT.

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1940 - 2003, BY WATER YEAR (WY)

Table with 13 columns (MEAN, MAX, (WY), MIN, (WY)) and 13 rows of monthly mean data for water years 1940-2003.

SUMMARY STATISTICS FOR 2002 CALENDAR YEAR FOR 2003 WATER YEAR WATER YEARS 1940 - 2003

Table with 4 columns (Statistic, 2002 Calendar Year, 2003 Water Year, Water Years 1940-2003) and 13 rows of summary statistics including annual total, mean, highest/lowest annual/daily means, and runoff percentages.

\*--Median of yearly discharge, 540 ft³/s. a--Gage height, 12.03 ft, may have been greater during estimated record. b--Backwater from ice. c--Gage height, 1.55 ft. e--Estimated.

MILK RIVER BASIN

06174500 MILK RIVER AT NASHUA, MT--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1950-53, October 1959 to August 1994, May 1999 to current year.

PERIOD OF DAILY RECORD.--

WATER TEMPERATURE (seasonal records): April 2001 to current year.

INSTRUMENTATION.--Temperature recorder installed Mar. 1, 2001.

REMARKS.--Water temperature records rated fair. Missing temperature data for May 17-21, 28 due to equipment problems. Unpublished records of instantaneous water temperature and specific conductance are available in files of District office.

EXTREMES FOR PERIOD OF DAILY RECORD.--

WATER TEMPERATURE (seasonal records): Maximum, 28.5°C, June 24, 2001; maximum may have been higher during period of lost record; minimum, 0.0°C, Apr. 1, 2001, many days in April 2002.

EXTREMES FOR CURRENT YEAR.--

WATER TEMPERATURE: During period of seasonal operation, maximum, 27.0°C, Aug. 13-15; minimum, 1.0°C, Apr. 3 and 5.

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

Date	Time	Instantaneous discharge, cfs (00061)	pH, water, unfltrd field, std units (00400)	Specific conductance, wat unfltrd uS/cm 25 degC (00095)	Temperature, air, deg C (00020)	Temperature, water, deg C (00010)	Ammonia + org-N, water, unfltrd mg/L as N (00625)	Nitrite + nitrate, water, fltrd, mg/L as N (00631)	Nitrite, water, fltrd, mg/L as N (00613)
MAR 2003									
24...	1145	4690	8.0	435	18.0	5.0	4.2	.427	.010
MAY									
05...	1345	258	8.5	893	14.0	13.0	.89	<.022	<.002
JUN									
24...	1320	215	8.5	1580	17.5	21.0	.85	<.022	<.002
AUG									
25...	1415	72	8.6	1130	30.5	22.5	.81	<.022	<.002

Date	Ortho-phosphate, water, fltrd, mg/L as P (00671)	Phosphorus, water, unfltrd mg/L (00665)	Suspnd. sediment, sieve diameter percent <.063mm (70331)	Suspended sediment concentration mg/L (80154)	Suspended sediment load, tons/d (80155)
MAR 2003					
24...	<.007	1.46	98	2210	28000
MAY					
05...	<.007	.121	97	51	36
JUN					
24...	.021	.143	83	136	79
AUG					
25...	.018	.134	89	72	14

Date	Time	Hardness, water, unfltrd mg/L as CaCO3 (00900)	Calcium, water, fltrd, mg/L (00915)	Magnesium, water, fltrd, mg/L (00925)	Potassium, water, fltrd, mg/L (00935)	Sodium adsorption ratio (00931)	Sodium, water, fltrd, mg/L (00930)	Alkalinity, wat flt lab, mg/L as CaCO3 (29801)	Chloride, water, fltrd, mg/L (00940)	Fluoride, water, fltrd, mg/L (00950)	Silica, water, fltrd, mg/L (00955)
MAY 2003											
05...	1345	240	53.5	25.6	8.98	3	102	239	14.9	.26	4.44
AUG											
25...	1415	310	69.5	33.6	8.73	4	149	288	26.3	.4	8.29

Date	Time	Sulfate, water, fltrd, mg/L (00945)	Residue of constituents, mg/L (70301)	Residue water, fltrd, tons/acre-ft (70303)	Residue water, fltrd, tons/d (70302)	Arsenic, water, unfltrd, ug/L (01002)	Cadmium, water, unfltrd, ug/L (01027)	Chromium, water, unfltrd, ug/L (01034)	Copper, water, unfltrd, ug/L (01042)	Lead, water, unfltrd, ug/L (01051)	Nickel, water, unfltrd, ug/L (01067)	Zinc, water, unfltrd, ug/L (01092)
MAY 2003												
05...	245	597	.81	416	E2	<.2	E.7	4.5	1.02	5.87	7	
AUG												
25...	278	747	1.02	145	13	E.02	1.0	4.7	1.32	6.80	6	

E--Estimated.

MILK RIVER BASIN

06174500 MILK RIVER AT NASHUA, MT--Continued

WATER TEMPERATURE, DEGREES CELSIUS, APRIL 2003 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	APRIL			MAY			JUNE			JULY		
1	4.5	4.0	4.5	15.5	13.5	14.5	21.5	19.5	20.0	25.5	23.0	24.0
2	4.0	1.5	3.0	16.5	14.0	15.0	20.5	18.5	19.5	25.5	24.0	24.5
3	3.0	1.0	2.0	18.0	14.5	16.0	20.5	18.5	19.5	25.0	23.5	24.5
4	2.5	1.5	2.0	17.0	15.5	16.0	20.5	18.5	19.0	24.5	23.0	24.0
5	3.5	1.0	2.0	16.0	14.5	15.0	19.0	17.0	18.0	25.5	23.0	24.0
6	3.5	2.0	2.5	14.5	13.0	13.5	18.5	17.0	17.5	24.0	22.5	23.0
7	5.0	2.5	3.5	13.5	12.0	12.5	18.0	16.0	17.0	24.0	22.0	23.0
8	6.5	3.0	4.5	12.5	10.5	11.5	19.5	16.5	18.0	23.0	20.0	22.0
9	8.5	4.5	6.5	10.5	10.0	10.0	19.5	18.0	18.5	22.5	20.0	21.5
10	9.5	7.0	8.5	11.5	9.5	10.5	19.5	18.0	18.5	23.0	22.0	22.5
11	11.0	8.0	9.5	11.0	10.0	10.5	19.0	17.5	18.0	24.5	21.5	23.0
12	12.0	10.0	11.0	12.5	10.5	11.5	20.5	17.5	19.0	25.0	23.0	24.0
13	13.0	11.0	12.0	14.5	12.0	13.0	22.0	19.0	20.5	25.5	23.0	24.5
14	13.0	11.0	12.0	15.5	13.5	14.5	23.5	20.5	22.0	26.0	24.0	25.0
15	12.5	11.5	12.0	16.5	14.5	15.5	23.5	21.5	22.5	26.5	24.0	25.0
16	12.5	10.5	11.5	17.0	16.0	16.0	23.5	21.5	22.5	25.5	23.5	24.5
17	13.0	10.5	11.5	17.0	16.0	16.5	24.5	22.0	23.0	25.5	24.0	24.5
18	12.5	11.5	12.0	16.5	15.5	16.0	24.5	22.0	23.5	26.5	24.5	25.5
19	13.0	11.0	12.0	15.5	14.0	15.0	24.5	22.0	23.0	26.5	25.5	26.0
20	14.5	11.0	12.5	15.5	13.5	14.5	25.0	23.0	24.0	26.5	25.0	26.0
21	15.0	12.5	13.5	15.5	14.5	15.0	24.0	22.5	23.5	26.5	24.5	25.5
22	16.0	13.0	14.5	17.0	14.5	15.5	23.0	22.0	22.5	26.0	24.5	25.5
23	16.5	13.5	15.0	18.0	16.0	17.0	22.5	21.0	21.5	26.0	25.0	25.5
24	16.0	15.0	15.0	19.5	17.0	18.0	21.5	20.0	21.0	25.5	25.5	25.5
25	16.5	14.0	15.0	20.0	18.0	19.0	21.0	19.0	20.0	26.0	25.0	25.5
26	15.5	14.5	14.5	21.5	19.0	20.0	21.5	18.5	20.0	25.5	24.5	25.0
27	15.5	13.0	14.0	22.0	20.0	21.0	21.5	19.5	20.5	25.5	24.5	25.0
28	15.0	12.5	13.5	22.5	20.0	21.0	22.5	20.0	21.0	26.0	24.5	25.0
29	14.0	12.5	13.5	22.5	20.5	21.5	22.5	20.5	22.0	26.0	24.0	25.0
30	15.5	13.0	14.0	22.5	20.0	21.5	23.5	22.0	23.0	26.0	23.5	25.0
31	---	---	---	22.0	20.0	21.0	---	---	---	26.0	24.0	24.5
MONTH	16.5	1.0	10.0	22.5	9.5	15.5	25.0	16.0	20.5	26.5	20.0	24.5
	AUGUST			SEPTEMBER								
1	25.5	23.5	24.5	21.0	20.0	20.5						
2	25.0	23.5	24.5	21.0	20.0	20.5						
3	25.0	23.0	24.0	21.0	19.5	20.5						
4	24.5	22.5	23.5	22.0	19.5	20.5						
5	25.0	23.5	24.0	21.0	20.0	20.5						
6	25.0	23.0	24.0	21.5	20.0	21.0						
7	25.5	23.0	24.0	22.5	20.5	21.5						
8	26.0	24.0	25.0	23.0	21.5	22.0						
9	26.0	24.5	25.0	22.5	21.5	22.0						
10	25.5	24.0	25.0	22.5	20.5	21.0						
11	26.0	23.5	25.0	20.5	19.0	20.0						
12	26.5	24.0	25.5	20.5	18.5	19.0						
13	27.0	25.0	26.0	19.0	17.0	17.5						
14	27.0	25.5	26.0	17.5	16.0	17.0						
15	27.0	25.0	26.0	17.5	16.5	17.0						
16	26.0	24.5	25.5	17.0	15.0	16.0						
17	25.5	24.0	24.5	15.5	13.5	14.5						
18	24.5	23.0	24.0	15.0	13.5	14.0						
19	25.0	23.5	24.0	15.5	14.0	14.5						
20	24.5	23.0	24.0	15.5	14.5	15.0						
21	23.5	22.5	23.0	14.5	13.5	14.0						
22	23.0	22.0	22.5	14.0	13.5	13.5						
23	23.0	22.0	22.5	14.5	13.5	14.0						
24	23.0	22.5	22.5	13.5	12.5	13.0						
25	22.5	22.0	22.5	14.0	13.0	13.5						
26	22.5	21.5	22.0	15.5	14.0	15.0						
27	22.0	20.0	21.0	15.5	14.5	15.0						
28	20.5	20.0	20.0	15.5	14.5	15.0						
29	20.5	19.0	19.5	15.5	13.5	15.0						
30	20.5	19.0	20.0	14.5	13.0	13.5						
31	21.0	20.0	20.0	---	---	---						
MONTH	27.0	19.0	23.5	23.0	12.5	17.0						

MISSOURI RIVER MAIN STEM

06177000 MISSOURI RIVER NEAR WOLF POINT, MT

LOCATION.--Lat 48°04'00", long 105°31'55" (NAD 27), in SW<sup>1</sup>/<sub>4</sub>NW<sup>1</sup>/<sub>4</sub> sec.28, T.27 N., R.48 E., McCone County, Hydrologic Unit 10060001, on right bank 500 ft downstream from bridge on State Highway 13, 5 mi southeast of Wolf Point, 7.8 mi downstream from Wolf Creek, and at river mile 1,701.4.

DRAINAGE AREA.--82,290 mi<sup>2</sup>.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--September 1928 to current year.

REVISED RECORDS.--WSP 1146: 1931. WSP 1729: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 1,958.57 ft (NGVD 29). Prior to Apr. 13, 1930, nonrecording gages at Wolf Point ferry landing 5.5 mi upstream at different elevation.

REMARKS.-- Water-discharge records good except those for estimated daily discharges, which are fair. Flow partly regulated by Fort Peck Lake and many other reservoirs upstream from station. Diversion for irrigation of about 1,010,400 acres upstream from station. U.S. Army Corps of Engineers satellite telemeter at station. Several observations of water temperature and specific conductance were made during the year.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 14, 1908, reached a stage of about 20 ft. (site and elevation then in use).

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	5200	5140	9260	10300	e10200	e10200	6500	9310	8830	8370	8090	7140
2	5140	5190	9290	10400	e10000	e9200	6250	9290	9020	8420	8220	6930
3	5350	5200	9190	10100	e10300	e9300	7030	9120	8820	8380	6820	6760
4	5160	5220	9130	10200	e10200	e9300	7860	8850	8830	7990	6780	6750
5	5150	5210	9830	9990	e10500	e7800	7660	9130	8850	7490	6880	6910
6	5200	5150	10200	10100	e10300	e8800	7370	9820	8800	7530	6770	7030
7	5250	5300	10400	10100	e10400	e7000	7000	8750	8850	7650	7050	7160
8	5240	5260	10000	10100	e10200	e7000	6880	8870	8760	7830	6760	7120
9	5120	5320	10100	10100	e10400	e6200	6760	9030	8940	7980	6910	7030
10	5120	5190	10000	e9700	e10200	e5900	6450	9440	8800	8040	6930	6750
11	5070	5210	10000	e10000	e10400	e5400	6520	9710	8860	7970	6660	6770
12	5110	5190	10100	e10100	e10100	e4900	6600	10300	9280	7840	6880	6790
13	5030	5200	10100	e10000	e10100	e4300	7140	11100	9010	7970	6990	6730
14	5110	5100	10000	e10100	e10300	e4000	7580	10900	9200	7890	7050	6670
15	5180	5150	10000	e10100	e10000	e3900	7640	10600	9030	7860	6970	6960
16	5080	5180	10000	e10100	e10000	e4200	7870	10300	9110	8040	6710	7340
17	4980	5280	9940	e9800	e10300	e4700	7690	9660	9180	7800	6910	6680
18	5180	5220	9930	e10100	e10300	e5700	7600	11400	9100	7770	6960	6650
19	4990	5180	9720	e9900	e10300	e6200	7600	11300	8870	7760	7010	6660
20	4980	5160	10000	e10100	e10000	e7200	7290	10900	8550	7850	6940	6660
21	5040	5260	9910	e10000	e10200	e8700	7460	9790	8620	7700	6810	6620
22	5130	5240	9980	e10200	e10100	10300	7140	11200	8790	7620	6940	6620
23	5130	5310	10100	e10100	e10000	10200	7380	11300	8730	7660	6660	6290
24	5220	5200	10100	e10000	e10400	9630	7800	9910	8460	7630	7200	5210
25	5170	5280	e10000	e8700	e10300	9460	8050	9420	8330	7570	6900	4780
26	5220	5910	e10500	e8500	e10200	9600	8170	9320	8180	7620	6860	4750
27	5110	8070	e10400	e9700	e10700	8820	8290	9310	8330	7650	6940	4720
28	5090	9440	10200	e10100	e10700	8030	8320	9150	8270	7740	7040	4710
29	5130	9220	10200	e10000	---	7780	8350	10300	8240	7890	6810	4680
30	5140	9180	10100	e10200	---	7700	8910	9430	8360	7640	6880	4620
31	5210	---	10200	e9800	---	7010	---	8760	---	7730	7060	---
TOTAL	159230	172160	308880	308690	287100	228430	223160	305670	263000	242880	216390	190490
MEAN	5136	5739	9964	9958	10250	7369	7439	9860	8767	7835	6980	6350
MAX	5350	9440	10500	10400	10700	10300	8910	11400	9280	8420	8220	7340
MIN	4980	5100	9130	8500	10000	3900	6250	8750	8180	7490	6660	4620
AC-FT	315800	341500	612700	612300	569500	453100	442600	606300	521700	481800	429200	377800

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1943 - 2003, BY WATER YEAR (WY)\*

MEAN	11430	9152	9030	9714	9923	8902	9538	9254	9418	10270	12010	11750
MAX	29130	22210	13420	14270	15820	16750	27180	21800	26040	36270	27110	27150
(WY)	1956	1998	1944	1971	1976	1976	1952	1979	1975	1975	1955	1955
MIN	3151	2328	1338	995	1195	2301	1470	1182	1268	1171	3515	3274
(WY)	1993	1947	1943	1943	1943	1945	1945	1945	1945	1945	1963	1992

SUMMARY STATISTICS

FOR 2002 CALENDAR YEAR

FOR 2003 WATER YEAR

WATER YEARS 1943 - 2003\*

ANNUAL TOTAL	2526650	2906080		
ANNUAL MEAN	6922	7962	10030	
HIGHEST ANNUAL MEAN			15850	1955
LOWEST ANNUAL MEAN			5607	1963
HIGHEST DAILY MEAN	11000	Aug 24	45100	Apr 19 1952
LOWEST DAILY MEAN	4000	Mar 21	680	Dec 5 1942
ANNUAL SEVEN-DAY MINIMUM	4010	Mar 21	906	Jan 12 1943
MAXIMUM PEAK FLOW			a11500	May 18
MAXIMUM PEAK STAGE			b9.00	Jan 29
INSTANTANEOUS LOW FLOW			d320	15.64
ANNUAL RUNOFF (AC-FT)	5012000	5764000	7269000	Dec 10 1941
10 PERCENT EXCEEDS	9950	10200	15700	
50 PERCENT EXCEEDS	5460	7980	9030	
90 PERCENT EXCEEDS	4530	5160	4560	

MISSOURI RIVER MAIN STEM

06177000 MISSOURI RIVER NEAR WOLF POINT, MT--Continued

SUMMARY STATISTICS

WATER YEARS 1929-1939\*\*

ANNUAL TOTAL		
ANNUAL MEAN	7183	
HIGHEST ANNUAL MEAN	10300	1939
LOWEST ANNUAL MEAN	4891	1937
HIGHEST DAILY MEAN	56700	Mar 25 1939
LOWEST DAILY MEAN	840	Nov 29 1937
ANNUAL SEVEN-DAY MINIMUM	910	Feb 10 1938
MAXIMUM PEAK FLOW	f66800	Mar 25 1939
MAXIMUM PEAK STAGE	d14.40	Mar 25 1939
INSTANTANEOUS LOW FLOW		
ANNUAL FLOW (AC-FT)	5204000	
10 PERCENT EXCEEDS	14800	
50 PERCENT EXCEEDS	5060	
90 PERCENT EXCEEDS	2600	

\*--After Fort Peck Lake reached operational level (1943 to current year).  
 \*\*--Prior to Fort Peck Lake reaching operational level (1929-1939).  
 a--Gage height, 4.41 ft.  
 b--Backwater from ice.  
 c--Gage height, 9.98 ft.  
 d--Occurred outside period of record, during filling of Fort Peck Lake.  
 e--Estimated.  
 f--From rating curve extended above 39,000 ft<sup>3</sup>/s.

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1949-51, 1961-62, 1965-68, 1970-73, May 2002 to current year.

PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: July 1979 to September 1985, seasonal records May 2002 to current year.

INSTRUMENTATION.--Temperature recorder installed May 16, 2002.

REMARKS.--Seasonal daily water temperature record good. Unpublished records of instantaneous water temperature and specific conductance are available in files of District office.

EXTREMES FOR PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: Maximum, 21.5°C, Aug. 12-14, 2003; minimum, 0.0°C, many days during winter periods.

EXTREMES FOR CURRENT YEAR.--

WATER TEMPERATURE: During period of seasonal operation, maximum, 21.5°C, Aug. 12-14; minimum, 1.0°C, Apr. 3, 4.

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

Date	Time	Instantaneous discharge, cfs (00061)	Barometric pressure, mm Hg (00025)	Dissolved oxygen, mg/L (00300)	Dissolved oxygen, percent of saturation (00301)	pH, water, unfltrd field, std (00400)	Specific conductance, wat unfltrd, uS/cm (00095)	Temperature, air, deg C (00020)	Temperature, water, deg C (00010)	Hardness, water, unfltrd mg/L as CaCO3 (00900)	Calcium, water, fltrd, mg/L (00915)	Magnesium, water, fltrd, mg/L (00925)
APR 2003												
01...	1200	6470	710	11.2	102	8.4	560	5.0	8.0	190	46.5	18.3
MAY												
08...	1115	8890	715	12.0	110	8.5	562	14.0	8.5	200	49.4	18.8
JUL												
08...	1015	7310	716	8.9	100	8.4	561	24.0	18.0	230	55.7	20.9
AUG												
26...	1015	6370	720	9.1	102	8.3	570	26.5	18.0	210	51.6	19.9

Date	Potassium, water, fltrd, mg/L (00935)	Sodium adsorption ratio (00931)	Sodium, water, fltrd, mg/L (00930)	Alkalinity, wat flt fxd end lab, mg/L as CaCO3 (29801)	Chloride, water, fltrd, mg/L (00940)	Fluoride, water, fltrd, mg/L (00950)	Silica, water, fltrd, mg/L (00955)	Sulfate, water, fltrd, mg/L (00945)	Residue sum of water, constituents, mg/L (70301)	Residue water, fltrd, tons/acre-ft (70303)	Residue water, fltrd, tons/d (70302)
APR 2003											
01...	5.18	1	43.7	150	6.87	.66	6.4	126	344	.47	6010
MAY											
08...	3.89	1	40.1	159	8.79	.85	6.9	120	344	.47	8260
JUL											
08...	4.03	1	40.7	158	8.75	.9	6.7	117	350	.48	6900
AUG											
26...	3.64	1	38.1	165	8.53	.9	7.4	115	344	.47	5920

## MISSOURI RIVER MAIN STEM

06177000 MISSOURI RIVER NEAR WOLF POINT, MT--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003--Continued

Date	Ammonia + org-N, water, unfltrd mg/L as N (00625)	Ammonia water, fltrd, mg/L as N (00608)	Nitrite + nitrate water, fltrd, mg/L as N (00631)	Nitrite water, fltrd, mg/L as N (00613)	Ortho-phosphate, water, fltrd, mg/L as P (00671)	Phosphorus, water, unfltrd mg/L (00665)	Arsenic water, fltrd, ug/L (01000)	Arsenic water, unfltrd ug/L (01002)	Barium, water, fltrd, ug/L (01005)	Barium, unfltrd recover-able, ug/L (01007)	Cadmium water, fltrd, ug/L (01025)
APR 2003											
01...	.90	.060	.128	.004	E.005	.22	2.3	6	33	95	<.04
MAY											
08...	.28	<.015	E.014	<.002	<.007	.092	3.1	5	37	54	<.04
JUL											
08...	.26	<.015	<.022	<.002	<.007	.057	3.2	4	35	63	<.04
AUG											
26...	.17	<.015	<.022	<.002	E.004	.035	2.9	4	35	52	<.04

Date	Cadmium water, unfltrd ug/L (01027)	Chromium, water, fltrd, ug/L (01030)	Chromium, water, unfltrd recover-able, ug/L (01034)	Copper, water, fltrd, ug/L (01040)	Copper, water, unfltrd recover-able, ug/L (01042)	Iron, water, fltrd, ug/L (01046)	Iron, water, unfltrd recover-able, ug/L (01045)	Lead, water, fltrd, ug/L (01049)	Lead, water, unfltrd recover-able, ug/L (01051)	Manganese, water, fltrd, ug/L (01056)	Manganese, water, unfltrd recover-able, ug/L (01055)
APR 2003											
01...	.10	<.8	3.4	2.3	10.3	<10	5850	<.08	5.04	3.4	143
MAY											
08...	.05	<.8	1.6	1.4	4.2	<10	2140	<.08	1.82	1.5	52
JUL											
08...	.04	<.8	E.6	1.4	2.9	<8	1330	<.08	1.04	1.9	33
AUG											
26...	<.04	<.8	E.4	1.4	2.8	<8	740	<.08	.61	1.4	26

Date	Mercury water, fltrd, ug/L (71890)	Mercury water, unfltrd recover-able, ug/L (71900)	Nickel, water, fltrd, ug/L (01065)	Nickel, water, unfltrd recover-able, ug/L (01067)	Selenium, water, fltrd, ug/L (01145)	Selenium, water, unfltrd ug/L (01147)	Zinc, water, fltrd, ug/L (01090)	Zinc, water, unfltrd recover-able, ug/L (01092)	Suspnd. sedi-ment, sieve diametr percent <.063mm (70331)	Sus-pended sedi-ment concen-tration mg/L (80154)	Sus-pended sedi-ment load, tons/d (80155)
APR 2003											
01...	<.02	E.02	2.37	9.50	.7	.8	1	30	94	279	4870
MAY											
08...	<.02	<.02	2.88	5.52	.8	.7	1	11	43	140	3360
JUL											
08...	<.02	<.02	2.15	3.73	.9	.7	1	7	57	74	1460
AUG											
26...	<.02	<.02	2.70	4.12	.7	1.0	<1	3	38	56	963

E--Estimated.

MISSOURI RIVER MAIN STEM

06177000 MISSOURI RIVER NEAR WOLF POINT, MT--Continued

WATER TEMPERATURE, DEGREES CELSIUS, APRIL 2003 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	APRIL			MAY			JUNE			JULY		
1	8.0	6.5	7.5	11.0	9.0	10.0	13.5	12.5	12.5	19.0	16.5	18.0
2	6.5	2.0	4.0	11.0	9.0	10.0	13.0	11.5	12.0	19.5	17.5	18.5
3	2.0	1.0	1.5	12.0	10.0	11.0	14.5	12.0	13.0	19.0	17.5	18.0
4	3.0	1.0	2.0	12.0	10.5	11.0	14.5	13.0	13.5	17.5	15.0	16.0
5	4.5	2.5	3.5	10.5	9.0	9.5	13.0	11.5	12.0	17.5	15.0	16.5
6	5.0	4.0	4.5	9.0	7.5	8.0	12.0	10.5	11.0	17.5	16.0	17.0
7	6.5	5.0	5.5	8.0	7.0	7.5	12.0	10.5	11.0	17.5	16.0	17.0
8	7.0	5.0	6.0	8.0	7.0	7.5	14.0	11.5	12.5	17.0	15.5	16.0
9	9.0	6.5	7.5	8.0	7.5	8.0	14.0	13.0	13.5	17.5	15.0	16.0
10	10.0	8.0	9.0	8.5	7.5	8.0	14.0	13.0	13.5	18.0	16.0	17.0
11	10.0	8.5	9.5	10.0	7.5	8.5	13.5	12.5	13.0	18.0	16.5	17.5
12	11.0	9.0	10.0	11.0	9.0	10.0	15.0	12.5	13.5	18.0	16.5	17.5
13	10.5	10.0	10.0	11.5	10.5	11.0	17.0	13.5	15.0	19.0	17.0	18.0
14	10.0	8.5	9.0	12.5	10.5	11.5	17.5	15.5	16.5	19.0	17.5	18.5
15	10.0	9.0	9.5	13.5	11.5	12.5	17.0	15.5	16.0	19.0	17.0	18.0
16	9.5	8.0	8.5	13.5	12.0	12.5	16.5	14.5	15.5	19.0	17.0	18.0
17	9.0	7.0	8.5	12.0	11.0	11.5	16.5	14.0	15.5	19.5	17.5	18.5
18	9.0	8.5	8.5	11.5	9.5	10.0	17.0	14.5	16.0	21.0	19.0	20.0
19	8.5	8.0	8.5	9.5	8.5	9.0	18.5	15.0	16.5	20.5	19.0	20.0
20	9.5	7.5	8.5	10.5	8.5	9.5	19.0	17.0	18.0	20.5	18.0	19.0
21	11.0	8.5	9.5	11.5	10.0	10.5	18.5	16.0	17.0	19.0	17.0	18.0
22	12.0	9.5	11.0	12.0	10.0	11.0	17.0	14.5	15.5	18.5	16.5	17.5
23	12.0	11.0	11.5	13.5	11.5	12.5	15.5	13.5	14.5	19.5	17.0	18.0
24	12.0	10.5	11.0	15.0	12.5	13.5	15.0	13.5	14.0	19.5	18.0	18.5
25	11.0	10.0	10.5	15.5	13.0	14.5	14.5	13.0	13.5	19.0	17.0	17.5
26	11.0	10.0	10.0	16.5	14.5	15.5	14.5	13.0	14.0	18.0	16.0	17.0
27	10.0	8.5	9.5	16.5	14.5	15.5	16.0	14.0	15.0	18.5	16.5	17.5
28	10.0	8.5	9.5	16.5	14.5	15.5	16.0	14.5	15.5	19.5	17.0	18.0
29	10.0	9.0	10.0	16.0	14.0	15.0	16.5	14.5	15.5	19.5	17.5	18.5
30	10.0	8.5	9.5	15.5	13.5	14.5	18.0	15.0	16.5	19.0	17.0	18.0
31	---	---	---	15.0	13.0	13.5	---	---	---	18.5	16.5	17.5
MONTH	12.0	1.0	8.1	16.5	7.0	11.2	19.0	10.5	14.4	21.0	15.0	17.8
	AUGUST			SEPTEMBER								
1	18.5	16.5	17.5	17.5	16.0	17.0						
2	18.0	16.5	17.5	17.0	16.0	16.5						
3	18.0	16.5	17.5	16.5	15.0	16.0						
4	18.5	17.0	17.5	16.0	15.0	15.5						
5	18.5	17.0	18.0	16.0	15.0	16.0						
6	18.5	17.0	18.0	16.5	15.5	16.0						
7	20.0	18.0	19.0	17.0	15.5	16.5						
8	21.0	19.0	20.0	17.5	16.0	17.0						
9	21.0	19.5	20.5	17.5	16.5	17.0						
10	20.0	18.5	19.5	17.0	14.0	15.0						
11	21.0	18.5	19.5	14.5	13.5	14.0						
12	21.5	19.5	20.5	14.5	14.0	14.0						
13	21.5	20.0	21.0	14.0	12.5	13.0						
14	21.5	19.5	20.5	14.0	12.0	13.0						
15	20.5	18.5	19.5	14.0	13.0	13.5						
16	20.0	18.5	19.5	13.5	13.0	13.0						
17	20.0	18.5	19.5	13.0	11.0	12.0						
18	19.5	18.5	19.0	11.5	10.0	10.5						
19	20.0	18.5	19.0	13.0	11.0	12.0						
20	19.5	18.0	19.0	13.5	12.5	13.0						
21	18.5	17.0	18.0	13.5	12.5	13.0						
22	18.0	16.5	17.5	13.0	12.0	12.5						
23	19.0	17.5	18.0	13.0	12.5	12.5						
24	19.0	17.5	18.0	12.5	11.0	11.5						
25	18.5	17.0	18.0	13.0	11.0	12.0						
26	18.0	16.5	17.5	13.5	12.5	13.0						
27	17.0	16.0	16.5	14.0	12.5	13.0						
28	16.0	15.0	15.5	13.5	12.0	13.0						
29	16.0	14.5	15.5	13.0	12.0	12.5						
30	16.5	14.5	15.5	12.5	11.0	11.5						
31	17.0	15.0	16.0	---	---	---						
MONTH	21.5	14.5	18.3	17.5	10.0	13.8						

REDWATER RIVER BASIN

06177500 REDWATER RIVER AT CIRCLE, MT

LOCATION.--Lat 47°24'51", long 105°34'30" (NAD 27), in SW<sup>1</sup>/<sub>4</sub>SW<sup>1</sup>/<sub>4</sub> sec.11, T.19 N., R.48 E., McCone County, Hydrologic Unit 10060002, on left bank at Circle, 1 mi upstream from Horse Creek, and at river mile 110.2.

DRAINAGE AREA.--547 mi<sup>2</sup>.

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 June 1972, October 1974 to current year. Monthly discharge only for some periods, published in WSP 1309. Prior to October 1967, published as Redwater Creek at Circle.

REVISED RECORDS.--WSP 1006: 1929-30, 1932-33, 1935-39. WSP 1509: 1929, 1934. WSP 1729: Drainage area.

GAGE.--Water-stage recorder. Sharp-crested weir since Sept. 24, 1938. Elevation of gage is 2,394.32 ft (NGVD 29) (levels by U.S. Army Corps of Engineers). Prior to June 1, 1941, and Mar. 23, 1943, to Feb. 16, 1948, nonrecording gage at site 0.3 mi upstream at same elevation. June 1, 1941, to Mar. 22, 1943, nonrecording gage at site 200 ft upstream at elevation 2.8 ft lower. Feb. 26, 1948, to May 7, 1950, nonrecording gage at site 200 ft upstream at present elevation.

REMARKS.--Records fair except those for estimated daily discharges, which are poor. Diversions for irrigation of about 1,200 acres upstream from station. U.S. Geological Survey satellite telemeter at station. Several observations of water temperature and specific conductance were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.06	e0.10	e0.10	e0.10	e0.15	e0.20	0.71	0.55	0.36	0.32	0.12	0.02
2	e0.05	e0.10	e0.10	e0.10	e0.10	e0.30	0.58	0.55	0.42	0.27	0.12	0.02
3	e0.05	e0.10	e0.10	e0.10	e0.15	e0.50	0.49	0.54	0.43	0.26	0.11	0.02
4	e0.05	e0.10	e0.10	e0.10	e0.10	e0.30	0.41	0.53	0.43	0.24	0.09	0.01
5	e0.05	e0.10	e0.10	e0.10	e0.10	e0.30	0.32	0.67	0.43	0.25	0.07	0.01
6	e0.05	e0.10	e0.10	e0.10	e0.10	e0.20	0.28	0.75	0.44	0.23	0.05	0.01
7	e0.05	e0.10	e0.10	e0.10	e0.10	e0.20	0.57	0.73	0.48	0.22	0.04	0.02
8	e0.10	e0.10	e0.10	e0.10	e0.10	e0.20	0.54	0.73	0.44	0.25	0.05	0.02
9	e0.10	e0.10	e0.10	e0.10	e0.10	e0.20	1.9	0.71	0.55	0.32	0.12	0.02
10	e0.10	e0.10	e0.10	e0.10	e0.10	e0.20	1.5	0.73	0.49	0.26	0.10	0.02
11	e0.10	e0.10	e0.10	e0.10	e0.10	e0.20	1.4	0.71	0.58	0.25	0.05	0.02
12	e0.10	e0.10	e0.10	e0.10	e0.10	e0.30	1.3	0.64	0.66	0.23	0.04	0.02
13	e0.10	e0.10	e0.10	e0.10	e0.15	e0.50	1.3	1.0	0.57	0.20	0.03	0.03
14	e0.10	e0.10	e0.10	e0.10	e0.15	e25.0	1.3	1.4	0.53	0.21	0.03	0.03
15	e0.10	e0.10	e0.10	e0.10	e0.15	e200	1.3	1.5	0.44	0.19	0.03	0.03
16	0.10	e0.10	e0.10	e0.10	e0.20	90	1.1	1.8	0.41	0.21	0.03	0.03
17	0.10	e0.10	e0.10	e0.10	e0.20	39	1.2	1.9	0.45	0.21	0.02	0.03
18	0.13	e0.10	e0.10	e0.10	e0.20	27	1.1	1.7	0.36	0.20	0.02	0.03
19	0.19	e0.10	e0.10	e0.10	e0.20	23	1.2	1.5	0.35	0.20	0.02	0.04
20	e0.20	e0.10	e0.10	e0.10	e0.20	19	1.1	1.3	0.34	0.20	0.01	0.04
21	e0.20	e0.10	e0.10	e0.10	e0.20	14	0.90	1.1	0.49	0.19	0.01	0.04
22	e0.20	e0.10	e0.10	e0.10	e0.15	11	0.71	0.95	0.50	0.17	0.01	0.05
23	e0.15	e0.10	e0.10	e0.10	e0.15	9.0	0.32	0.82	0.48	0.15	0.01	0.04
24	e0.10	e0.10	e0.10	e0.10	e0.15	5.6	0.55	0.74	0.62	0.15	0.01	0.04
25	e0.10	e0.10	e0.10	e0.10	e0.15	4.0	0.55	0.59	0.59	0.15	0.01	0.04
26	e0.10	e0.10	e0.10	e0.10	e0.15	2.9	0.52	0.47	0.45	0.15	0.01	0.04
27	e0.10	e0.10	e0.10	e0.15	e0.20	2.1	0.55	0.44	0.41	0.16	0.00	0.05
28	e0.10	e0.10	e0.10	e0.15	e0.20	1.6	0.49	0.37	0.39	0.16	0.00	0.05
29	e0.10	e0.10	e0.10	e0.10	---	1.2	0.44	0.33	0.36	0.13	0.00	0.05
30	e0.10	e0.10	e0.10	e0.10	---	1.1	0.52	0.32	0.32	0.13	0.00	0.05
31	e0.10	---	e0.10	e0.15	---	0.88	---	0.31	---	0.13	0.01	---
TOTAL	3.23	3.00	3.10	3.25	4.10	479.98	25.15	26.38	13.77	6.39	1.22	0.92
MEAN	0.10	0.10	0.10	0.10	0.15	15.5	0.84	0.85	0.46	0.21	0.039	0.031
MAX	0.20	0.10	0.10	0.15	0.20	200	1.9	1.9	0.66	0.32	0.12	0.05
MIN	0.05	0.10	0.10	0.10	0.10	0.20	0.28	0.31	0.32	0.13	0.00	0.01
AC-FT	6.4	6.0	6.1	6.4	8.1	952	50	52	27	13	2.4	1.8

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1929 - 2003, BY WATER YEAR (WY)\*

MEAN	0.51	0.36	0.43	0.35	14.9	72.1	17.0	3.66	14.5	11.1	1.98	2.38
MAX	19.2	7.11	8.58	6.13	141	476	418	32.1	167	116	37.4	139
(WY)	1987	1987	1952	1976	1943	1994	1952	1979	1944	1957	1932	1986
MIN	0.000	0.000	0.000	0.000	0.000	0.045	0.070	0.023	0.003	0.000	0.000	0.000
(WY)	1941	1931	1936	1936	1939	1941	1961	1961	1961	1939	1939	1940



REDWATER RIVER BASIN

06177500 REDWATER RIVER AT CIRCLE, MT--Continued

SUMMARY STATISTICS	FOR 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1929 - 2003*	
ANNUAL TOTAL	270.14		570.49			
ANNUAL MEAN	0.74		1.56		11.5**	
HIGHEST ANNUAL MEAN					61.6	1952
LOWEST ANNUAL MEAN					0.04	1941
HIGHEST DAILY MEAN	37	Mar 28	200	Mar 15	4510	Mar 31 1952
LOWEST DAILY MEAN	0.00	Jan 1	0.00	Aug 27	0.00	Oct 8 1929
ANNUAL SEVEN-DAY MINIMUM	0.04	Jul 28	0.00	Aug 24	0.00	Nov 20 1929
MAXIMUM PEAK FLOW			a200	Mar 15	c6960	Jun 29 1986
MAXIMUM PEAK STAGE			b8.80	Mar 15	12.93	Mar 4 1994
ANNUAL RUNOFF (AC-FT)	536		1130		8310	
10 PERCENT EXCEEDS	1.2		1.1		7.1	
50 PERCENT EXCEEDS	0.11		0.12		0.20	
90 PERCENT EXCEEDS	0.05		0.03		d0.00	

\*--During period of operation ( 1932, 1936, 1938-71, 1975 to current year).

\*\*--Median of yearly discharges, 6.04 ft<sup>3</sup>/s.

a--About.

b--Backwater from ice.

c--From rating curve extended above 3,500 ft<sup>3</sup>/s, gage height, 12.85 ft, from floodmark.

e--Estimated.

POPLAR RIVER BASIN

06178000 POPLAR RIVER AT INTERNATIONAL BOUNDARY

(International gaging station)

LOCATION.--Lat 48°59'25", long 105°41'46" (NAD 27), in NE<sup>1</sup>/<sub>4</sub>NE<sup>1</sup>/<sub>4</sub>SE<sup>1</sup>/<sub>4</sub> sec.6, T.37 N., R.46 E., Daniels County, Hydrologic Unit 10060003, on left bank 0.7 mi south of international boundary, 1.5 mi upstream from Coal Creek, 18.5 mi northwest of Scobey, MT, and at river mile 135.7.

DRAINAGE AREA.--358 mi<sup>2</sup>.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--March 1931 to current season (seasonal records only for most years). Published as Middle Fork Poplar River at international boundary, March 1931 to November 1975.

REVISED RECORDS.--WSP 1389: 1931, 1935-37(M), 1939-40, 1942(M), 1943, 1948(M), 1950(M). WSP 1729: Drainage area. W 1984: Drainage area.

GAGE.--Water-stage recorder and concrete control since September 1977. Elevation of gage is 2,460 ft (NGVD 29).

REMARKS.--Water-discharge records good except those for estimated daily discharges, which are poor. U.S. Geological Survey satellite telemeter at station. A few small diversions for irrigation upstream from station.

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

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 12,700 ft<sup>3</sup>/s, Apr. 6, 1954, gage height, 10.25 ft, from floodmark, from rating curve extended above 2,500 ft<sup>3</sup>/s, on basis of slope-area measurement of peak flow; no flow at times.

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 2003  
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			e0.30	15	15	5.1	2.2	0.11	0.32	0.29		
2			e0.30	11	15	5.8	1.7	0.06	0.36	0.33		
3			e0.30	13	15	8.2	1.3	0.06	0.42	0.30		
4			e0.0	14	15	8.6	0.98	0.14	0.51	0.32		
5			e0.0	21	17	8.0	0.74	0.13	0.54	0.38		
6			e0.0	15	26	8.6	0.48	0.11	0.57	0.41		
7			e0.0	18	55	7.7	0.35	0.14	0.55	0.46		
8			e0.0	21	68	7.4	0.50	0.15	0.53	0.95		
9			e0.0	32	66	7.5	0.67	0.14	0.36	1.3		
10			e0.0	32	71	7.5	0.52	0.10	0.35	1.3		
11			e0.0	26	72	7.8	0.36	0.07	0.31	1.4		
12			e0.0	22	51	7.9	0.53	0.05	0.35	1.5		
13			e0.0	19	43	7.9	0.50	0.04	0.37	1.6		
14			e2.0	22	40	7.5	0.53	0.04	0.26	1.9		
15			e20	33	33	8.0	0.43	0.05	0.25	2.2		
16			e300	34	34	8.3	0.29	0.06	0.28	2.4		
17			e600	32	46	6.8	0.26	0.04	0.38	2.5		
18			e500	31	47	5.8	0.33	0.03	0.36	2.4		
19			434	27	35	4.9	0.17	0.05	0.32	2.5		
20			238	24	26	4.3	0.12	0.13	0.43	2.4		
21			112	21	21	4.4	0.17	0.23	0.59	2.4		
22			71	19	20	4.3	0.16	0.22	0.44	2.4		
23			53	18	18	4.0	0.13	0.14	0.33	2.5		
24			41	17	15	4.1	0.12	0.05	0.29	2.5		
25			35	17	13	5.0	0.16	0.09	0.29	2.4		
26			30	16	11	4.2	0.11	0.07	0.29	2.5		
27			27	17	9.7	3.6	0.11	0.12	0.27	2.7		
28			24	17	9.4	3.2	0.10	0.31	0.28	2.7		
29			22	16	7.7	2.8	0.10	0.43	0.29	2.2		
30			20	16	6.6	2.6	0.10	0.37	0.29	e2.0		
31			17	---	5.8	---	0.11	0.31	---	e1.5		
TOTAL			2546.90	636	927.2	181.8	14.33	4.04	11.18	52.64		
MEAN			82.2	21.2	29.9	6.06	0.46	0.13	0.37	1.70		
MAX			600	34	72	8.6	2.2	0.43	0.59	2.7		
MIN			0.00	11	5.8	2.6	0.10	0.03	0.25	0.29		
MED			20	19	21	6.3	0.33	0.11	0.35	2.0		
AC-FT			5050	1260	1840	361	28	8.0	22	104		

STATISTICS OF MONTHLY MEAN DATA FOR SEASONS 1931 - 2003\*

MEAN	0.000	20.2	69.4	81.6	17.2	14.4	8.63	1.53	1.45	2.68	4.90	0.000
MAX	0.000	61.3	418	699	86.2	191	120	19.4	15.3	11.8	9.35	0.000
(WY)	1936	1981	1999	1952	1982	1963	1993	1940	1954	1955	1955	1936
MIN	0.000	0.000	0.000	5.52	3.05	0.16	0.041	0.000	0.007	0.039	0.12	0.000
(WY)	1936	1936	1950	1988	1992	1988	1988	1967	1988	1989	1937	1936

SUMMARY STATISTICS

FOR 2002 CALENDAR YEAR

FOR 2003 SEASON

SEASONS 1931 - 2003\*

HIGHEST DAILY MEAN	150	Apr 12	a600	Mar 17	5000	Apr 6 1954
LOWEST DAILY MEAN	0.00	Mar 1	0.00	Mar 4	0.00	Jun 30 1932
MAXIMUM PEAK FLOW			unknown		b127000	Apr 6 1954
MAXIMUM PEAK STAGE			a6.90	Mar 16	10.25	Apr 6 1954

\*--Seasonal record most years.

a--Backwater from ice.

b--From rating curve extended above 2,500 ft<sup>3</sup>/s on basis of slope-area measurement of peak flow.

e--Estimated.

POPLAR RIVER BASIN

06178000 POPLAR RIVER AT INTERNATIONAL BOUNDARY--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1964-65, 1976 to current year.

REMARKS.--Unpublished records of instantaneous water temperature and specific conductance are available in files of the District office.

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

Date	Time	Instantaneous discharge, cfs (00061)	Barometric pressure, mm Hg (00025)	Dissolved oxygen, mg/L (00300)	Dissolved oxygen, percent of saturation (00301)	pH, water, unfltrd field, std units (00400)	Specific conductance, wat unfltrd uS/cm 25 degC (00095)	Temperature, air, deg C (00020)	Temperature, water, deg C (00010)	Hardness, water, unfltrd mg/L as CaCO3 (00900)	Calcium water, fltrd, mg/L (00915)	Magnesium, water, fltrd, mg/L (00925)
MAR 2003												
20...	1315	220	702	10.8	92	8.1	364	6.0	5.0	120	21.5	15.0
MAY												
14...	1200	41	700	10.2	110	8.4	1600	12.0	14.5	420	49.6	72.6
JUN												
16...	0900	9.0	711	10.8	124	8.3	1220	21.0	18.5	320	37.2	54.5
AUG												
13...	0900	.03	706	7.7	98	8.9	1950	29.0	23.5	260	20.0	50.5

Date	Potassium, water, fltrd, mg/L (00935)	Sodium adsorption ratio (00931)	Sodium, water, fltrd, mg/L (00930)	Alkalinity, wat flt lab, mg/L as CaCO3 (29801)	Chloride, water, fltrd, mg/L (00940)	Fluoride, water, fltrd, mg/L (00950)	Silica, water, fltrd, mg/L (00955)	Sulfate, water, fltrd, mg/L (00945)	Residue sum of constituents mg/L (70301)	Residue water, fltrd, tons/acre-ft (70303)	Residue water, fltrd, tons/d (70302)
MAR 2003											
20...	16.2	1	27.0	142	2.57	.12	10.7	37.0	220	.30	131
MAY											
14...	14.2	5	217	615	6.35	.4	18.7	302	1050	1.43	116
JUN											
16...	8.61	4	174	497	5.06	.4	1.5	197	776	1.06	18.9
AUG											
13...	9.86	9	342	631	13.3	.6	.5	422	1240	1.68	.10

Date	Ammonia + org-N, water, unfltrd mg/L as N (00625)	Ammonia water, fltrd, mg/L as N (00608)	Nitrite + nitrate, water, fltrd, mg/L as N (00631)	Nitrite water, fltrd, mg/L as N (00613)	Orthophosphate, water, fltrd, mg/L as P (00671)	Phosphorus, water, unfltrd mg/L (00665)	Arsenic water, fltrd, ug/L (01000)	Arsenic water, unfltrd ug/L (01002)	Barium, water, fltrd, ug/L (01005)	Barium, unfltrd recover-able, ug/L (01007)	Cadmium water, fltrd, ug/L (01025)
MAR 2003											
20...	1.8	.085	.866	.048	.134	.26	2.6	2	45	50	<.04
MAY											
14...	1.5	E.011	<.022	.003	.028	.073	4.4	3	82	77	<.04
JUN											
16...	.80	<.015	<.022	<.002	.015	.042	4.2	4	47	51	<.04
AUG											
13...	1.2	<.015	<.022	<.002	<.007	.050	7.8	7	34	37	<.04

Date	Cadmium water, unfltrd ug/L (01027)	Chromium, water, fltrd, ug/L (01030)	Chromium, water, unfltrd recover-able, ug/L (01034)	Copper, water, fltrd, ug/L (01040)	Copper, water, unfltrd recover-able, ug/L (01042)	Iron, water, fltrd, ug/L (01046)	Iron, water, unfltrd recover-able, ug/L (01045)	Lead, water, fltrd, ug/L (01049)	Lead, water, unfltrd recover-able, ug/L (01051)	Manganese, water, fltrd, ug/L (01056)	Manganese, water, unfltrd recover-able, ug/L (01055)
MAR 2003											
20...	.05	E.5	E.5	2.8	3.4	185	640	.18	.59	17.6	31
MAY											
14...	.04	<.8	<.8	3.0	5.1	99	230	E.07	.16	11.5	16
JUN											
16...	<.04	<.8	<.8	1.5	2.2	43	100	<.08	.08	6.0	10
AUG											
13...	<.04	<.8	<.8	1.8	3.2	28	570	<.08	.17	2.7	12

E--Estimated.

## POPLAR RIVER BASIN

06178000 POPLAR RIVER AT INTERNATIONAL BOUNDARY--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003--Continued

Date	Mercury water, fltrd, ug/L (71890)	Mercury water, unfltrd recover- able, ug/L (71900)	Nickel, water, fltrd, ug/L (01065)	Nickel, water, unfltrd recover- able, ug/L (01067)	Selen- ium, water, fltrd, ug/L (01145)	Selen- ium, water, unfltrd ug/L (01147)	Zinc, water, fltrd, ug/L (01090)	Zinc, water, unfltrd recover- able, ug/L (01092)	Suspnd. sedi- ment, sieve diametr percent <.063mm (70331)	Sus- pended sedi- ment concen- tration mg/L (80154)	Sus- pended sedi- ment load, tons/d (80155)
MAR 2003											
20...	<.02	E.01	2.16	2.25	E.3	<.5	2	5	88	22	13
MAY											
14...	<.02	<.02	3.53	3.43	.6	.7	3	4	33	182	20
JUN											
16...	<.02	<.02	2.22	2.17	E.3	E.4	<2	E2	40	28	.68
AUG											
13...	<.02	<.02	1.56	2.42	E.4	<.5	2	2	46	51	.00

E--Estimated.



POPLAR RIVER BASIN

06178500 EAST POPLAR RIVER AT INTERNATIONAL BOUNDARY--Continued

SUMMARY STATISTICS	FOR 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1977 - 2003*	
ANNUAL TOTAL	1019.3		959.2			
ANNUAL MEAN	2.79		2.63		6.75	
HIGHEST ANNUAL MEAN					32.3 1982	
LOWEST ANNUAL MEAN					2.13 1992	
HIGHEST DAILY MEAN	12	May 2	8.5	Mar 17	2930	Apr 15 1982
LOWEST DAILY MEAN	1.4	Sep 24	1.4	Oct 3	c0.70	Feb 28 1998
ANNUAL SEVEN-DAY MINIMUM	1.9	Sep 27	1.6	Mar 4	0.80	Jan 16 1982
MAXIMUM PEAK FLOW			all	Mar 17	d4020	Apr 23 1975
MAXIMUM PEAK STAGE			b5.97	Oct 3	12.80	Mar 25 1943
INSTANTANEOUS LOW FLOW					0.70	Feb 28 1998
ANNUAL RUNOFF (AC-FT)	2020		1900		4890	
10 PERCENT EXCEEDS	3.5		3.6		6.7	
50 PERCENT EXCEEDS	2.3		2.3		2.5	
90 PERCENT EXCEEDS	2.0		1.9		1.7	

\*--Since initial filling of Cookson Reservoir.  
a--Gage height, 5.94 ft.  
b--Backwater from beavers.  
c--No flow at times prior to filling Cookson Reservoir.  
d--Gage height, 12.01 ft.  
e--Estimated.

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1964-65, 1975 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: February 1982 to current year.

WATER TEMPERATURE: June 1975 to September 1983.

INSTRUMENTATION.--Specific conductance monitor installed April 1995.

REMARKS.--Daily specific conductance records fair. Missing conductance data for June 28 to Sept. 25 due to equipment problems. Unpublished records of instantaneous water temperature and specific conductance are available in files of District office.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: Maximum daily mean, 2,040 microsiemens per centimeter (µS/cm) at 25.0°C, Feb. 10-12, 1997; minimum daily mean, 363 µS/cm at 25.0°C, July 2, 1991.

WATER TEMPERATURE: Maximum, 29.5°C, July 6, 1975, July 25, 26, 1978; minimum, 0.0°C on many days during winters most years.

EXTREMES FOR CURRENT YEAR.--

SPECIFIC CONDUCTANCE: During period of usable record (October to June), maximum daily mean, 1,630 microsiemens per centimeter (µS/cm) at 25.0°C, Jan. 14-26 and Feb. 18-24; minimum daily mean, 1,030 µS/cm at 25.0°C, Mar. 18-20.

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

Date	Time	Instantaneous discharge, cfs (00061)	Barometric pressure, mm Hg (00025)	Dissolved oxygen, mg/L (00300)	Dissolved oxygen, percent of saturation (00301)	pH, water, unfltrd field, std units (00400)	Specific conductance, wat unfltrd, uS/cm 25 degC (00095)	Temperature, air, deg C (00020)	Temperature, water, deg C (00010)	Hardness, water, unfltrd, mg/L as CaCO3 (00900)	Calcium water, fltrd, mg/L (00915)	
MAY 2003												
14...	0915	6.7	706	8.4	85	8.3	1530	7.5	12.0	360	56.2	
JUN												
16...	1200	2.8	712	6.1	74	8.3	1440	23.0	21.0	360	62.0	
AUG												
13...	1200	1.8	707	8.7	113	8.5	1440	36.0	24.5	300	44.1	
SEP												
09...	1245	1.9	700	8.2	96	8.4	1490	22.0	18.5	350	55.9	
Date		Magnesium, water, fltrd, mg/L (00925)	Potassium, water, fltrd, mg/L (00935)	Sodium adsorption ratio (00931)	Sodium, water, fltrd, mg/L (00930)	Alkalinity, wat flt fxd end lab, mg/L as CaCO3 (29801)	Chloride, water, fltrd, mg/L (00940)	Fluoride, fltrd, mg/L (00950)	Silica, water, fltrd, mg/L (00955)	Sulfate, water, fltrd, mg/L (00945)	Residue water, fltrd, sum of constituents mg/L (70301)	Residue water, fltrd, tons/acre-ft (70303)
MAY 2003												
14...	54.0	14.4	5	211	534	7.04	.4	8.5	318	991	1.35	
JUN												
16...	49.7	8.77	5	221	517	6.28	.3	11.1	289	958	1.30	
AUG												
13...	46.5	8.17	5	205	476	6.77	.3	12.0	287	896	1.22	
SEP												
09...	52.1	9.81	5	238	471	7.25	.4	10.7	296	952	1.29	

POPLAR RIVER BASIN

06178500 EAST POPLAR RIVER AT INTERNATIONAL BOUNDARY--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003--Continued

Date	Residue water, fltrd, tons/d (70302)	Ammonia + org-N, water, unfltrd mg/L as N (00625)	Ammonia water, fltrd, mg/L as N (00608)	Nitrite + nitrate water, fltrd, mg/L as N (00631)	Nitrite water, fltrd, mg/L as N (00613)	Ortho-phosphate, water, fltrd, mg/L as P (00671)	Phos-phorus, water, unfltrd mg/L (00665)	Arsenic water, fltrd, ug/L (01000)	Arsenic water unfltrd ug/L (01002)	Barium, water, fltrd, ug/L (01005)	Barium, water, unfltrd recover -able, ug/L (01007)
MAY 2003											
14...	17.9	1.6	.462	.149	.017	<.007	.110	3.7	6	68	75
JUN											
16...	7.24	.82	E.009	<.022	E.002	<.007	.050	5.9	6	58	66
AUG											
13...	4.35	1.2	<.015	<.022	<.002	<.007	.122	6.2	6	54	64
SEP											
09...	4.88	.67	<.015	<.022	<.002	<.007	.046	4.0	5	49	55

Date	Cadmium water, fltrd, ug/L (01025)	Cadmium water, unfltrd ug/L (01027)	Chrom-ium, water, fltrd, ug/L (01030)	Chrom-ium, water, unfltrd recover -able, ug/L (01034)	Copper, water, fltrd, ug/L (01040)	Copper, water, unfltrd recover -able, ug/L (01042)	Iron, water, fltrd, ug/L (01046)	Iron, water, unfltrd recover -able, ug/L (01045)	Lead, water, fltrd, ug/L (01049)	Lead, water, unfltrd recover -able, ug/L (01051)	Mangan-ese, water, fltrd, ug/L (01056)
MAY 2003											
14...	<.04	.05	<.8	E.6	1.5	5.1	12	1970	<.08	.95	60.0
JUN											
16...	<.04	<.04	<.8	<.8	1.3	2.5	17	460	<.08	.36	11.6
AUG											
13...	<.04	<.04	<.8	<.8	1.1	2.5	10	70	<.08	.50	5.5
SEP											
09...	<.04	<.04	<.8	<.8	1.2	2.0	18	410	<.08	.38	4.4

Date	Mangan-ese, water, unfltrd recover -able, ug/L (01055)	Mercury water, unfltrd recover -able, ug/L (71890)	Mercury water, unfltrd recover -able, ug/L (71900)	Nickel, water, fltrd, ug/L (01065)	Nickel, water, unfltrd recover -able, ug/L (01067)	Selen-ium, water, fltrd, ug/L (01145)	Selen-ium, water, unfltrd recover -able, ug/L (01147)	Zinc, water, fltrd, ug/L (01090)	Zinc, water, unfltrd recover -able, ug/L (01092)	Suspnd. sedi-ment, sieve diametr percent <.063mm (70331)	Sus-pended sedi-ment concen-tration mg/L (80154)	Sus-pended sedi-ment load, tons/d (80155)
MAY 2003												
14...	133	<.02	<.02	3.83	4.44	E.5	.8	2	7	92	121	2.2
JUN												
16...	72	<.02	<.02	2.89	2.55	E.3	<.5	1	2	94	91	.69
AUG												
13...	83	<.02	<.02	2.56	3.13	<.5	E.4	<1	3	40	75	.36
SEP												
09...	41	<.02	<.02	1.93	2.69	E.3	E.4	<1	2	74	105	.54

E--Estimated.

## POPLAR RIVER BASIN

06178500 EAST POPLAR RIVER AT INTERNATIONAL BOUNDARY--Continued

SPECIFIC CONDUCTANCE, US/CM @ 25 DEGREES CENTIGRADE, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1500	1530	1540	1590	1600	1620	1080	1400	1500	---	---	---
2	1500	1530	1540	1590	1600	1600	1080	1410	1500	---	---	---
3	1500	1530	1540	1590	1600	1590	1080	1410	1500	---	---	---
4	1510	1530	1540	1590	1600	1590	1090	1410	1500	---	---	---
5	1510	1530	1540	1600	1610	1590	1090	1420	1500	---	---	---
6	1510	1530	1540	1600	1610	1590	1100	1430	1500	---	---	---
7	1510	1530	1540	1600	1610	1600	1100	1450	1500	---	---	---
8	1510	1530	1540	1600	1610	1590	1110	1460	1500	---	---	---
9	1510	1530	1550	1600	1610	1590	1110	1470	1500	---	---	---
10	1510	1530	1540	1600	1620	1590	1120	1490	1500	---	---	---
11	1510	1540	1550	1600	1620	1590	1160	1500	1500	---	---	---
12	1510	1540	1540	1610	1620	1570	1200	1510	1500	---	---	---
13	1510	1540	1540	1620	1620	1480	1230	1520	1500	---	---	---
14	1520	1540	1540	1630	1620	1390	1270	1530	1500	---	---	---
15	1520	1540	1550	1630	1620	1290	1300	1530	1500	---	---	---
16	1520	1540	1550	1630	1620	1180	1300	1530	1480	---	---	---
17	1520	1540	1550	1630	1620	1050	1310	1530	1450	---	---	---
18	1520	1540	1550	1630	1630	1030	1320	1530	1450	---	---	---
19	1520	1540	1560	1630	1630	1030	1330	1530	1450	---	---	---
20	1520	1540	1560	1630	1630	1030	1340	1520	1450	---	---	---
21	1520	1540	1570	1630	1630	1040	1340	1530	1450	---	---	---
22	1520	1540	1570	1630	1630	1040	1350	1530	1450	---	---	---
23	1520	1540	1570	1630	1630	1040	1360	1530	1450	---	---	---
24	1520	1540	1570	1630	1630	1050	1360	1530	1450	---	---	---
25	1530	1540	1570	1630	1620	1050	1370	1530	1450	---	---	---
26	1530	1540	1580	1630	1610	1060	1380	1520	1450	---	---	1520
27	1530	1540	1580	1620	1610	1060	1380	1520	1450	---	---	1520
28	1530	1540	1590	1600	1610	1060	1380	1520	---	---	---	1510
29	1530	1540	1590	1600	---	1070	1390	1520	---	---	---	1500
30	1530	1540	1590	1600	---	1070	1390	1510	---	---	---	1480
31	1530	---	1590	1600	---	1080	---	1500	---	---	---	---
MEAN	1517	1537	1557	1613	1617	1297	1247	1494	---	---	---	---
MAX	1530	1540	1590	1630	1630	1620	1390	1530	---	---	---	---
MIN	1500	1530	1540	1590	1600	1030	1080	1400	---	---	---	---



POPLAR RIVER BASIN

06181000 POPLAR RIVER NEAR POPLAR, MT

LOCATION.--Lat 48°10'15", long 105°10'42" (NAD 27), in NE<sup>1</sup>/<sub>4</sub>NE<sup>1</sup>/<sub>4</sub> sec.19, T.28 N., R.51 E., Roosevelt County, Hydrologic Unit 10060003, on right bank 4 mi north of Poplar, and at river mile 11.

DRAINAGE AREA.---3,174 mi<sup>2</sup>.

PERIOD OF RECORD.--August 1908 to October 1924, August 1947 to September 1969, June 1975 to September 1979, October 1981 to current year. Monthly discharge only for some periods, published in WSP 1309.

WATER-DISCHARGE RECORDS

REVISED RECORDS.--WSP 1176. 1948. WSP 1389: 1911. WSP 1729: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 1,953.16 ft (NGVD 29). Prior to May 1, 1911, nonrecording gage at site 4.2 mi upstream at different elevation. May 1, 1911, to Oct. 4, 1913, nonrecording gage at site 14 mi upstream at different elevation. Oct. 5, 1913, to Oct. 31, 1924, nonrecording gage at site 2.2 mi upstream at different elevation. Aug. 10, 1947, to Sept. 30, 1969, water-stage recorder at present site and elevation.

REMARKS.--Water-discharge records good except those for estimated daily discharges, which are poor. Diversions for irrigation of about 5,500 acres upstream from station. Flow partially regulated by Coronach Dam, on the East Fork Poplar River, 2 mi north of international boundary. U. S. Geological Survey satellite telemeter at station.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of July 10, 1946, reached a stage of 18.1 ft, from floodmark, discharge, 40,000 ft<sup>3</sup>/s, from slope-area measurement of peak flow made at site 20 mi upstream.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	20	e30	e25	e10	e6.0	e9.0	165	79	67	32	5.7	3.1
2	20	e30	e20	e10	e6.0	e9.0	151	78	67	32	5.4	2.9
3	20	e30	e20	e10	e6.0	e9.0	111	77	67	32	5.1	2.9
4	20	e30	e20	e15	e6.0	e8.5	118	78	65	28	7.3	3.0
5	21	e30	e25	e15	e6.0	e8.5	131	82	65	25	7.0	3.0
6	22	e30	e25	e15	e6.0	e8.5	144	97	61	23	6.6	3.1
7	23	e30	e25	e15	e6.0	e8.5	136	115	57	22	7.0	3.1
8	25	e30	e30	e15	e6.0	e8.5	131	119	54	22	6.7	3.1
9	25	e30	e30	e10	e6.0	e9.0	125	122	57	25	6.5	3.0
10	25	e25	e30	e10	e6.0	e9.0	117	144	63	31	6.7	3.0
11	24	e25	e30	e9.5	e6.5	e9.0	111	203	70	25	6.4	3.2
12	24	e25	e30	e9.5	e7.0	e9.5	107	216	85	29	5.7	3.5
13	24	e30	e30	e9.0	e7.5	e10	108	234	73	30	5.7	3.7
14	25	e30	e35	e9.0	e8.0	e15	109	245	68	26	5.2	4.0
15	26	e30	e35	e8.5	e8.5	e100	109	227	64	24	4.7	4.2
16	27	e30	e35	e8.5	e9.0	e300	104	197	59	23	4.3	4.6
17	28	e30	e35	e7.0	e9.0	e1300	105	179	56	22	3.8	4.8
18	28	e35	e30	e7.0	e9.0	e4000	105	165	53	21	3.6	4.9
19	28	e35	e25	e6.0	e9.0	e2800	106	152	49	18	3.5	5.3
20	29	e35	e20	e6.0	e8.5	1680	104	139	47	14	3.4	5.6
21	28	e35	e20	e5.0	e8.0	1070	105	130	49	12	3.3	6.1
22	e25	e30	e15	e5.0	e7.0	798	101	123	46	11	3.5	6.6
23	e20	e30	e15	e6.5	e7.0	620	98	119	44	10	3.2	6.6
24	e25	e20	e15	e6.5	e7.0	474	95	112	43	9.1	3.0	6.4
25	e30	e20	e10	e5.5	e8.0	376	90	103	42	8.9	3.0	6.7
26	e30	e20	e10	e6.0	e9.0	302	89	94	41	8.7	3.0	6.6
27	e30	e20	e10	e6.0	e9.0	268	90	89	41	8.7	3.0	6.7
28	e30	e25	e10	e6.0	e9.0	232	87	83	39	7.7	2.8	6.6
29	e25	e25	e10	e6.0	---	204	85	77	36	6.5	2.9	6.5
30	e30	e25	e10	e6.0	---	186	82	73	34	5.9	3.0	6.4
31	e30	---	e10	e6.0	---	172	---	69	---	5.8	3.1	---
TOTAL	787	850	690	269.5	206.0	15013.0	3319	4020	1662	598.3	144.1	139.2
MEAN	25.4	28.3	22.3	8.69	7.36	484	111	130	55.4	19.3	4.65	4.64
MAX	30	35	35	15	9.0	4000	165	245	85	32	7.3	6.7
MIN	20	20	10	5.0	6.0	8.5	82	69	34	5.8	2.8	2.9
AC-FT	1560	1690	1370	535	409	29780	6580	7970	3300	1190	286	276

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1908 - 2003, BY WATER YEAR (WY)\*

MEAN	28.1	26.7	16.6	8.50	27.0	334	664	123	85.7	77.0	27.2	23.9
MAX	81.5	93.5	50.0	30.0	743	2445	4918	421	336	800	220	206
(WY)	1925	1919	1915	1915	1996	1960	1952	1955	1953	1993	1993	1911
MIN	2.19	4.25	1.28	0.013	0.10	0.18	37.3	17.4	2.77	0.68	0.043	0.15
(WY)	1959	1959	1986	1950	1959	1965	1992	1992	1988	1984	1988	1988

POPLAR RIVER BASIN

06181000 POPLAR RIVER NEAR POPLAR, MT--Continued

SUMMARY STATISTICS	FOR 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1908 - 2003*	
ANNUAL TOTAL	13216.0		27698.1			
ANNUAL MEAN	36.2		75.9		120**	
HIGHEST ANNUAL MEAN					435 1952	
LOWEST ANNUAL MEAN					13.7 1988	
HIGHEST DAILY MEAN	206	Jun 16	4000	Mar 18	34200	Apr 7 1954
LOWEST DAILY MEAN	8.0	Jan 24	2.8	Aug 28	b0.00	Dec 16 1917
ANNUAL SEVEN-DAY MINIMUM	8.0	Jan 24	3.0	Aug 24	0.00	Jan 4 1950
MAXIMUM PEAK FLOW			unknown		37400 Apr 6 1954	
MAXIMUM PEAK STAGE			a13.55 Mar 18		c17.86 Apr 6 1954	
ANNUAL RUNOFF (AC-FT)	26210		54940		86690	
10 PERCENT EXCEEDS	82		122		175	
50 PERCENT EXCEEDS	21		24		23	
90 PERCENT EXCEEDS	8.0		5.0		2.9	

\*--During period of operation ( 1908-24 1947-69, 1975-79, 1982 to current year).  
 \*\*--Median of yearly mean discharge, 82.1 ft<sup>3</sup>/s.  
 a--Backwater from ice.  
 b--No flow at times.  
 c--From floodmark, from slope-area measurement of peak flow.  
 e--Estimated.

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1975-81, 1987-94, May 1999 to current year.

PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: Seasonal records from April 2000 to current year.

INSTRUMENTATION.--Temperature recorder installed Sept. 27, 1999; new probe installed Oct. 23, 2002.

REMARKS.--Seasonal daily water temperature record good. Unpublished records of instantaneous water temperature and specific conductance are available in files of District office.

EXTREMES FOR PERIOD OF DAILY RECORD.--

WATER TEMPERATURE (seasonal records): Maximum, 33.0°C, Aug. 12, 18, 19, 2003; minimum, 0.0°C on many days during winter periods.

EXTREMES FOR CURRENT YEAR.--

WATER TEMPERATURE: During period of seasonal operation, maximum, 33.0°C, Aug. 12, 18, 19; minimum, 0.0°C, Apr.2.

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

Date	Time	Instantaneous discharge, cfs (00061)	Barometric pressure, mm Hg (00025)	Dissolved oxygen, mg/L (00300)	Dissolved oxygen, percent of saturation (00301)	pH, water, unfltrd field, std units (00400)	Specific conductance, wat unfltrd, uS/cm 25 degC (00095)	Temperature, air, deg C (00020)	Temperature, water, deg C (00010)	Hardness, water, unfltrd, mg/L as CaCO3 (00900)	Calcium water, fltrd, mg/L (00915)	
MAR 2003												
21...	1100	1080	717	12.8	101	8.5	308	4.0	3.0	77	15.2	
MAY												
15...	1015	235	714	9.2	100	8.6	1400	18.5	16.0	240	36.8	
JUN												
24...	0937	44	721	8.8	99	8.8	1580	11.5	18.0	230	26.4	
AUG												
25...	1045	3.2	--	--	--	8.6	2570	30.0	22.0	330	30.6	
Date		Magnesium, water, fltrd, mg/L (00925)	Potassium, water, fltrd, mg/L (00935)	Sodium adsorption ratio (00931)	Sodium, water, fltrd, mg/L (00930)	Alkalinity, water flt end lab, mg/L as CaCO3 (29801)	Chloride, water, fltrd, mg/L (00940)	Fluoride, water, fltrd, mg/L (00950)	Silica, water, fltrd, mg/L (00955)	Sulfate, water, fltrd, mg/L (00945)	Residue water, fltrd, sum of constituents, mg/L (70301)	Residue water, fltrd, tons/ acre-ft (70303)
MAR 2003												
21...	9.47	12.4	2	31.7	114	3.07	.12	8.6	34.1	187	.25	
MAY												
15...	36.8	8.10	6	230	483	13.1	.5	11.0	262	888	1.21	
JUN												
24...	40.5	8.49	8	295	501	56.0	.5	4.7	273	1000	1.37	
AUG												
25...	61.3	10.2	11	440	515	354	.5	4.1	320	1530	2.08	

POPLAR RIVER BASIN

06181000 POPLAR RIVER NEAR POPLAR, MT--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003--Continued

Date	Residue water, fltrd, tons/d (70302)	Ammonia + org-N, water, unfltrd mg/L as N (00625)	Ammonia water, fltrd, mg/L as N (00608)	Nitrite + nitrate water, fltrd, mg/L as N (00631)	Nitrite water, fltrd, mg/L as N (00613)	Ortho-phosphate, water, fltrd, mg/L as P (00671)	Phos-phorus, water, unfltrd mg/L (00665)	Arsenic water, fltrd, ug/L (01000)	Arsenic water, unfltrd ug/L (01002)	Barium, water, fltrd, ug/L (01005)	Barium, unfltrd recover -able, ug/L (01007)
MAR 2003 21...	547	2.3	.043	.798	.032	.106	.40	1.9	2	36	92
MAY 15...	564	1.7	<.015	<.022	.005	<.007	.23	2.9	4	80	104
JUN 24...	119	.90	<.015	<.022	<.002	<.007	.06	3.1	3	56	61
AUG 25...	13.2	.63	<.015	<.022	<.002	<.007	.04	2.8	E5	63	72

Date	Cadmium water, fltrd, ug/L (01025)	Cadmium water, unfltrd ug/L (01027)	Chrom-ium, water, fltrd, ug/L (01030)	Chrom-ium, water, unfltrd recover -able, ug/L (01034)	Copper, water, fltrd, ug/L (01040)	Copper, water, unfltrd recover -able, ug/L (01042)	Iron, water, fltrd, ug/L (01046)	Iron, water, unfltrd recover -able, ug/L (01045)	Lead, water, fltrd, ug/L (01049)	Lead, water, unfltrd recover -able, ug/L (01051)	Mangan-ese, water, fltrd, ug/L (01056)
MAR 2003 21...	E.02	.12	<.8	3.7	2.5	8.2	127	4340	.14	3.50	22.1
MAY 15...	<.04	.17	<.8	5.6	4.1	18.3	12	7270	E.04	6.74	1.3
JUN 24...	<.04	.04	<.8	1.0	2.4	4.8	<8	1330	<.08	1.25	2.4
AUG 25...	<.07	<.07	<.8	<.8	2.6	3.4	E4	1340	<.16	.52	10.5

Date	Mangan-ese, water, unfltrd recover -able, ug/L (01055)	Mercury water, unfltrd recover -able, ug/L (71890)	Mercury water, unfltrd recover -able, ug/L (71900)	Nickel, water, fltrd, ug/L (01065)	Nickel, water, unfltrd recover -able, ug/L (01067)	Selen-ium, water, fltrd, ug/L (01145)	Selen-ium, water, unfltrd ug/L (01147)	Zinc, water, fltrd, ug/L (01090)	Zinc, water, unfltrd recover -able, ug/L (01092)	Suspnd. sedi-ment, sieve diametr <.063mm (70331)	Sus-pended sedi-ment concen-tration mg/L (80154)	Sus-pended sedi-ment load, tons/d (80155)
MAR 2003 21...	147	<.02	.02	2.74	8.08	E.3	<.5	2	19	72	214	624
MAY 15...	188	<.02	.03	4.68	16.5	1.0	1.2	3	36	99	460	292
JUN 24...	91	<.02	<.02	2.90	4.99	E.4	E.4	<1	6	99	82	9.7
AUG 25...	75	<.02	<.02	3.09	4.96	<1.0	1.1	E1	E3	96	54	.47

E--Estimated.

## POPLAR RIVER BASIN

06181000 POPLAR RIVER NEAR POPLAR, MT--Continued

## WATER TEMPERATURE, DEGREES CELSIUS, APRIL 2003 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	APRIL			MAY			JUNE			JULY		
1	9.0	5.5	7.5	18.0	12.0	15.0	17.0	15.5	16.5	29.0	21.0	25.0
2	5.5	0.0	2.0	16.5	12.5	14.5	19.5	15.0	17.0	28.5	22.0	25.5
3	1.0	0.0	0.0	19.0	12.5	15.5	21.0	15.5	18.0	26.5	22.0	24.0
4	3.0	0.0	1.0	16.0	12.5	14.5	18.5	16.0	17.0	26.0	19.0	22.5
5	5.5	0.5	3.0	12.5	10.5	11.5	18.0	14.5	16.0	26.5	19.5	23.0
6	4.0	2.0	3.0	11.0	9.5	10.0	17.0	13.5	15.0	24.0	18.5	21.5
7	7.0	3.0	5.0	11.5	8.0	9.5	15.0	13.0	14.0	25.0	17.5	21.5
8	9.5	5.0	7.0	11.0	8.0	9.5	20.0	12.5	16.5	21.5	18.0	19.5
9	13.0	7.0	10.0	10.0	8.5	9.5	19.0	16.5	17.5	24.5	17.5	20.5
10	13.5	9.0	11.0	9.5	8.0	9.0	19.5	15.5	17.5	25.0	19.0	22.0
11	14.5	9.5	12.0	12.0	6.5	9.0	18.5	15.0	16.5	27.0	19.0	23.0
12	16.5	11.0	13.5	15.0	10.0	12.5	21.0	15.0	18.0	28.0	20.5	24.5
13	16.5	13.0	14.5	14.5	13.0	13.5	24.0	17.0	20.5	29.0	22.0	25.5
14	14.5	11.5	13.0	17.0	12.5	14.5	26.0	19.5	22.5	26.5	21.5	24.0
15	14.0	11.0	12.5	19.0	14.5	16.5	25.5	21.0	23.0	28.5	20.0	24.5
16	11.0	8.5	9.5	18.0	14.5	16.0	26.0	20.5	23.0	27.0	21.5	24.0
17	13.0	7.5	10.0	15.0	13.0	14.0	26.5	21.0	23.5	27.0	21.5	24.0
18	11.5	10.0	10.5	14.0	11.0	12.5	26.5	20.5	23.5	30.5	22.5	26.5
19	13.0	8.5	11.0	11.5	9.0	10.5	25.5	19.5	22.5	32.0	23.5	27.5
20	14.5	10.0	12.0	13.5	8.5	11.0	27.5	21.0	24.0	30.0	22.0	26.0
21	16.5	11.0	13.5	15.5	12.0	13.5	23.5	20.0	21.5	28.5	21.5	24.5
22	17.0	12.0	14.0	18.0	13.0	15.5	23.0	18.0	20.5	28.5	20.5	24.5
23	18.0	13.0	15.0	20.5	16.0	18.0	22.5	17.0	20.0	29.5	21.0	25.0
24	15.5	14.0	14.5	22.0	16.0	19.0	20.0	17.0	18.0	29.5	22.5	25.5
25	17.0	13.0	14.5	22.5	17.0	19.5	19.0	15.0	17.0	25.0	21.0	23.5
26	14.5	12.0	13.5	23.5	18.0	20.5	20.5	14.5	17.5	28.0	19.0	23.0
27	14.0	9.5	12.0	23.5	19.5	21.5	22.0	16.5	19.0	29.5	21.5	25.0
28	15.0	9.5	12.0	24.0	18.5	21.0	22.5	17.0	19.5	31.0	21.5	26.0
29	15.5	11.0	13.0	24.0	19.5	21.5	25.5	17.0	21.0	27.0	21.0	23.5
30	17.0	11.0	14.0	21.5	17.0	19.0	26.5	19.0	23.0	28.5	18.5	23.5
31	---	---	---	19.5	16.0	17.5	---	---	---	29.0	20.0	24.0
MONTH	18.0	0.0	10.0	24.0	6.5	14.5	27.5	12.5	19.5	32.0	17.5	24.0
	AUGUST			SEPTEMBER								
1	30.0	19.0	24.0	31.0	15.5	22.5						
2	29.0	19.0	24.0	24.5	14.5	19.0						
3	25.0	19.5	22.5	27.5	11.5	19.5						
4	27.5	19.5	23.0	31.5	14.0	22.0						
5	29.5	20.5	24.5	30.5	15.5	22.0						
6	26.5	21.0	23.5	31.0	16.5	22.5						
7	30.5	20.0	25.0	32.0	15.5	23.0						
8	31.0	22.0	26.0	28.0	17.5	22.0						
9	27.5	22.0	24.0	24.0	15.0	19.5						
10	28.0	20.0	24.0	16.0	12.5	14.0						
11	31.5	21.0	25.5	24.0	11.0	17.0						
12	33.0	21.5	27.5	17.0	11.5	13.5						
13	32.5	23.0	27.5	16.5	9.0	12.0						
14	32.5	22.5	27.5	23.0	7.0	15.0						
15	32.0	22.0	26.0	18.0	9.5	13.0						
16	31.5	21.0	25.5	17.0	8.5	11.5						
17	30.5	20.5	25.5	9.5	6.0	7.5						
18	33.0	19.0	25.5	15.5	5.0	10.0						
19	33.0	19.0	26.5	18.5	6.5	12.5						
20	27.5	18.5	23.0	15.5	9.0	12.5						
21	28.5	15.5	22.5	11.0	8.0	9.0						
22	29.5	19.0	24.0	15.5	5.0	10.5						
23	30.5	19.5	24.5	15.0	7.5	10.5						
24	32.0	16.0	24.0	14.0	5.5	9.5						
25	31.5	17.5	24.5	16.0	7.5	11.5						
26	29.5	15.5	22.5	14.0	9.0	11.5						
27	29.5	16.5	21.5	15.0	8.0	11.0						
28	25.5	14.5	18.5	14.5	7.0	10.5						
29	25.5	12.5	18.5	12.5	6.5	9.5						
30	27.0	13.0	20.0	13.5	3.0	8.5						
31	27.5	13.5	21.0	---	---	---						
MONTH	33.0	12.5	24.0	32.0	3.0	14.5						

BIG MUDDY CREEK BASIN

06183450 BIG MUDDY CREEK NEAR ANTELOPE, MT

LOCATION.--Lat 48°40'22", long 104°30'42" (NAD 27), in SW<sup>1</sup>/<sub>4</sub>SW<sup>1</sup>/<sub>4</sub>NW<sup>1</sup>/<sub>4</sub> sec. 27, T.34 N., R.55 E., Sheridan County, Hydrologic Unit 10060006, on right bank, 3 mi southwest of Antelope, and 7 mi south of Plentywood, MT.

DRAINAGE AREA.--967 mi<sup>2</sup>. Prior to 1981, drainage area published as 1,171 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1978 to current year.

REVISED RECORDS.--WDR MT-81-1: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 2,000 ft (NGVD 29).

REMARKS.--Records good except those for estimated daily discharges, which are poor. Several known diversions for irrigation upstream from station. U.S. Geological Survey satellite telemeter at station. Several observations of instantaneous water temperature and specific conductance were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.5	5.2	e5.5	e3.5	e2.0	e1.0	86	23	8.1	6.3	2.3	0.51
2	1.4	5.3	e5.0	e3.5	e1.5	e1.0	55	18	8.0	6.4	2.2	0.44
3	1.4	5.3	e4.0	e3.5	e1.5	e1.0	33	20	8.3	6.1	2.1	0.33
4	1.3	5.3	e3.0	e3.5	e1.5	e1.0	39	24	8.3	5.7	2.5	0.31
5	1.4	5.1	e3.5	e3.5	e1.5	e1.0	36	23	9.0	5.2	2.5	0.30
6	2.4	5.2	e3.5	e3.5	e1.5	e1.0	34	32	8.3	4.8	2.3	0.31
7	4.4	5.5	e3.5	e3.5	e1.5	e1.0	40	48	8.6	4.5	2.4	0.32
8	4.6	e5.5	e3.5	e3.5	e1.5	e1.0	57	56	7.9	4.3	2.4	0.31
9	4.4	e5.0	e4.0	e3.0	e1.5	e1.0	47	68	14	6.8	2.3	0.35
10	5.3	e5.0	e4.0	e2.5	e1.5	e1.0	44	103	14	5.8	2.1	0.40
11	5.8	e5.5	e4.0	e2.5	e1.5	e1.0	50	102	14	7.9	1.8	0.47
12	6.0	e5.5	e4.0	e2.5	e2.0	e1.5	58	104	14	8.4	1.6	0.46
13	6.1	e5.5	e4.0	e2.0	e2.0	e5.0	77	110	15	8.8	1.6	0.45
14	6.7	e5.5	e4.0	e2.0	e1.5	e2.0	74	100	13	7.0	1.5	0.40
15	6.9	e5.5	e4.0	e2.5	e1.5	e5.0	64	85	15	5.7	1.4	0.40
16	6.5	e5.5	e4.0	e2.5	e2.0	e400	54	74	16	6.0	1.3	0.32
17	7.2	e5.5	e3.5	e2.5	e2.0	e1500	47	63	21	6.5	1.1	0.32
18	7.2	e5.5	e3.5	e2.5	e2.0	e2300	41	55	15	5.9	0.92	0.26
19	7.6	e5.5	e3.5	e2.5	e2.0	e2000	37	47	10	5.8	0.85	0.27
20	7.2	e5.5	e3.0	e2.0	e1.5	e1300	33	41	8.4	5.0	0.82	0.51
21	7.0	e5.5	e3.0	e1.5	e1.0	832	30	36	8.6	4.4	0.72	0.66
22	e6.0	e5.5	e3.0	e1.5	e1.0	479	23	32	7.1	3.8	0.68	0.61
23	e5.0	e5.0	e3.0	e1.5	e1.0	337	22	27	6.7	3.3	0.61	0.61
24	e5.5	e5.0	e3.5	e1.5	e1.0	263	18	23	6.6	3.3	0.51	0.55
25	e5.5	e5.0	e3.5	e1.5	e1.5	200	14	19	6.1	3.6	0.49	0.61
26	e5.5	e5.0	e3.5	e1.5	e1.5	136	13	17	5.7	3.2	0.46	0.77
27	e5.5	e5.5	e3.5	e2.0	e1.5	99	23	17	6.0	3.1	0.44	0.87
28	e5.5	e5.5	e3.5	e1.5	e1.5	78	24	14	6.6	3.1	0.43	1.00
29	e5.5	e5.0	e3.5	e2.0	---	64	21	11	7.4	2.9	0.36	0.96
30	e5.5	e5.0	e3.0	e2.0	---	53	20	9.8	6.9	2.7	0.42	0.92
31	5.3	---	e3.0	e2.0	---	49	---	8.3	---	2.5	0.46	---
TOTAL	157.1	159.4	113.0	75.5	43.5	10177.5	1214	1410.1	303.6	158.8	41.57	15.00
MEAN	5.07	5.31	3.65	2.44	1.55	328	40.5	45.5	10.1	5.12	1.34	0.50
MAX	7.6	5.5	5.5	3.5	2.0	2300	86	110	21	8.8	2.5	1.0
MIN	1.3	5.0	3.0	1.5	1.0	1.0	13	8.3	5.7	2.5	0.36	0.26
AC-FT	312	316	224	150	86	20190	2410	2800	602	315	82	30

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1979 - 2003, BY WATER YEAR (WY)

	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
MEAN	5.33	5.88	3.56	1.86	24.1	141	113	25.9	15.8	25.2	8.77	4.32													
MAX	25.0	11.8	6.86	6.38	290	851	826	120	62.0	226	92.5	35.7													
(WY)	1987	1999	1982	1983	1996	1999	1982	1979	1979	1993	1987	1997													
MIN	0.14	0.88	0.45	0.000	0.000	2.65	5.04	5.29	0.23	0.031	0.000	0.000													
(WY)	1989	1989	1986	1989	1989	2002	1988	1992	1988	1985	1984	1984													

SUMMARY STATISTICS FOR 2002 CALENDAR YEAR FOR 2003 WATER YEAR WATER YEARS 1979 - 2003

ANNUAL TOTAL	3766.7	13869.07	
ANNUAL MEAN	10.3	38.0	31.2*
HIGHEST ANNUAL MEAN			93.2
LOWEST ANNUAL MEAN			4.73
HIGHEST DAILY MEAN	356	Apr 15	2300
LOWEST DAILY MEAN	1.0	Jan 1	0.26
ANNUAL SEVEN-DAY MINIMUM	1.1	Jan 1	0.32
MAXIMUM PEAK FLOW			unknown
MAXIMUM PEAK STAGE			a16.89
INSTANTANEOUS LOW FLOW			17.37
ANNUAL RUNOFF (AC-FT)	7470	27510	22630
10 PERCENT EXCEEDS	23	49	38
50 PERCENT EXCEEDS	4.0	4.6	4.6
90 PERCENT EXCEEDS	1.4	0.75	0.20

\*--Median of yearly mean discharge, 25.1 ft<sup>3</sup>/s.  
a--Backwater from ice.  
b--No flow many days most years.  
e--Estimated.

BIG MUDDY CREEK BASIN

06183700 BIG MUDDY CREEK DIVERSION CANAL NEAR MEDICINE LAKE, MT

LOCATION.--Lat 48°30'34", long 104°32'55" (NAD 27), in SE<sup>1</sup>/<sub>4</sub>NW<sup>1</sup>/<sub>4</sub>SE<sup>1</sup>/<sub>4</sub> sec. 22, T.32 N., R.55 E., Sheridan County, Hydrologic Unit 10060006, on right bank, on dike road about 2 ft upstream from canal headgate and 2.2 miles northwest of Medicine Lake.

PERIOD OF RECORD.--August 1985 to September 1991, October 1991 to current season (seasonal records).

GAGE.--Water-stage recorder. Elevation of gage is 1,940 ft (NGVD 29).

REMARKS.--Records fair except those for estimated daily discharges, which are poor. Canal diverts water into Medicine Lake at the Medicine Lake National Wildlife Refuge. Several observations of water temperature and specific conductance were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 2003  
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			e0.00	26	6.5	8.3	e1.0	0.00	0.00	0.00		
2			e0.00	39	7.1	8.2	e2.0	0.00	0.00	0.00		
3			e0.00	21	7.2	e10	2.4	0.00	0.00	0.00		
4			e0.00	11	7.1	e6.0	2.1	0.00	0.00	0.00		
5			e0.00	12	9.2	e6.0	1.8	0.00	0.00	0.00		
6			e0.00	11	13	e6.0	1.1	0.00	0.00	0.00		
7			e0.00	12	25	e6.0	0.79	0.00	0.00	0.00		
8			e0.00	16	30	e6.0	0.07	0.00	0.00	0.00		
9			e0.00	27	35	e7.0	0.37	0.00	0.00	0.00		
10			e0.00	22	42	e10	0.14	0.00	0.00	0.00		
11			e0.00	13	61	e10	0.00	0.00	0.00	0.00		
12			e0.00	14	64	e10	0.12	0.00	0.00	0.00		
13			e0.50	22	66	e10	0.28	0.00	0.00	0.00		
14			e1.0	37	68	e10	0.78	0.00	0.00	0.00		
15			e20	36	63	e10	1.1	0.00	0.00	0.00		
16		e130		31	57	e9.0	0.92	0.00	0.00	0.00		
17		e700		27	51	e8.0	0.50	0.00	0.00	0.00		
18		824		21	46	e8.0	0.00	0.00	0.00	0.00		
19		784		16	39	e6.0	0.00	0.00	0.00	0.00		
20		842		12	34	e5.0	0.00	0.00	0.00	0.00		
21		815		10	29	e5.0	0.00	0.00	0.00	0.00		
22		627		7.8	28	e5.0	0.00	0.00	0.00	0.00		
23		335		5.9	28	e4.0	0.00	0.00	0.00	0.00		
24		193		5.7	19	e4.0	0.00	0.00	0.00	0.00		
25		132		5.6	15	e4.0	0.00	0.00	0.00	0.00		
26		101		5.2	12	e4.0	0.00	0.00	0.00	0.00		
27		70		5.4	11	e4.0	0.00	0.00	0.00	0.00		
28		54		6.3	10	e4.0	0.00	0.00	0.00	e10		
29		42		7.6	9.2	e4.0	0.00	0.00	0.00	e7.0		
30		36		7.5	9.4	e0.50	0.00	0.00	0.00	e5.0		
31		27		--	9.5	--	0.00	0.00	--	e3.0		
TOTAL		5733.50		493.0	911.2	198.00	15.47	0.00	0.00	25.00		
MEAN		185		16.4	29.4	6.60	0.50	0.000	0.000	0.81		
MAX		842		39	68	10	2.4	0.00	0.00	10		
MIN		0.000		5.2	6.5	0.50	0.00	0.00	0.00	0.00		
AC-FT		11370		978	1810	393	31	0.00	0.00	50		

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1985 - 1991 AND SEASONS 1992 - 2003\*

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
MEAN	0.28	5.11	100	50.7	15.0	9.04	23.8	6.06	3.72	2.89	1.66	0.580
MAX	1.10	23.4	434	260	46.5	28.5	144	31.3	37.3	7.97	4.97	2.80
(WY)	1990	1986	1999	1997	1999	1994	1993	1987	1997	1999	1990	1990
MIN	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
(WY)	1988	1988	2002	1988	1987	1987	1987	1988	1987	1988	1988	1988

SUMMARY STATISTICS	FOR 2003 SEASON	WATER YEARS 1985 - 1991*	SEASONS 1992 - 2003*
ANNUAL MEAN		14.5	
HIGHEST ANNUAL MEAN		31.6	1989
LOWEST ANNUAL MEAN		0.17	1988
HIGHEST DAILY MEAN	842	1300	Mar 2 1986
LOWEST DAILY MEAN	0.00	b0.00	Feb 11 1986
ANNUAL SEVEN-DAY MINIMUM		0.00	Feb 11 1986
MAXIMUM PEAK FLOW	1070	1300	Mar 2 1986
MAXIMUM PEAK STAGE	a12.18		c1360 Mar 23 1999
ANNUAL RUNOFF (AC-FT)		10540	d12.18 Jul 24 1993
10 PERCENT EXCEEDS		29	
50 PERCENT EXCEEDS		2.6	
90 PERCENT		0.00	

\*--During periods of operation 1985 - 1991, 1992 to current year. Seasonal records beginning water year 1992.  
a--Backwater from ice and trash.  
b--No flow at times most years.  
c--Gage height, 10.99 ft.  
d--Site and datum then in use.  
e--Estimated.

BIG MUDDY CREEK BASIN

06183750 LAKE CREEK NEAR DAGMAR, MT

LOCATION.--Lat 48°33'51", long 104°10'38" (NAD 27), in SE<sup>1</sup>/<sub>4</sub>SE<sup>1</sup>/<sub>4</sub>SW<sup>1</sup>/<sub>4</sub> sec. 31, T.33 N., R.58 E., Sheridan County, Hydrologic Unit 10060006, on left bank, at downstream end of dike, just north of Medicine Lake National Wildlife Refuge and 1.7 mi southeast of Dagmar.

DRAINAGE AREA.--101 mi<sup>2</sup>.

PERIOD OF RECORD.--September 1985 to October 1989, March 1995 to current year (seasonal records only since 1986).

GAGE.--Water-stage recorder. Elevation of gage is 1,979 ft (NGVD 29).

REMARKS.--Records poor. Numerous diversions upstream for irrigation. Several observations of water temperature and specific conductance were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 2003  
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			e0.00	64	0.45	0.00	0.45	0.00	0.00	0.00		
2			e0.00	e60	0.47	0.00	0.37	0.00	0.00	0.00		
3			e0.00	e50	0.41	0.00	0.24	0.00	0.00	0.00		
4			e0.00	e45	0.30	0.00	0.13	0.00	0.00	0.00		
5			e0.00	e40	0.33	0.00	0.04	0.00	0.00	0.00		
6			e0.00	39	1.4	0.00	0.00	0.00	0.00	0.00		
7			e0.00	39	4.5	0.00	0.00	0.00	0.00	0.00		
8			e0.00	37	3.9	0.07	0.16	0.00	0.00	0.00		
9			e0.00	34	3.2	0.17	0.36	0.00	0.00	0.00		
10			e0.00	31	3.2	0.25	0.28	0.00	0.00	0.00		
11			e0.00	28	3.7	0.33	0.18	0.00	0.00	0.00		
12			e0.00	25	3.3	0.44	0.06	0.00	0.00	0.00		
13			e0.00	22	3.5	0.43	0.00	0.00	0.00	0.00		
14			e0.00	19	4.5	0.36	0.00	0.00	0.00	0.00		
15			e0.00	14	4.0	0.33	0.00	0.00	0.00	0.00		
16			e0.00	12	3.0	0.28	0.00	0.00	0.00	0.00		
17			e0.00	13	1.6	0.22	0.19	0.00	0.00	0.00		
18			e0.00	12	0.53	0.19	0.12	0.00	0.00	0.00		
19			e10	11	0.45	0.18	0.00	0.00	0.00	0.00		
20			e950	9.4	0.46	0.11	0.00	0.00	0.00	0.00		
21			533	7.9	0.41	0.07	0.00	0.00	0.00	0.00		
22			256	6.6	0.38	0.05	0.00	0.00	0.00	0.00		
23			178	5.0	0.34	0.00	0.00	0.00	0.00	0.00		
24			143	3.8	0.29	0.00	0.00	0.00	0.00	0.00		
25			114	2.8	0.25	0.00	0.00	0.00	0.00	0.00		
26			89	1.7	0.23	0.00	0.00	0.00	0.00	0.00		
27			75	1.8	0.19	0.00	0.00	0.00	0.00	0.00		
28			64	0.71	0.13	0.00	0.00	0.00	0.00	0.00		
29			58	0.51	0.10	0.00	0.00	0.00	0.00	e0.00		
30			54	0.48	0.00	0.31	0.00	0.00	0.00	e0.00		
31			62	---	0.00	---	0.00	0.00	---	e0.00		
TOTAL			2586.00	635.70	45.52	3.79	2.58	0.00	0.00	0.00		
MEAN			83.4	21.2	1.47	0.13	0.083	0.000	0.000	0.000		
MAX			950	64	4.5	0.44	0.45	0.00	0.00	0.00		
MIN			0.00	0.48	0.00	0.00	0.00	0.00	0.00	0.00		
AC-FT			5130	1260	90	7.5	5.1	0.00	0.00	0.00		

STATISTICS OF MONTHLY MEAN DATA FOR SEASONS 1986 - 2003\*

MEAN	12.3	10.7	0.93	0.32	0.35	0.039	0.000	0.000
MAX	83.4	45.1	3.35	2.81	1.40	0.26	0.000	0.000
(WY)	2003	1997	1986	2000	1999	1999	1986	1986
MIN	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
(WY)	1988	1988	1998	1997	1986	1986	1986	1986

SUMMARY STATISTICS

FOR 2003 SEASON

SEASONS 1986 - 2003\*

HIGHEST DAILY MEAN	950	Mar 20	950	Mar 20 2003
LOWEST DAILY MEAN	a0.00	Mar 1	a0.00	Oct 1 1985
MAXIMUM PEAK FLOW	950	Mar 20	950	Mar 20 2003
MAXIMUM PEAK STAGE	b10.05	Mar 20	b10.05	Mar 20 2003

\*--During periods of operation (September 1985 to October 1989, March 1995 to current year).

a--No flow many days most years.

b--Backwater from ice.

e--Estimated.

BIG MUDDY CREEK BASIN

06183800 COTTONWOOD CREEK NEAR DAGMAR, MT

LOCATION.--Lat 48°30'35", long 104°10'23" (NAD 27), in SE<sup>1</sup>/<sub>4</sub>NE<sup>1</sup>/<sub>4</sub>SE<sup>1</sup>/<sub>4</sub> sec. 21, T.32 N., R.58 E., Sheridan County, Hydrologic Unit 10060006, on right bank, at bridge on county road 1.2 mi southeast of Medicine Lake National Wildlife Refuge, and 5.3 mi south of Dagmar.

DRAINAGE AREA.--126 mi<sup>2</sup>.

PERIOD OF RECORD.--August 1985 to September 1989, March 1995 to current year. Seasonal records only.

GAGE.--Water-stage recorder. Elevation of gage is 1,975 ft (NGVD 29).

REMARKS.--Records fair except those for estimated daily discharges, which are poor. Several observations of water temperature and specific conductance were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 2003  
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			e0.00	1.2	1.4	0.53	0.17	0.02	0.00	0.00		
2			e0.00	1.3	1.3	0.51	0.17	0.02	0.00	0.00		
3			e0.00	1.3	1.2	0.54	0.17	0.00	0.00	0.00		
4			e0.00	1.4	1.2	0.57	0.16	0.04	0.00	0.00		
5			e0.00	1.3	1.4	0.67	0.14	0.06	0.00	0.00		
6			e0.00	1.8	2.3	0.62	0.12	0.05	0.00	0.00		
7			e0.00	5.1	9.9	0.97	0.11	0.05	0.00	0.00		
8			e0.00	5.9	9.1	1.8	0.13	0.04	0.00	0.00		
9			e0.00	4.6	9.1	1.8	0.21	0.14	0.00	0.00		
10			e0.00	4.0	13	3.3	0.21	0.14	0.00	0.00		
11			e0.00	4.3	11	3.6	0.17	0.13	0.00	0.00		
12			e0.00	4.6	8.4	12	0.16	0.10	0.00	0.00		
13			e0.00	4.2	7.8	9.7	0.20	0.11	0.00	0.00		
14			e1.0	3.2	8.3	3.6	0.20	0.10	0.00	0.00		
15			e10	2.6	7.7	1.4	0.18	0.08	0.00	0.00		
16			e100	2.9	5.7	0.81	0.18	0.04	0.00	0.00		
17			1390	6.1	4.4	0.54	0.17	0.02	0.00	0.00		
18			1810	8.3	3.6	0.43	0.15	0.00	0.00	0.00		
19			588	7.3	3.2	0.37	0.14	0.00	0.00	0.00		
20			175	6.2	2.5	0.32	0.14	0.00	0.00	0.00		
21			104	5.0	1.9	0.31	0.14	0.00	0.00	0.00		
22			62	4.1	1.6	0.28	0.12	0.00	0.00	0.00		
23			39	3.2	1.3	0.26	0.10	0.00	0.00	0.00		
24			26	2.8	1.1	0.26	0.08	0.00	0.00	0.00		
25			15	2.4	1.1	0.25	0.09	0.00	0.00	0.00		
26			10	2.1	0.94	0.24	0.08	0.00	0.00	0.00		
27			6.2	2.0	0.82	0.25	0.07	0.00	0.00	0.00		
28			3.5	1.8	0.72	0.23	0.07	0.00	0.00	0.00		
29			2.1	1.8	0.62	0.22	0.05	0.00	0.00	e0.00		
30			1.5	1.5	0.52	0.21	0.03	0.00	0.00	e0.00		
31			1.2	---	0.52	---	0.02	0.00	---	e0.00		
TOTAL			4344.50	104.3	123.64	46.59	4.13	1.14	0.00	0.00		
MEAN			140	3.48	3.99	1.55	0.13	0.037	0.000	0.000		
MAX			1810	8.3	13	12	0.21	0.14	0.00	0.00		
MIN			0.00	1.2	0.52	0.21	0.02	0.00	0.00	0.00		
AC-FT			8620	207	245	92	8.2	2.3	0.00	0.00		

STATISTICS OF MONTHLY MEAN DATA FOR SEASONS 1986 - 2003\*

MEAN	35.4	9.02	1.54	1.64	5.64	0.14	0.038	0.009
MAX	140	32.6	6.95	13.7	27.4	0.71	0.33	0.096
(WY)	2003	1987	1999	2000	1997	1999	1997	2001
MIN	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
(WY)	1988	1988	1988	1987	1986	1986	1986	1986

SUMMARY STATISTICS

FOR 2003 WATER YEAR

SEASONS 1986 - 2003

HIGHEST DAILY MEAN	1810	Mar 18	1810	Mar 18 2003
LOWEST DAILY MEAN	a0.00	Mar 1	a0.00	Oct 1 1985
MAXIMUM PEAK FLOW	b3380	Mar 18	b3380	Mar 18 2003
MAXIMUM PEAK STAGE	8.43	Mar 18	8.76	Mar 22 1997

\*--During periods of operation (1885-1889, 1995 to current year; seasonal records only).

a--No flow most year.

b--Gage height, 8.43 ft, from floodmark.

e--Estimated.



BIG MUDDY CREEK BASIN

06183850 SAND CREEK NEAR DAGMAR, MT

LOCATION.--Lat 48°29'38", long 104°16'23" (NAD 27), in SE<sup>1</sup>/<sub>4</sub>NW<sup>1</sup>/<sub>4</sub>NW<sup>1</sup>/<sub>4</sub> sec. 26, T.32 N., R.57 E., Sheridan County, Hydrologic Unit 10060006, at Medicine Lake National Wildlife Refuge boundary, on right bank at downstream end of culvert on county road, 1.0 mi upstream from mouth, and 7 mi southwest of Dagmar.

DRAINAGE AREA.--122 mi<sup>2</sup>.

PERIOD OF RECORD.--August 1985 to September 1989, March 1995 to current year (seasonal records).

GAGE.--Water-stage recorder. Elevation of gage is 1,945 ft (NGVD 29).

REMARKS.--Records good except those for estimated daily discharges, which are poor. No known diversions for irrigation upstream from station. Several observations of water temperature and specific conductance were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 2003  
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			e0.00	e2.0	2.1	1.1	0.43	e0.05	e0.00	0.00		
2			e0.00	e2.0	2.1	1.1	0.73	e0.05	e0.00	0.00		
3			e0.00	e2.0	2.0	0.93	0.86	e0.05	e0.00	0.00		
4			e0.00	e2.0	2.1	0.79	0.83	e0.05	e0.00	0.00		
5			e0.00	e3.0	2.9	1.3	0.44	e0.10	e0.00	0.00		
6			e0.00	e4.0	5.1	1.8	0.07	e0.10	e0.00	0.00		
7			e0.00	e6.0	9.9	4.2	0.01	e0.10	e0.00	0.00		
8			e0.00	e7.0	17	5.0	0.01	e0.10	e0.00	0.00		
9			e0.00	e6.0	14	7.8	1.3	e0.15	e0.00	0.00		
10			e0.00	e5.0	13	10	2.3	e0.15	0.00	0.00		
11			e0.00	e5.0	12	14	1.5	e0.15	0.00	0.00		
12			e0.00	e5.0	10	35	1.3	e0.15	0.00	e0.00		
13			e0.00	e5.0	9.2	41	1.1	e0.15	0.00	e0.00		
14			e0.00	e5.0	8.6	26	0.95	e0.15	0.00	e0.00		
15			e0.00	e4.0	9.2	16	0.51	e0.10	0.00	e0.00		
16			e1.0	e6.0	8.1	11	0.31	e0.10	0.00	e0.00		
17			e15	e8.0	7.4	8.2	e0.20	e0.05	0.00	e0.00		
18			e200	e10	7.3	6.6	e0.20	e0.05	0.00	e0.00		
19			e100	e10	6.2	5.3	e0.20	e0.00	0.00	e0.00		
20			e80	e10	5.1	4.4	e0.20	e0.00	0.00	e0.00		
21			e65	e9.0	4.3	4.1	e0.20	e0.00	0.00	e0.00		
22			e50	e8.0	3.5	3.8	e0.20	e0.00	0.00	e0.00		
23			e40	e7.0	3.4	2.6	e0.15	e0.00	0.00	e0.00		
24			e30	5.9	2.9	2.1	e0.15	e0.00	0.00	e0.00		
25			e25	4.6	2.4	1.8	e0.15	e0.00	0.00	e0.00		
26			e20	3.7	2.2	1.8	e0.10	e0.00	0.00	e0.00		
27			e10	3.4	1.8	1.6	e0.10	e0.00	0.00	e0.00		
28			e6.0	2.8	1.4	1.2	e0.10	e0.00	0.00	e0.00		
29			e4.0	3.0	1.3	0.85	e0.10	e0.00	0.00	e0.00		
30			e3.0	2.5	1.1	0.85	e0.05	e0.00	0.00	e0.00		
31			e2.0	---	1.1	---	e0.05	e0.00	---	e0.00		
TOTAL			651.00	156.9	178.7	222.22	14.80	1.80	0.00	0.00		
MEAN			21.0	5.23	5.76	7.41	0.48	0.058	0.000	0.000		
MAX			200	10	17	41	2.3	0.15	0.00	0.00		
MIN			0.00	2.0	1.1	0.79	0.01	0.00	0.00	0.00		
AC-FT			1290	311	354	441	29	3.6	0.00	0.00		

STATISTICS OF MONTHLY MEAN DATA FOR SEASONS 1986 - 2003\*

	1986	1987	1988	1989	2000	2001	2002	2003
MEAN	10.8	6.51	1.84	2.20	3.57	0.33	0.061	0.000
MAX	33.1	16.7	6.80	9.06	21.6	3.34	0.80	0.000
(WY)	1999	1987	1999	2000	1997	1997	1986	
MIN	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
(WY)	1988	1988	1988	1988	1986	1986	1986	1986

SUMMARY STATISTICS

FOR 2003 SEASON

1986 - 2003 SEASONS\*

HIGHEST DAILY MEAN	200	Mar 18	200	Mar 18 2003
LOWEST DAILY MEAN	a0.00	Mar 1	a0.00	Oct 1 1985
MAXIMUM PEAK FLOW	b284	Mar 18	b284	Mar 18 2003
MAXIMUM PEAK STAGE	c5.70	Mar 18	d5.80	Mar 26 1997

\*--During periods of operation (1985-1989, 1995 to current year; seasonal records only).

a--No flow most years.

b--Result of culvert computation of peak flow.

c--From corkline on crest-stage gage.

d--From floodmark, probable date, backwater from ice.

e--Estimated.

## MISSOURI RIVER MAIN STEM

06185500 MISSOURI RIVER NEAR CULBERTSON, MT

(National stream quality accounting network station)

LOCATION.--Lat 48°07'30", long 104°28'20" (NAD 27), in SE 1/4 NW 1/4 sec.3, T.27 N., R.56 E., Richland County, Hydrologic Unit 10060005, on right bank at upstream side of bridge on State Highway 16, 2.5 mi southeast of Culbertson, 10 mi downstream from Big Muddy Creek, and at river mile 1,620.76.

DRAINAGE AREA.--91,557 mi<sup>2</sup>.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--July 1941 to December 1951, April 1958 to current year.

REVISED RECORDS.--WSP 1729: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 1,883.4 ft (NGVD 29) (U.S. Army Corps of Engineers bench mark). July 1 to Nov. 6, 1941, water-stage recorder at site 400 ft upstream at elevation 0.11 ft higher. Nov. 7, 1941, to Aug. 17, 1950, water-stage recorder at site 580 ft downstream at present elevation. Aug. 18, 1950, to Dec. 31, 1951, nonrecording gage on bridge at present elevation. Apr. 1, 1958, to Nov. 1, 1967, water-stage recorder at site 580 ft downstream at present elevation.

REMARKS.--Water-discharge records good except those for estimated daily discharges, which are fair. Flow partly regulated by Fort Peck Lake (station number 06131500) and many other reservoirs upstream from station. Diversions for irrigation of about 1,030,400 acres upstream from station. U.S. Army Corps of Engineers satellite telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	5240	5290	9830	e10300	e10000	e10800	e8600	8630	8900	8270	7460	6850
2	5240	5270	9780	e10400	e10300	e10400	8100	9340	8950	8280	7650	6990
3	5230	5240	9800	e10500	e10100	e9400	7830	9570	9100	8290	7910	6920
4	5290	5290	9780	e10200	e10400	e9500	7800	9470	9100	8390	7650	6720
5	5340	5280	e9700	e10300	e10300	e9500	8840	e9420	8950	8200	6790	6630
6	5240	5300	e10300	e10100	e10600	e8000	9180	9510	9140	7610	6720	6680
7	5230	5250	e10600	e10200	e10400	e9000	8940	10100	9100	7390	6700	6780
8	5280	5280	e10800	e10200	e10500	e7200	8440	10000	9060	7400	6750	6980
9	5290	5380	e10300	e10200	e10300	e7200	8050	9420	9020	7750	6910	7100
10	5210	5370	e10400	e10200	e10500	e6400	7830	9670	9110	7850	6470	7010
11	5100	5380	10200	e9800	e10300	e6100	7560	9970	9220	7960	6770	6830
12	5090	5320	10100	e10100	e10500	e5600	7220	10300	9290	7900	6630	6710
13	5090	5360	9880	e10200	e10200	e5000	7070	10600	9400	7750	6520	6790
14	5100	5370	9860	e10100	e10200	e4400	7060	11700	9430	7820	6690	6770
15	5100	5330	9810	e10200	e10400	e4100	7630	12000	9250	7810	6790	6700
16	5170	5300	9810	e10200	e10100	e4100	7890	11500	9290	7640	6820	6740
17	5250	5320	9760	e10200	e10100	e4600	7990	11100	9210	7770	6610	7180
18	5070	5380	9580	e10000	e10400	e6100	8030	10400	9320	7830	6530	7060
19	5120	5450	9580	e10200	e10400	e9900	7880	11100	9230	7560	6740	6720
20	5170	5410	9560	e10000	e10400	e9300	7820	11900	9170	7570	6780	6660
21	5080	5380	9830	e10200	e10100	e9100	7680	11700	8860	7560	6800	6660
22	5100	5420	e9800	e10100	e10300	e9900	7480	10700	8740	7560	6630	6670
23	5160	5440	e10100	e10300	e10200	e11200	7450	11000	8820	7490	6610	6610
24	5230	5480	e10200	e10200	e10100	e10900	7320	11500	8860	7430	6730	6530
25	5270	5450	e10200	e10100	e10500	e10200	7590	11000	8790	7430	6570	5790
26	5350	5710	e10100	e8900	e10400	e9900	8100	9840	8510	7450	6950	5020
27	5360	5670	e10600	e8700	e10300	e10000	8390	9580	8350	7360	6690	4830
28	5350	6940	e10500	e9800	e10800	e9300	8480	9520	8310	7440	6690	4780
29	5270	8990	e10300	e10200	---	e9800	8560	9290	8280	7460	6910	4740
30	5250	9860	e10300	e10100	---	10200	8550	9660	8190	7540	6800	4730
31	5260	---	e10200	e10300	---	e9400	---	10200	---	7530	6700	---
TOTAL	161530	170910	311560	312500	289100	256500	239360	319690	268950	239290	211970	193180
MEAN	5211	5697	10050	10080	10320	8274	7979	10310	8965	7719	6838	6439
MAX	5360	9860	10800	10500	10800	11200	9180	12000	9430	8390	7910	7180
MIN	5070	5240	9560	8700	10000	4100	7060	8630	8190	7360	6470	4730
AC-FT	320400	339000	618000	619800	573400	508800	474800	634100	533500	474600	420400	383200

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1941 - 2003, BY WATER YEAR (WY)\*

MEAN	10600	9196	9159	9917	10520	10310	10500	9557	9723	10200	11290	11030
MAX	28570	22440	13280	14400	17450	20690	32840	26220	26650	37050	25300	26590
(WY)	1949	1952	1944	1986	1976	1976	1979	1979	1975	1975	1948	1948
MIN	1237	1126	1061	1010	1167	2674	1965	1353	1366	1273	3823	3771
(WY)	1942	1942	1942	1943	1942	1950	1945	1945	1945	1945	1963	1992

SUMMARY STATISTICS	FOR 2002 CALENDAR YEAR	FOR 2003 WATER YEAR	WATER YEARS 1941 - 2003*
ANNUAL TOTAL	2586330	2974540	
ANNUAL MEAN	7086	8149	10170
HIGHEST ANNUAL MEAN			19910
LOWEST ANNUAL MEAN			4083
HIGHEST DAILY MEAN	11800	Aug 26	69200
LOWEST DAILY MEAN	4300	Mar 23	575
ANNUAL SEVEN-DAY MINIMUM	4400	Mar 21	709
MAXIMUM PEAK FLOW		a12000	c78200
MAXIMUM PEAK STAGE		b10.37	b19.66
INSTANTANEOUS LOW FLOW			575
ANNUAL RUNOFF (AC-FT)	5130000	5900000	7366000
10 PERCENT EXCEEDS	9870	10400	15800
50 PERCENT EXCEEDS	5600	8280	9410
90 PERCENT EXCEEDS	4810	5270	4500

MISSOURI RIVER MAIN STEM

06185500 MISSOURI RIVER NEAR CULBERTSON, MT--Continued

(National stream quality accounting network station)

SUMMARY STATISTICS	FOR WATER YEARS 1941-51**		WATER YEARS 1958 - 2003***	
ANNUAL TOTAL				
ANNUAL MEAN	9245		10330	
HIGHEST ANNUAL MEAN	14520	1948	16580	1975
LOWEST ANNUAL MEAN	4083	1942	6121	1963
HIGHEST DAILY MEAN	69200	Mar 27 1943	52000	Apr 18 1979
LOWEST DAILY MEAN	575	Nov 22 1941	2000	Nov 20 1964
ANNUAL SEVEN-DAY MINIMUM	709	Nov 19 1941	2130	Nov 19 1964
MAXIMUM PEAK FLOW	c78200	Mar 26 1943	d55000	Mar 23 1960
MAXIMUM PEAK STAGE	b15.12	Mar 26 1943	b19.66	Apr 14 1979
ANNUAL RUNOFF (AC-FT)	6698000		7482000	
10 PERCENT EXCEEDS	21000		15100	
50 PERCENT EXCEEDS	6910		9600	
90 PERCENT EXCEEDS	1400		5710	

\*--During period of operation (1941-52, 1958 to current year).  
 \*\*--Before operational level at Fort Peck Lake was reached.  
 \*\*\*--After operational level at Fort Peck Lake was reached.  
 a--Gage height, 6.32 ft.  
 b--Backwater from ice.  
 c--Gage height, 14.80 ft, from rating curve extended above 30,000 ft<sup>3</sup>/s.  
 d--Gage height, 19.14 ft.  
 e--Estimated.

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1946, 1965 to 1986, 1991 to 1994, October 1996 to current year.

PERIOD OF DAILY RECORD.--

- SPECIFIC CONDUCTANCE: July 1965 to September 1981.
- WATER TEMPERATURE: July 1965 to September 1979, seasonal records starting July 18, 2002 to current year.
- SUSPENDED-SEDIMENT DISCHARGE: October 1971 to September 1976.

INSTRUMENTATION.--Temperature probe installed July 17, 2002.

REMARKS.--Daily water temperature records good. Unpublished records of instantaneous water temperature and specific conductance are available in files of the District office.

EXTREMES FOR PERIOD OF DAILY RECORD:

- SPECIFIC CONDUCTANCE: Maximum daily, 941 microsiemens per centimeter (µS/cm) at 25°C, Jan. 19, 1980; minimum daily, 338 µS/cm at 25°C, Mar. 30, 1967.
- WATER TEMPERATURE: Maximum 26.0°C, Aug. 14, 2003; minimum, 0.0°C, on many days during winter period.
- SEDIMENT CONCENTRATION: Maximum daily mean, 2,940 mg/L, Aug. 15, 1974; minimum daily mean, 30 mg/L, Jan. 13, 1975.
- SEDIMENT LOAD: Maximum daily, 147,000 tons, June 5, 1975; minimum daily, 421 tons, Jan. 13, 1975.

EXTREMES FOR CURRENT YEAR:

- WATER TEMPERATURE: During period of seasonal operation, maximum 26.0°C, July 19 and Aug. 14; minimum, 1.5°C, Apr. 3-5.

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

Date	Time	Instantaneous discharge, cfs (00061)	Turbidity, wat unfltrd, Hach 2100AN NTU (99872)	UV absorbance, 254 nm, units /cm (50624)	UV absorbance, 280 nm, wat flt units /cm (61726)	Barometric pressure, mm Hg (00025)	Dissolved oxygen, mg/L (00300)	Dissolved oxygen, percent of saturation (00301)	pH, water, unfltrd std units (00400)	Specific conductance, wat unfltrd, uS/cm 25 degC (00095)	Temperature, air, deg C (00020)
OCT 2002											
22...	1130	5100	20	.046	.030	737	11.6	92	8.5	585	-3.5
APR 2003											
07...	1030	9000	88	.126	.091	730	12.8	102	8.4	694	12.0
29...	1100	8600	50	.054	.037	720	10.6	104	8.4	592	18.0
MAY											
19...	1115	11500	170	.076	.053	735	9.8	89	8.3	658	2.0
JUN											
02...	1115	9040	40	.047	.031	718	7.8	83	8.4	580	21.0
23...	1130	8930	48	.049	.032	714	12.6	145	8.5	577	18.5
JUL											
14...	1115	7940	45	.048	.034	720	7.9	98	8.5	582	30.0
AUG											
25...	1230	6540	31	.049	.034	720	10.0	129	8.4	575	32.0

## MISSOURI RIVER MAIN STEM

## 06185500 MISSOURI RIVER NEAR CULBERTSON, MT--Continued

## WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003--Continued

Date	Temperature, water, deg C (00010)	Hardness, water, unfltrd mg/L as CaCO3 (00900)	Calcium, water, fltrd, mg/L (00915)	Magnesium, water, fltrd, mg/L (00925)	Potassium, water, fltrd, mg/L (00935)	Sodium adsorption ratio (00931)	Sodium, water, fltrd, mg/L (00930)	Alkalinity, water, fxd end lab, mg/L as CaCO3 (29801)	Alkalinity, water, fxd end tit field, mg/L as CaCO3 (39086)	Bicarbonate, water, fxd end titr., mg/L (00453)	Carbonate, water, fxd end titr., mg/L (00452)
OCT 2002 22...	4.0	210	51.9	19.6	3.34	1	44.1	E166	161	196	.0
APR 2003 07...	4.0	210	45.9	22.7	5.74	2	74.8	182	166	203	.0
29...	12.0	210	51.2	20.6	4.02	1	46.4	167	154	186	1
MAY 19...	9.5	210	48.9	20.6	4.61	2	57.9	192	150	183	.0
JUN 02...	15.5	210	50.1	19.7	3.95	1	43.5	164	149	173	5
23...	19.0	210	51.2	20.4	3.89	1	43.8	162	134	160	2
JUL 14...	23.0	200	47.8	18.3	3.46	1	40.8	162	135	164	.0
AUG 25...	25.0	210	52.8	19.7	3.79	1	40.8	161	135	150	7

Date	Chloride, water, fltrd, mg/L (00940)	Fluoride, water, fltrd, mg/L (00950)	Silica, water, fltrd, mg/L (00955)	Sulfate, water, fltrd, mg/L (00945)	Residue water, sum of constituents, mg/L (70301)	Residue water, fltrd, tons/acre-ft (70303)	Residue water, fltrd, tons/d (70302)	Residue on evap. at 180degC, wat flt mg/L (70300)	Ammonia + org-N, water, fltrd, mg/L as N (00623)	Ammonia + org-N, water, unfltrd, mg/L as N (00625)	Ammonia water, fltrd, mg/L as N (00608)
OCT 2002 22...	9.37	.84	6.53	127	359	.51	5180	376	.14	.26	<.015
APR 2003 07...	8.68	.65	7.09	162	429	.62	11100	457	.42	.65	.049
29...	8.50	.88	6.77	129	361	.52	8950	386	.17	.35	<.015
MAY 19...	10.5	.9	6.96	177	419	.65	14900	480	.19	.63	<.015
JUN 02...	9.29	.9	7.12	124	349	.50	8990	368	.15	.28	<.015
23...	9.16	.9	6.93	124	342	.50	8790	365	.16	.29	<.015
JUL 14...	9.24	.9	6.40	122	330	.48	7610	355	.17	.41	<.015
AUG 25...	9.57	.9	7.34	121	337	.49	6380	361	.17	.26	<.015

Date	Nitrite + nitrate, water, fltrd, mg/L as N (00631)	Nitrite, water, fltrd, mg/L as N (00613)	Orthophosphate, water, fltrd, mg/L as P (00671)	Phosphorus, water, fltrd, mg/L (00666)	Phosphorus, water, unfltrd, mg/L (00665)	Total carbon, suspnd sedimnt, mg/L (00694)	Inorganic carbon, suspnd sedimnt, mg/L (00688)	Organic carbon, suspnd sedimnt, mg/L (00689)	Organic carbon, water, fltrd, mg/L (00681)	Pheophytin a, phytoplankton, ug/L (62360)	Chlorophyll a, phytoplankton, fluoro, ug/L (70953)
OCT 2002 22...	<.022	<.002	E.005	.009	.083	.9	<.1	.9	2.4	1.0	3.4
APR 2003 07...	.099	.003	.013	.023	.27	2.2	<.1	2.1	5.4	1.8	6.2
29...	<.022	<.002	E.006	.012	.159	1.4	.1	1.3	2.5	.7	3.6
MAY 19...	.023	<.002	.010	.016	.35	3.5	.8	2.7	3.2	1.7	4.2
JUN 02...	<.022	<.002	.009	.011	.186	1.9	.3	1.6	2.3	.4	2.1
23...	<.022	<.002	.008	.012	.131	1.8	<.1	1.8	2.2	.6	4.7
JUL 14...	<.022	<.002	.009	.012	.179	1.3	.4	.9	2.4	.6	E2.3
AUG 25...	<.022	<.002	.008	.011	.113	1.4	.3	1.1	2.5	.5	2.0

E--Estimated.

MISSOURI RIVER MAIN STEM

06185500 MISSOURI RIVER NEAR CULBERTSON, MT--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003--Continued

Date	Arsenic water, fltrd, ug/L (01000)	Arsenic water, unfltrd, ug/L (01002)	Barium, water, fltrd, ug/L (01005)	Barium, water, unfltrd, recover-able, ug/L (01007)	Boron, water, fltrd, ug/L (01020)	Cadmium water, fltrd, ug/L (01025)	Cadmium water, unfltrd, ug/L (01027)	Chrom-ium, water, fltrd, ug/L (01030)	Chrom-ium, water, unfltrd, recover-able, ug/L (01034)	Copper, water, fltrd, ug/L (01040)	Copper, water, unfltrd, recover-able, ug/L (01042)
OCT 2002 22...	2.9	--	--	--	115	--	--	--	--	--	--
APR 2003 07...	2.6	--	--	--	156	--	--	--	--	--	--
29...	2.5	--	--	--	108	--	--	--	--	--	--
MAY 19...	2.3	7	43	106	128	<.04	.14	<.8	3.8	2.0	12.0
JUN 02...	2.6	--	--	--	102	--	--	--	--	--	--
23...	2.7	5	36	85	111	<.04	.07	<.8	3.6	1.9	5.5
JUL 14...	2.8	4	39	74	120	<.04	.07	<.8	1.6	1.5	5.7
AUG 25...	2.5	4	38	67	101	<.04	.04	<.8	1.1	2.3	8.5

Date	Iron, water, fltrd, ug/L (01046)	Iron, water, unfltrd, recover-able, ug/L (01045)	Lead, water, fltrd, ug/L (01049)	Lead, water, unfltrd, recover-able, ug/L (01051)	Lithium water, fltrd, ug/L (01130)	Mangan-ese, water, fltrd, ug/L (01056)	Mangan-ese, water, unfltrd, recover-able, ug/L (01055)	Mercury water, fltrd, ug/L (71890)	Mercury water, unfltrd, recover-able, ug/L (71900)	Nickel, water, fltrd, ug/L (01065)	Nickel, water, unfltrd, recover-able, ug/L (01067)
OCT 2002 22...	<10	--	--	--	58.0	--	--	--	--	--	--
APR 2003 07...	<10	--	--	--	51.5	--	--	--	--	--	--
29...	<10	--	--	--	59.6	--	--	--	--	--	--
MAY 19...	<10	7640	<.08	6.42	62.5	1.4	154	<.02	.02	3.15	12.1
JUN 02...	<8	--	--	--	56.6	--	--	--	--	--	--
23...	<8	3020	E.04	2.43	58.7	.7	65	<.02	E.01	2.43	6.80
JUL 14...	<8	3000	<.08	2.34	50.4	.7	61	<.02	E.01	2.45	5.92
AUG 25...	<8	2290	<.08	1.71	60.2	.7	56	<.02	<.02	2.20	6.12

Date	Selen-ium, water, fltrd, ug/L (01145)	Selen-ium, water, unfltrd, ug/L (01147)	Stront-ium, water, fltrd, ug/L (01080)	Vanad-ium, water, fltrd, ug/L (01085)	Zinc, water, fltrd, ug/L (01090)	Zinc, water, unfltrd, recover-able, ug/L (01092)	2,6-Di-ethyl-aniline water, fltrd, 0.7u GF, ug/L (82660)	CIAT, water, fltrd, ug/L (04040)	Aceto-chlor, water, fltrd, ug/L (49260)	Ala-chlor, water, fltrd, ug/L (46342)	alpha-HCH, water, fltrd, ug/L (34253)
OCT 2002 22...	.8	--	467	2.0	--	--	<.006	<.006	<.006	<.004	<.005
APR 2003 07...	E.4	--	417	1.3	--	--	<.006	<.006	<.006	<.004	<.005
29...	.7	--	480	1.9	--	--	<.006	<.006	<.006	<.004	<.005
MAY 19...	.7	.9	453	.9	1	35	<.006	<.006	<.006	<.004	<.005
JUN 02...	.8	--	482	1.1	--	--	<.006	<.006	<.006	<.004	<.005
23...	.7	.7	469	1.7	1	14	<.006	<.006	<.006	<.004	<.005
JUL 14...	.7	.9	485	2.6	1	13	<.006	<.006	<.006	<.004	<.005
AUG 25...	.6	1.3	485	1.3	1	9	<.006	<.006	<.006	<.004	<.005

E--Estimated.

## MISSOURI RIVER MAIN STEM

## 06185500 MISSOURI RIVER NEAR CULBERTSON, MT--Continued

## WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003--Continued

Date	alpha-HCH-d6, surrog, wat flt 0.7u GF percent recovery (91065)	Atra-zine, water, fltrd, ug/L (39632)	Azin-phos-methyl, water, fltrd 0.7u GF ug/L (82686)	Ben-flur-alin, water, fltrd 0.7u GF ug/L (82673)	Butyl-ate, water, fltrd, ug/L (04028)	Car-baryl, water, fltrd 0.7u GF ug/L (82680)	Carbo-furan, water, fltrd 0.7u GF ug/L (82674)	Chlor-pyrifos, water, fltrd, ug/L (38933)	Cis-per-methrin, water, fltrd 0.7u GF ug/L (82687)	Cyana-zine, water, fltrd, ug/L (04041)	DCPA, water, fltrd 0.7u GF ug/L (82682)
OCT 2002											
22...	93.3	<.007	<.050	<.010	<.002	<.041	<.020	<.005	<.006	<.018	<.003
APR 2003											
07...	85.3	<.007	<.050	<.010	<.002	<.041	<.020	<.005	<.006	<.018	<.003
29...	101	<.007	<.050	<.010	<.002	E.004	<.020	<.005	<.006	<.018	<.003
MAY											
19...	105	E.003	<.050	<.010	<.002	<.041	<.020	<.005	<.006	<.018	<.003
JUN											
02...	94.4	<.007	<.050	<.010	<.002	<.041	<.020	<.005	<.006	<.018	<.003
23...	104	<.007	<.050	<.010	<.002	<.041	<.020	<.005	<.006	<.018	<.003
JUL											
14...	97.3	<.007	<.050	<.010	<.002	<.041	<.020	<.005	<.006	<.018	<.003
AUG											
25...	91.5	<.007	<.050	<.010	<.002	<.041	<.020	<.005	<.006	<.018	<.003
Date	Desulf-inyl fipro-nil, water, fltrd, ug/L (62170)	Diazi-non, water, fltrd, ug/L (39572)	Diazi-non-d10 surrog, wat flt 0.7u GF percent recovery (91063)	Diel-drin, water, fltrd, ug/L (39381)	Disul-foton, water, fltrd 0.7u GF ug/L (82677)	EPTC, water, fltrd 0.7u GF ug/L (82668)	Ethal-flur-alin, water, fltrd 0.7u GF ug/L (82663)	Etho-prop, water, fltrd 0.7u GF ug/L (82672)	Desulf-inyl fipro-nil amide, wat flt ug/L (62169)	Fipro-nil sulfide, water, fltrd, ug/L (62167)	Fipro-nil sulfone, water, fltrd, ug/L (62168)
OCT 2002											
22...	<.004	<.005	103	<.005	<.02	<.002	<.009	<.005	<.009	<.005	<.005
APR 2003											
07...	<.004	<.005	111	<.005	<.02	<.002	<.009	<.005	<.009	<.005	<.005
29...	<.004	<.005	105	<.005	<.02	<.002	<.009	<.005	<.009	<.005	<.005
MAY											
19...	<.004	<.005	119	<.005	<.02	<.007	<.009	<.005	<.009	<.005	<.005
JUN											
02...	<.004	<.005	100	<.005	<.02	<.002	<.009	<.005	<.009	<.005	<.005
23...	<.004	<.005	102	<.005	<.02	<.002	<.009	<.005	<.009	<.005	<.005
JUL											
14...	<.004	<.005	107	<.005	<.02	<.002	<.009	<.005	<.009	<.005	<.005
AUG											
25...	<.004	<.005	90.7	<.005	<.02	<.002	<.009	<.005	<.009	<.005	<.005
Date	Fipro-nil, water, fltrd, ug/L (62166)	Fonofos, water, fltrd, ug/L (04095)	Lindane, water, fltrd, ug/L (39341)	Linuron, water, fltrd 0.7u GF ug/L (82666)	Mala-thion, water, fltrd, ug/L (39532)	Methyl para-thion, water, fltrd 0.7u GF ug/L (82667)	Metola-chlor, water, fltrd, ug/L (39415)	Metri-buzin, water, fltrd, ug/L (82630)	Moli-nate, water, fltrd 0.7u GF ug/L (82671)	Naprop-amide, water, fltrd 0.7u GF ug/L (82684)	p,p'-DDE, water, fltrd, ug/L (34653)
OCT 2002											
22...	<.007	<.003	<.004	<.035	<.027	<.006	<.013	<.006	<.002	<.007	<.003
APR 2003											
07...	<.007	<.003	<.004	<.035	<.027	<.006	<.013	<.006	<.002	<.007	<.003
29...	<.007	<.003	<.004	<.035	<.027	<.006	<.013	<.006	<.002	<.007	<.003
MAY											
19...	<.007	<.003	<.004	<.035	<.027	<.006	<.013	<.006	<.004	<.007	<.003
JUN											
02...	<.007	<.003	<.004	<.035	<.027	<.006	<.013	<.006	<.002	<.007	<.003
23...	<.007	<.003	<.004	<.035	<.027	<.006	<.013	<.006	<.002	<.007	<.003
JUL											
14...	<.007	<.003	<.004	<.035	<.027	<.006	<.013	<.006	<.002	<.007	<.003
AUG											
25...	<.007	<.003	<.004	<.035	<.027	<.006	<.013	<.006	<.002	<.007	<.003

E--Estimated.

MISSOURI RIVER MAIN STEM

06185500 MISSOURI RIVER NEAR CULBERTSON, MT--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003--Continued

Date	Para- thion, water, fltrd, ug/L (39542)	Peb- ulate, water, fltrd 0.7u GF ug/L (82669)	Pendi- meth- alin, water, fltrd 0.7u GF ug/L (82683)	Phorate water fltrd 0.7u GF ug/L (82664)	Prome- ton, water, fltrd, ug/L (04037)	Pron- amide, water, fltrd 0.7u GF ug/L (82676)	Propa- chlor, water, fltrd, ug/L (04024)	Pro- panil, water, fltrd 0.7u GF ug/L (82679)	Propar- gite, water, fltrd 0.7u GF ug/L (82685)	Sima- zine, water, fltrd, ug/L (04035)	Tebu- thiuron water fltrd 0.7u GF ug/L (82670)
OCT 2002 22...	<.010	<.004	<.022	<.011	<.01	<.004	<.010	<.011	<.02	<.005	<.02
APR 2003 07...	<.010	<.004	<.022	<.011	<.01	<.004	<.010	<.011	<.02	<.005	<.02
29...	<.010	<.004	<.022	<.011	E.01	<.004	<.010	<.011	<.18	<.005	<.02
MAY 19...	<.010	<.004	<.022	<.011	<.01	E.004	<.010	<.011	<.02	<.005	<.02
JUN 02...	<.010	<.004	<.022	<.011	<.01	<.004	<.010	<.011	<.02	<.005	<.02
23...	<.010	<.004	<.022	<.011	<.01	<.004	<.010	<.011	<.02	<.005	<.02
JUL 14...	<.010	<.004	<.022	<.011	<.01	<.004	<.010	<.011	<.25	<.005	<.02
AUG 25...	<.010	<.004	<.022	<.011	<.01	<.004	<.010	<.011	<.09	<.005	<.02

Date	Terba- cil, water, fltrd 0.7u GF ug/L (82665)	Terbu- fos, water, fltrd 0.7u GF ug/L (82675)	Thio- bencarb water fltrd 0.7u GF ug/L (82681)	Tri- allate, water, fltrd 0.7u GF ug/L (82678)	Tri- flur- alin, water, fltrd 0.7u GF ug/L (82661)	Suspnd. sedi- ment, sieve diametr percent <.063mm (70331)	Sus- pended sedi- ment concen- tration mg/L (80154)	Sus- pended sedi- ment load, tons/d (80155)
OCT 2002 22...	<.034	<.02	<.005	<.002	<.009	28	156	2150
APR 2003 07...	<.034	<.02	<.005	<.002	<.009	46	366	8890
29...	<.034	<.02	<.005	<.002	<.009	36	299	6940
MAY 19...	<.034	<.02	<.005	.003	<.009	65	477	14800
JUN 02...	<.034	<.02	<.005	<.002	<.009	34	281	6860
23...	<.034	<.02	<.005	<.002	<.009	41	269	6490
JUL 14...	<.034	<.02	<.005	<.002	<.009	48	229	4910
AUG 25...	<.034	<.02	<.005	<.002	<.009	41	176	3110

E--Estimated.

## MISSOURI RIVER MAIN STEM

06185500 MISSOURI RIVER NEAR CULBERTSON, MT--Continued

WATER TEMPERATURE, DEGREES CELSIUS, APRIL 2003 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
1	5.5	5.0	5.5	13.5	12.0	12.5	16.5	15.0	15.5	22.5	20.0	21.0
2	5.0	2.5	4.0	13.0	12.0	12.5	16.0	15.0	15.0	23.0	20.5	22.0
3	2.5	1.5	2.0	13.5	11.5	12.5	17.0	15.0	16.0	22.5	21.5	22.0
4	2.0	1.5	1.5	13.0	12.0	12.5	16.5	15.5	15.5	22.0	20.5	21.5
5	2.5	1.5	2.0	12.0	11.0	11.5	15.5	14.5	15.0	22.0	20.0	21.0
6	3.5	2.0	2.5	11.0	10.0	10.5	15.0	14.5	14.5	21.0	19.5	20.5
7	4.5	3.5	4.0	10.0	9.0	9.5	14.5	13.0	14.0	20.5	19.0	20.0
8	6.0	4.0	5.0	9.5	8.5	8.5	14.5	13.0	13.5	19.5	18.5	19.0
9	8.0	6.0	6.5	9.0	8.5	9.0	15.0	14.0	14.5	20.5	18.5	19.5
10	10.5	7.5	9.0	9.0	7.5	8.0	16.0	14.5	15.0	21.0	19.0	20.0
11	11.5	9.0	10.0	9.5	7.0	8.0	15.5	15.0	15.5	22.0	19.5	20.5
12	13.0	10.5	11.5	11.0	8.5	9.5	17.0	15.0	16.0	23.0	20.5	21.5
13	14.0	12.0	13.0	11.5	10.5	11.0	18.5	15.5	17.0	24.0	21.5	22.5
14	13.5	12.0	12.5	13.0	11.0	12.0	19.5	17.5	18.5	23.5	22.5	23.0
15	12.5	11.0	11.5	14.0	11.5	13.0	20.5	19.0	19.5	24.0	22.0	23.0
16	11.0	9.0	9.5	14.0	13.0	13.5	21.0	19.5	20.0	24.0	22.0	23.0
17	11.0	9.0	10.0	13.5	12.5	13.0	21.0	19.5	20.5	23.5	22.0	23.0
18	11.0	10.0	10.5	12.5	11.0	12.0	20.5	19.0	20.0	24.5	22.0	23.5
19	12.0	10.0	10.5	11.0	9.5	10.0	20.5	18.5	19.5	26.0	23.0	24.5
20	12.5	10.5	11.5	10.5	8.5	9.5	21.5	19.5	20.5	25.5	24.0	24.5
21	13.0	11.0	12.0	11.5	10.0	10.5	21.0	20.0	20.5	24.0	23.0	23.5
22	14.0	12.0	13.0	13.5	11.0	12.0	20.5	19.0	19.5	24.0	22.5	23.0
23	15.0	13.0	14.0	14.5	13.0	14.0	19.5	18.0	19.0	23.5	21.5	22.5
24	15.0	14.0	14.5	16.0	13.5	14.5	18.5	16.0	17.0	24.0	22.0	23.0
25	15.0	13.5	14.5	17.5	15.0	16.0	16.0	15.0	15.5	23.0	21.5	22.5
26	14.0	12.5	13.5	19.0	16.5	17.5	16.5	14.5	15.5	23.0	21.0	22.0
27	12.5	11.5	12.0	19.5	18.5	19.0	17.5	16.0	16.5	22.5	21.0	21.5
28	12.5	11.0	11.5	20.5	18.5	19.5	18.0	16.5	17.0	23.5	21.0	22.0
29	13.0	11.0	12.0	20.5	18.5	19.5	20.0	17.0	18.5	23.0	21.5	22.5
30	13.0	11.5	12.0	19.0	18.0	18.5	21.0	18.5	19.5	23.0	21.0	22.0
31	---	---	---	18.5	16.5	17.0	---	---	---	23.0	21.5	22.0
MONTH	15.0	1.5	9.5	20.5	7.0	13.0	21.5	13.0	17.0	26.0	18.5	22.0
	AUGUST			SEPTEMBER								
1	23.0	21.0	22.0	19.5	17.5	18.5						
2	22.5	21.0	21.5	19.0	17.5	18.0						
3	21.5	20.5	21.0	19.0	17.0	18.0						
4	21.0	20.0	20.5	19.0	17.0	18.0						
5	22.5	20.0	21.0	19.0	17.5	18.5						
6	23.0	21.0	22.0	19.0	17.5	18.0						
7	23.0	21.0	22.0	19.0	17.5	18.0						
8	24.5	21.5	23.0	20.0	18.0	18.5						
9	24.0	23.0	23.5	19.0	17.5	18.5						
10	24.5	22.0	23.5	17.5	16.0	16.5						
11	24.5	22.0	23.0	16.5	15.5	16.0						
12	25.0	22.5	23.5	16.0	14.5	15.5						
13	25.5	23.0	24.0	14.5	13.0	13.5						
14	26.0	24.0	25.0	14.0	12.0	13.0						
15	25.5	24.0	24.5	14.0	12.5	13.5						
16	25.0	23.0	24.0	13.5	12.5	13.0						
17	24.0	22.5	23.0	12.5	11.0	11.5						
18	23.0	21.5	22.0	11.5	10.0	11.0						
19	24.0	21.5	22.5	12.5	10.0	11.5						
20	23.0	21.5	22.5	12.5	11.0	12.0						
21	22.5	20.5	21.5	12.0	11.5	12.0						
22	21.5	20.0	20.5	12.5	10.5	11.5						
23	22.0	20.0	21.0	13.0	11.5	12.0						
24	22.0	20.0	21.0	11.5	10.5	11.0						
25	22.5	20.5	21.5	12.5	10.5	11.5						
26	21.5	20.0	21.0	12.5	11.0	12.0						
27	20.0	19.0	19.5	12.5	11.5	12.0						
28	19.5	18.0	18.5	13.0	11.0	12.0						
29	18.5	17.0	17.5	12.5	11.0	11.5						
30	18.5	16.5	17.5	12.0	10.0	11.0						
31	19.0	16.5	17.5	---	---	---						
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# Conversion Factors

Multiply	By	To obtain
<b>Length</b>		
inch (in.)	$2.54 \times 10^1$	millimeter (mm)
	$2.54 \times 10^{-2}$	meter
foot (ft)	$3.048 \times 10^{-1}$	meter (m)
mile (mi)	$1.609 \times 10^0$	kilometer (km)
<b>Area</b>		
acre	$4.047 \times 10^3$	square meter (m <sup>2</sup> )
	$4.047 \times 10^{-1}$	square hectometer (hm <sup>2</sup> )
	$4.047 \times 10^{-3}$	square kilometer (km <sup>2</sup> )
	$2.590 \times 10^0$	square kilometer (km <sup>2</sup> )
square mile (mi <sup>2</sup> )	$2.590 \times 10^0$	square kilometer (km <sup>2</sup> )
<b>Volume</b>		
gallon (gal)	$3.785 \times 10^0$	liter (L)
	$3.785 \times 10^{-3}$	cubic meter (m <sup>3</sup> )
	$3.785 \times 10^0$	cubic decimeter (dm <sup>3</sup> )
million gallons (Mgal)	$3.785 \times 10^3$	cubic meter (m <sup>3</sup> )
	$3.785 \times 10^{-3}$	cubic hectometer (hm <sup>3</sup> )
cubic foot (ft <sup>3</sup> )	$2.832 \times 10^{-2}$	cubic meter (m <sup>3</sup> )
	$2.832 \times 10^1$	cubic decimeter (dm <sup>3</sup> )
cubic-foot-per-second-per-day [(ft <sup>3</sup> /s/d)]	$2.447 \times 10^3$	cubic meter (m <sup>3</sup> )
	$2.447 \times 10^{-3}$	cubic hectometer (hm <sup>3</sup> )
acre-foot (acre-ft)	$1.223 \times 10^3$	cubic meter (m <sup>3</sup> )
	$1.223 \times 10^{-3}$	cubic hectometer (hm <sup>3</sup> )
	$1.223 \times 10^{-6}$	cubic kilometer (km <sup>3</sup> )
<b>Flow rate</b>		
cubic foot per second (ft <sup>3</sup> /s)	$2.832 \times 10^1$	liter (L/s)
	$2.832 \times 10^{-2}$	cubic meter per second (m <sup>3</sup> /s)
	$2.832 \times 10^1$	cubic decimeter per second (dm <sup>3</sup> /s)
gallon per minute (gal/min)	$6.309 \times 10^{-2}$	liter per second (L/s)
	$6.309 \times 10^{-5}$	cubic meter per second (m <sup>3</sup> /s)
	$6.309 \times 10^{-2}$	cubic decimeter per second (dm <sup>3</sup> /s)
million gallons per day (Mgal/d)	$4.381 \times 10^{-2}$	cubic meter per second
	$4.381 \times 10^1$	cubic decimeter per second (dm <sup>3</sup> /s)
<b>Mass</b>		
ton, short (2,000 lb)	$9.072 \times 10^{-1}$	megagram (Mg) or metric ton
<b>Water Temperature</b>		
degrees Celsius (°C)	°F = (1.8 x °C) + 32	degrees Fahrenheit (°F)